

# A vehicle for change

Upskilling the UK's technicians to service and repair electric vehicles

Amy Norman

**SMF**

**Social Market  
Foundation**

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## ABOUT THE AUTHOR

### **Amy Norman**

Amy joined the SMF research team in April 2020. Her research is largely focused on public policy relating to education and skills, net zero, and local-level economic trends.

Prior to joining, Amy worked at an education charity advising on the delivery of the free schools policy and governance challenges across the academies sector. Amy holds a MSc in International and Social Public Policy from the London School of Economics and Political Science and a BSc Hons in Sociology and Anthropology from Oxford Brookes University.

## EXECUTIVE SUMMARY

As the largest contributor to the UK's total greenhouse gas emissions (GHG), decarbonising the transport sector is critical to achieving the government's net zero target. A key part of shifting to cleaner road transport will require replacing 32 million internal combustion engine vehicles (ICEVs) with low-carbon alternatives – the majority of which will be substituted for battery electric vehicles (BEVs).

The displacement of ICEVs will bring challenges, such as: ensuring that drivers can afford to make the switch to an EV, developing national and local infrastructure that supports the technology, and upskilling the automotive industry to manufacture and maintain EVs. Less political attention is given to the latter of these challenges.

This report explores the extent to which the UK's vehicle technicians are prepared for this upskilling challenge and what policymakers can do to support businesses and workers in vehicle service, maintenance, and repair.

**The findings indicate that there is currently a surplus of well-trained technicians to service and repair EVs for existing and near-future demand.**

The Institute of Motor Industry (IMI) finds that in 2021, 24,507 (11%) technicians were qualified for EV repairs compared to an estimated requirement of 5,107 (2%). This surplus is expected to continue until 2026. This is a welcome finding for the industry and the broader green skills agenda – drivers should be reassured that a lack of trained EV technicians is no barrier to EV uptake today.

**However, this progress should not be taken for granted. Concerted action from government and industry is likely to be required to avert a looming skills crunch towards the backend of the decade.**

The IMI estimates that a skills gap is expected to materialise by 2027, creating a shortfall of 25,100 EV-trained TechSafe technicians by 2030. Our research findings from a technician focus group and industry stakeholder engagement highlights possible barriers to plugging this shortfall.

- **Recruitment challenges:** a historical shortage of vehicle technicians has led to a 30% decline in workers between 2006 and 2021. A declining pipeline of entrants has also contributed to an ageing workforce. This pipeline has likely been impacted by unfavourable cultural perceptions of the trade and wider issues with careers advice and apprenticeship policy.
- **Structural and attitudinal barriers to reskilling:** technicians expressed a reluctant willingness to retrain for EV repairs due to low confidence in the government's policy plans for delivering EV infrastructure and doubts about EV technology. These doubts included the reliability, cost and benefits of an EV; anxiety about the risks high-voltage vehicles; and a preference for mechanical work. Some technicians also raised concerns about learning new skills and knowledge.
- **FE colleges face capital constraints** to strategically plan courses to meet future local demand and invest in training equipment for students.

- **Small independent workshops may require additional support:** while data is limited, it is conceivable that the early movers in EV repair skills are employed by franchise dealers, who are currently more likely to service and maintain EVs than independent workshops. As the market develops, small independents may face barriers to invest in skills and training due to resource and capital constraints.

As these challenges are perceived to be medium-term, policymakers and industry actors have an opportunity to sufficiently plan for, design, and implement solutions.

### **The increasing computerisation of cars and efforts by manufacturers to monopolise the aftermarket space are seen as key concerns within the industry today.**

Although EVs are generally understood to have lower maintenance costs and requirements than combustion engine vehicles (around 50% less), the repairs industry today does not see EVs as a significant challenge to their business.

- **Technicians face a skills gap for advanced vehicle technology:** continuous professional development (CPD) to service increasingly computerised cars is seen as more of an immediate upskilling challenge than EV repairs. However, CPD is infrequent and/or informal in the repairs sector due to a lack of regulatory requirements.
- **Emerging market trends highlight potential issues for competition:** the advancement of vehicle technology enables manufacturers to explore new ways of monopolising who is able to repair their cars. There is a concern that independent workshops may be “locked out of the aftermarket”, which could be anti-competitive and result in less choice for consumers. New models of ownership may also raise questions about competition.

### **EV transition represents a unique opportunity to get more young people into the auto technician sector.**

- Through the EV transition, auto aftermarket jobs will become ‘green jobs’ by definition, with a greater focus on electrical and computer-based skills rather than mechanical skills. These factors are likely to make the auto aftermarket more attractive, especially for young people who have grown up with high levels of digital and environmental awareness.

## **Recommendations**

### **Improve the attractiveness of the industry to get more young people into vehicle repairs**

- Policymakers should work with industry leaders and education providers to launch an attractive green careers campaign to get young people and those from underrepresented backgrounds into EV repairs.
- Key low-carbon industries, including EV repairs, should be central to the government’s consultation on Apprenticeship Levy reform to ensure the development of a pipeline of green apprentices to deliver net zero.

### **Develop a medium-term credible plan to upskill technicians for EVs**

The progress in upskilling vehicle technicians for EVs should not be taken for granted. Challenges may lay ahead towards the end of the decade. Policymakers should use this opportunity of time to set out a credible plan through:

- Better communication of key dates and strategies for phasing out ICEVs, particularly among workers that are essential to the success of those plans.
- Ensured access to affordable, reliable, and convenient charging infrastructure for all drivers to build confidence in policy plans and the EV market more broadly.
- Learning lessons from the Strategic Development Fund pilot to understand and better support colleges in planning for and investing in emerging skills, such as EV repair.

As part of this strategic planning, manufacturers, industry bodies and training providers should develop a clear accredited training route that sufficiently teaches the fundamentals of electricity prior to upskilling for EVs.

### **Introduce a mandatory licence to operate in the repair and maintenance industry**

The auto repairs industry is characterised by light-touch regulation with no mandatory accreditation or licensing requirements for technicians outside of annual MOTs. In contrast, comparative trades such as gas heating engineers are required by law to have, at minimum, a Gas Safe certification that must be renewed every three years to work on gas boilers.

- Given the safety risks of high-voltage vehicles and a desire among technicians to professionalise the trade, policymakers should establish a technician's licensing scheme with an integrated safety certification.

### **Create the conditions for fair competition**

Competition within the auto repairs industry largely relates to the sharing of parts and information between vehicle or equipment manufacturers and the repairs industry. The European Motor Vehicle Block Exemption Regulation (MVER) is meant to protect this but is due to expire in May 2023.

- Following the CMA's final consultation on the MVER, policymakers should introduce a renewed block exemption order that ensures the independent sector has sufficient legal access to materials, information, and connectivity.
- As well as this, policymakers should be mindful of the competition implications of evolving leasing and subscription services that include maintenance packages.

Looking ahead, the existence of a productive independent market matters for competition, but the structure of that market may evolve and should be allowed to so long as it is still delivering good consumer outcomes. This may be of particular relevance if the uptake of EVs over the long-term causes a reduction in the demand for maintenance, and thus technicians.



- Industry bodies, employers and policymakers should think coherently about the future structure of demand and labour in the auto repairs industry, and look to support businesses and workers through any restructure.

## Glossary

The motor vehicle industry uses a range of terminology, often interchangeably, when referring to aspects of the industry and workforce. In this report, we refer to the following:

**Automotive aftermarket** refers to the entire secondary market of the automotive industry relating to vehicle parts, equipment, service repair, collision repair, and accessories after the sale of the original vehicle. For example, this would include businesses that carry out service work as well as those who solely buy and sell parts.

**Service, maintenance and repair of motor vehicles** refers to the industry and workforce related to working directly on vehicles, and would therefore not include businesses that just buy and sell parts.

**Technicians** service, maintain and repair motor vehicles. Technicians are also referred to as mechanics but due to the evolving nature of vehicle technology and the skillset, this report uses the term 'technician'.

**Workshops** are where the servicing, maintenance and repair of motor vehicles take place. Workshops also tend to be referred to as garages but for reasons stated above, this report uses the term 'workshop'.

**A powertrain** is the mechanism for generating power from the engine and delivering it to the vehicle axle for movement. This report refers to the different powertrains of **internal combustion engine vehicles (ICEVs)** and **electrified vehicle (EV)**, including hybrids and battery-powered.

**Car parc** refers to the overall group of cars on the road in the UK.

**Vehicle acronyms include:** zero-emission vehicle (**ZEV**), battery-electric vehicle (**BEV**), plug-in hybrid vehicle (**PHEV**), hybrid electric vehicle (**HEV**). A BEV is an example of a ZEV, whereas a PHEV and a HEV are not.

**Other acronyms include:** information, advice and guidance (**IAG**), continuous professional development (**CPD**); advanced driver assistance systems (**ADAS**).

## CHAPTER ONE – INTRODUCTION

The government is committed, as legislated, to reaching net zero emissions by 2050. As the largest contributor to the UK's total greenhouse gas emissions (GHG), decarbonising the transport sector is critical to achieving this target.<sup>1</sup> Road transport alone accounts for nearly a quarter of the UK's GHG emissions with the majority resulting from cars and taxis.<sup>2</sup> A key part of shifting to cleaner road transport will require replacing 32 million internal combustion engine vehicles (ICEVs) with low-carbon alternatives. The majority of these cars will be substituted for battery electric vehicles (BEVs), in addition to public and active transport options to reduce car dependency more broadly.

The transition to zero-emission vehicles is already underway and progressing well, outpacing even the most optimistic scenarios from both the Committee for Climate Change (CCC) and the automotive industry.<sup>3</sup> At the end of October 2022, plug-in EVs comprised 21.4% of new car sales, reaching a total of 1 million cars on the road, including 590,000 BEVs and 430,000 plug-in hybrid electric vehicles (PHEVs).<sup>4</sup> To date, the government has supported the development of the EV market through financial incentives, enabling early adopters to benefit from plug-in vehicle grants and preferential company car and road tax treatment. Looking ahead, the decarbonisation of road transport is set to be underpinned by a firmer policy approach by way of a proposed zero-emission vehicle (ZEV) mandate on car manufacturers from 2024. It's worth acknowledging the government's emphasis on incentivising uptake of zero-emission vehicles (i.e. BEVs) over low-emission vehicles (i.e. PHEVs). This is also demonstrated through the renaming of the Office for Low-Emission Vehicles (OLEV) to the Office for Zero-Emission Vehicles (OZEV).

The displacement of ICEVs will bring challenges, such as: ensuring that drivers can afford to make the switch to an EV, developing national and local infrastructure that supports the technology, and upskilling the automotive industry to manufacture and maintain EVs. The extent to which these challenges will be resolved by market forces alone may be limited. While meeting the demands of technological advancements is not a new phenomenon in the automotive industry, the government's pursuit of net zero by 2050 sets a legislative backstop on the sector that by necessity increases the pace of advancement. This level of market intervention reasonably warrants responsiveness from policymakers to ensure that the transition is delivered fairly so that consumers, workers and employers are supported.

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<sup>1</sup> The battery electric vehicle (BEV) share of new car registrations in 2021 was 11.6%, which is higher than modelled estimates in the CCC's Tailwinds scenario (8.2%) and the Society of Motor Manufacturers and Traders (SMMT)'s high scenario (8.9%).

Existing policy research on electric vehicles has tended to focus on the challenges around securing and scaling domestic manufacturing for EVs and their batteries, and ensuring access to convenient, reliable and affordable charging infrastructure, as highlighted in a previous SMF report.<sup>5</sup> For workers who service, maintain, and repair ICEVs, the technological change to EVs will require upskilling to find and fix new electrical faults and work safely on high-voltage vehicles. However, this area of the automotive transition has received less political attention to date.

**This report explores the extent to which the UK's vehicle technicians are prepared for this upskilling challenge and what policymakers can do to support businesses and workers in vehicle service, maintenance, and repair.**

Across key net zero policy publications, the impact of EV uptake on vehicle technicians is given limited attention in the Department for Transport's (DfT) Road to Zero Strategy (2018) and the Department for Education's Green Jobs Taskforce's report (2021), and no explicit recognition in the DfT's Transport Decarbonisation Plan (2021). Where mentioned, the policy focus tends to be on the health and safety risks of working on high-voltage vehicles and an intention to review the relevant regulations to protect technicians – although it remains to be seen what progress has been made here. The upskilling challenge more specifically is referenced just once, four years ago:

*"We will put the UK at the forefront of the design and manufacturing of zero emission vehicles by [...] working with the Institute of Motor Industry to ensure mechanics are well trained and have the skills they need to repair these vehicles safely, delivering for consumers." – Road to Zero, Department for Transport (2018)*

As highlighted by the Department for Transport, ensuring technicians are suitably upskilled to work on EVs is crucial for building and maintaining consumer confidence among a growing group of existing and future EV drivers. More broadly, this also matters for maintaining support for the net zero agenda. It is conceivable that after being incentivised by the government to purchase an EV, poor experiences from an insufficiently trained servicing, repairs and maintenance workforce could lead to dissatisfaction with the wider transition among drivers and voters. And the potential disaffection of a workforce experiencing disruption from the shift to EVs should not be overlooked.

## Methods

This report is informed by qualitative research with vehicle technicians as well as engagement with businesses, industry bodies, and wider stakeholders in the automotive aftermarket industry.

Ten in-depth interviews were conducted with industry stakeholders throughout March and April 2022 to provide background context to the challenges faced by the automotive service, repair, and maintenance workforce and industry relating to the transition to EVs.

In April 2022, a focus group of nine vehicle technicians was conducted to capture the direct experiences and attitudes of workers. The participants ranged in ages from 20 years old to 63 years old, and included one woman. Six of the nine participants worked in independent workshops and three worked for franchise dealers. The group also included a range of powertrain experience between ICEVs and EVs: six participants had worked on both ICEVs and EVs; three had only ever worked on ICEVs. Of the six with EV experience, only three listed professional EV qualifications.

In May 2022, the findings from this primary research were presented to and discussed with government officials and industry stakeholders at a policy roundtable.

The report summarises the chapters as follows:

- **Chapter Two** – provides background insight into the industry and workforce
- **Chapter Three** – identifies emerging market trends that may impact the vehicle repair and maintenance industry
- **Chapter Four** – explores what the upskilling challenge looks like for repairing and maintaining EVs
- **Chapter Five** – highlights the barriers to upskilling technicians for EV repair and maintenance
- **Chapter Six** – provides policy recommendations to government and industry

## CHAPTER TWO – INDUSTRY AND WORKFORCE BACKGROUND

While the technology of EVs may differ from ICEVs, the expertise required to scale EV uptake naturally sits within the wider automotive industry. Meeting the evolving demands for service, maintenance and repair skills will largely depend on transitioning some existing businesses and workers, as well as new entrants. As a result, the existing structure of the industry and workforce may influence the nature of the transition. This chapter explores these characteristics as well as emerging trends that may present challenges and opportunities for businesses and workers.

### Structure of the industry

The service, maintenance and repair of motor vehicles industry is predominantly comprised of two types of businesses – franchise dealers and independents. These businesses share many similarities in the day-to-day jobs of employees, but the structure and arrangement of the business tend to vary between the two models, as set out in the table below. Broadly, we can identify the following differences.

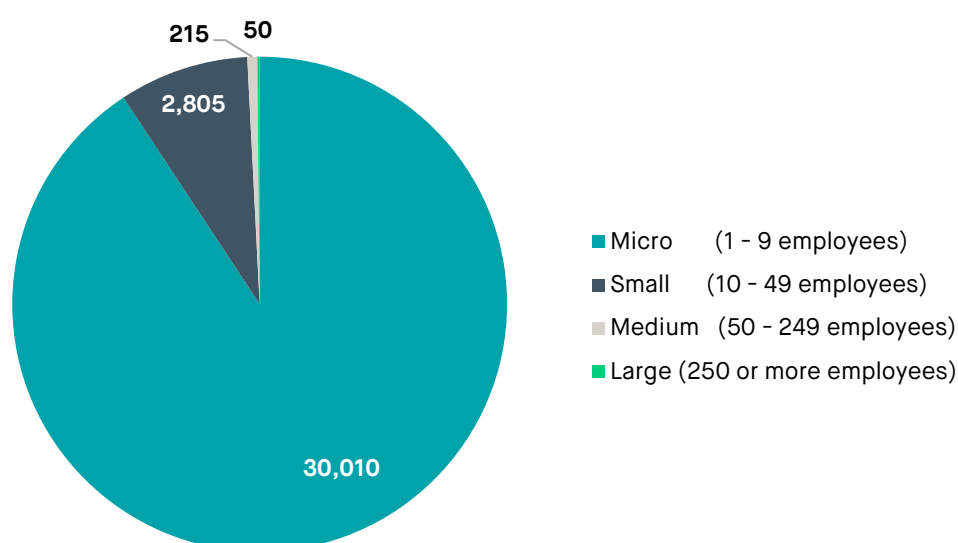
**Table 1: Differences between franchise dealers and independent business models**

	Franchise dealers or manufacturer- authorised repairers	Independent workshops
Size of business	Can range from micro (<10 employees) to large (>250 employees).	Tend to be micro or small (10-49 employees). Although large national retail chains such as Halfords Autocentre and Kwik Fit are also considered independent.
Number of workshop sites	The business may operate from a single site or multiple sites.	Small independents tend to operate from a single site while national retail chains operate from multiple sites.
Association with manufacturers	Often has an agreement(s) with specific car manufacturer(s) or brand(s), such as Ford, BMW, Mercedes etc.	Not associated with a particular car manufacturer or brand.
Access to information	Manufacturers provide access to data, information, training, and sometimes equipment for service, maintenance and repair.	Manufacturers are prohibited from restricting parts and equipment to independent operators, under the EU Motor Vehicle Block Exemption Regulation. However, there are concerns over their future access to information.
Type of service provided	Will specialise in service, maintenance, repair and parts supply for those specific manufacturers/brands.	Deliver a range of services and supply a variety of parts for different brands. Some independent workshops will only carry out MOTs.
Age of cars serviced	Cars under warranty (usually up to three years old) tend to be serviced by franchise workshops, although this is not a legal requirement.	Can service cars under warranty although tend not to as this depends on accessing manufacturer-specific service information or technical support.
Cost of repairs	While there is limited data on average pricing, it is acknowledged that franchise dealers tend to have higher costs than independent workshops.	Independent garages are often perceived to be better value for money.

Due to the nature of the auto repairs industry being lightly regulated, data on the number of workshops and their business type are limited – although, it is understood that the majority of workshops in the UK are independent. Market research from the SMMT in 2016 found that independent workshops comprised 64% of market share of and 73% of all jobs.<sup>6</sup>

Across both business types, it is clear that the service, maintenance and repair industry is characterised by micro and small businesses – as highlighted in **Error! Not a valid bookmark self-reference..** This may mean that many businesses within the industry have less capital to leverage for new investments and to allow employees the time for attending training courses.

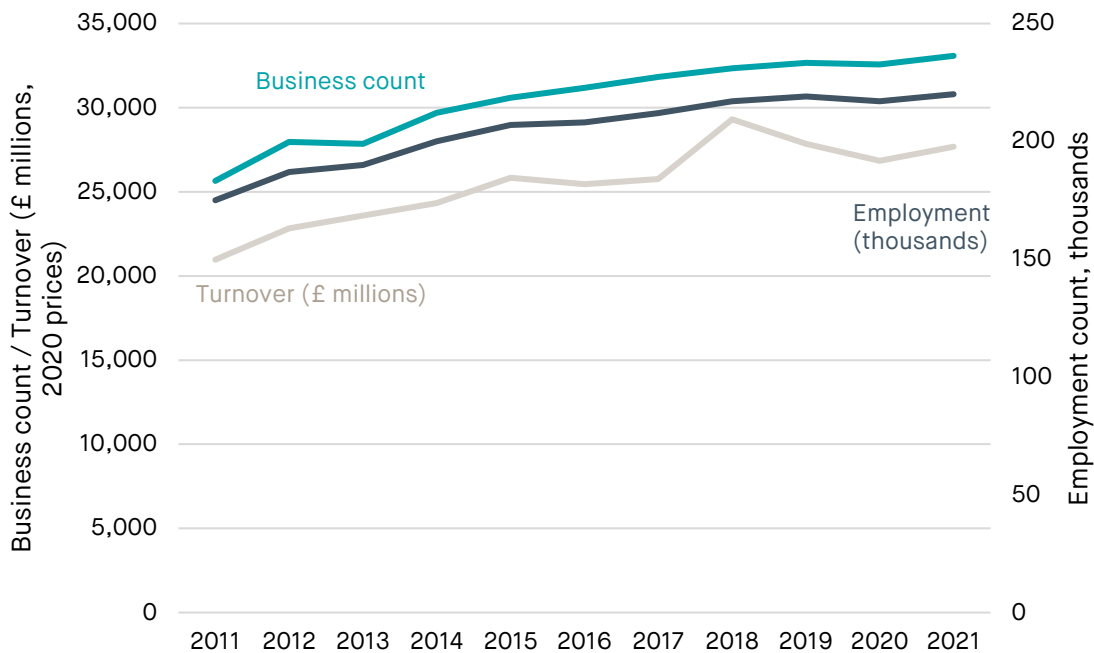
**Figure 1: Number of maintenance and repair of motor vehicles businesses (SIC Code 452) in 2021, UK, by employment size**



Source: SMF analysis of Business Population Estimates

Evidence of market growth may indicate that there could be additional capacity within the industry to take on investment and upskilling. Since 2011, the overall market for the maintenance and repair of motor vehicles has grown with turnover increasing in real terms by 32% - as shown in Figure 2. The industry has also grown with the number of businesses up 29% and the number of employees up 26%.

**Figure 2: Number of businesses and their associated employment and turnover (2020 prices) in maintenance and repair of motor vehicles industry group**



Source: SMF analysis of Business Population Estimates

This growth may be explained by trends in the UK car parc, such as a steady increase in the number of cars on the road over the past two decades and the increase in the average of age of a vehicle.<sup>7</sup> In 2020, the average age of a vehicle was 8.6 years old, compared to 7 years old in 2000. The average lifetime of a vehicle is estimated to be around 14 years, as noted in the CCC’s Sixth Carbon Budget assumptions, therefore it is conceivable that more vehicles are approaching the latter half of their life and may require more maintenance and repairs.<sup>8</sup>

Taking a closer look at the industry in Table 2, the data show that businesses of all sizes are growing, albeit at different rates. This appears to differ from the sale and distribution of parts in the aftermarket, where there has been a trend of domestic mergers and acquisitions as part of market consolidation.<sup>9</sup>

Large businesses have seen the biggest growth in all three key indicators of turnover, business count and employment over the past decade, indicating that the structure of the industry may be evolving. As a result, the distribution of market share has shifted. In terms of turnover, market share has been redistributed from smaller businesses to larger businesses. Among other indicators, the picture differs – micro businesses have seen the largest increase in their share of business count and jobs, even compared to large businesses.

**Table 2: Changes in key business indicators of maintenance and repair of motor vehicles industry group 2011-2021, by employer size**

	Percentage growth in count			Percentage point change in market share		
	Turnover (2020 prices)	Business count	Employment	Turnover	Business count	Employment
<b>Overall market</b>	<b>+32%</b>	<b>+29%</b>	<b>+26%</b>	-	-	-
<b>Micro (1 - 9 employees)</b>	+15%	+30%	+30%	-4.5	+0.9	+1.8
<b>Small (10 - 49 employees)</b>	+11%	+16%	+12%	-4.1	-0.9	-2.8
<b>Medium (50 - 249 employees)</b>	+49%	+19%	+18%	+2.2	-0.1	-0.6
<b>Large (250 or more employees)</b>	+72%	+67%	+35%	+6.5	+0.1	+1

Source: SMF analysis of Business Population Estimates

## Existing pressures on the workforce

From reviewing literature and speaking with stakeholders, we find that the service, maintenance and repair industry already faces persistent challenges, which may impact the preparedness of the workforce to effectively upskill for EVs. Many of these challenges echo similar findings from previous SMF research on the home heat workforce and the barriers to upskilling plumbers for heat pump installation.<sup>10</sup> It is therefore important that policymakers consider how far certain challenges are symptomatic of wider issues in vocational trade industries and how this may impact the broader transition of reskilling and upskilling workers for green jobs.

### Declining workforce

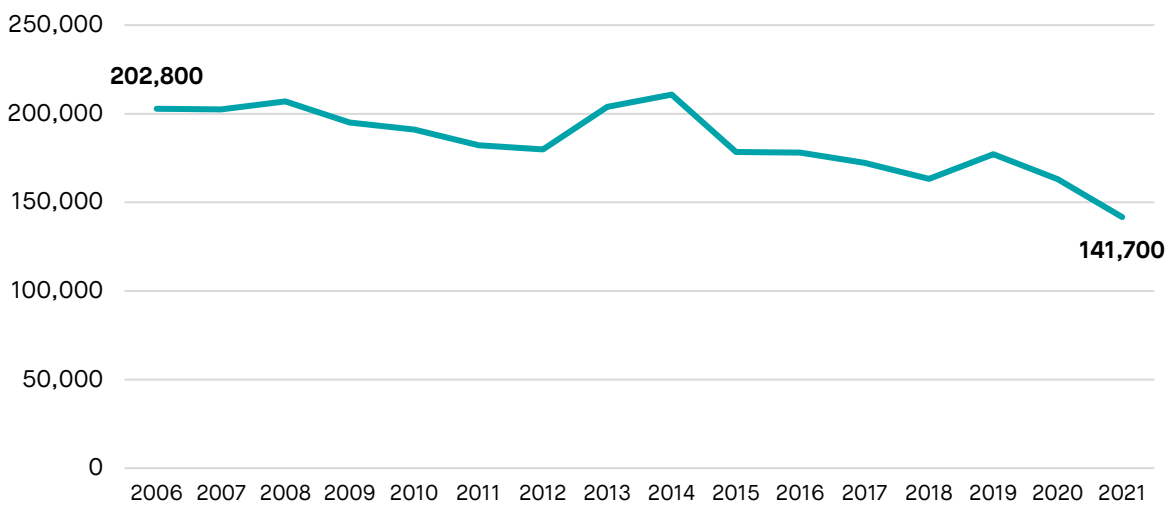
One key challenge raised by stakeholders is related to a historical shortage of vehicle technicians, in part due to difficulties in attracting new entrants to the industry. Between 2006 and 2021, the number of technicians declined by 30% - as shown in Figure 3. Policymakers should be cautious of problematising a smaller workforce without further insight into the productivity of workshops and future demand for repairs - the latter of which is explored in Chapter Three. Wider questions on the future of the workforce are discussed in Chapter Six.

Given that overall employment has grown in the industry - as highlighted in Figure 2 - it is conceivable that this has been the result of an increase in non-technician roles, such as administrative or sales occupations. Gender differences in the workforce are explored later in this chapter.



On the surface, this decline may seem problematic, but that conclusion is difficult to draw without further context. A declining workforce may be an issue if consumer data shows a backlog of repairs, long wait times, or poor experiences. However, a smaller workforce may in fact be more highly skilled and productive in delivering satisfactory outcomes for consumers. Policymakers should be cautious of problematising a smaller workforce without further insight into the productivity of workshops and future demand for repairs – the latter of which is explored in Chapter Three. Wider questions on the future of the workforce are discussed in Chapter Six.

**Figure 3: Count of workers employed as vehicle technicians, mechanics, and electricians in the UK (2006-2021)**



Source: SMF analysis of Annual Population Survey

### Recruitment challenges

Many intersecting challenges relate to the attractiveness of the industry, which makes addressing a technician shortage difficult, particularly when recruiting young people. These challenges spanned cultural perceptions, economic structures, and political priorities, which are ultimately co-created and socially reinforced. It was recognised that this was likely reflective of perceptions of vocational careers more broadly, as highlighted by previous SMF research.<sup>11</sup>

### Cultural perceptions

Stakeholders indicated that challenges related to recruitment and retention stemmed from misperceptions about the nature of the work and its social value. Primarily, stakeholders expressed concern that the service, maintenance and repair industry has an ‘image problem’.

Industry bodies, employers, and focus group technicians often drew on societal misperceptions around the job of a traditional mechanic. These misperceptions were often focused on the cleanliness of the work, referring to traditional ‘oily’ or ‘greasy’ workshops, as well as the education levels of the workers themselves. Stakeholders and technicians spoke of past experiences at school where teachers would imply that poor academic performance would result in a career repairing vehicles. This sentiment is not only critical to understanding current challenges relating to recruitment and the perceived attractiveness of the industry but also the attitudinal barriers to upskilling existing workers – explored in Chapter Four. It is important to note that these historic stereotypes do not reflect the reality of the work, or the skillset and knowledge required to work on vehicles today. The ever-evolving sophistication of vehicle technology has led to an increase in demand for electrical engineering, computing, and software diagnostics skills, requiring high-tech workshops and continued upskilling.

The following quotes were taken from the focus group with technicians.

*“We were always viewed as ‘grease monkeys’. We were not the best educated when we came out of school. Typically we came out of school with certain mediocre results. We will always be tradesmen. We turn nuts and bolts for a living type thing. But the industry has moved on, there's a more of a demand for knowledge with the electrical systems.” – 40-year-old, ICEV and EV technician*

*“Years ago, mechanics were perceived as ‘grease monkeys’... But the mechanics I know are educated folk.” – 63-year-old, ICEV and EV technician*

In addition, one industry stakeholder highlighted that the correlation between the overall automotive industry, carbon emissions and the climate is damaging for recruiting young people, who are more strongly in support of climate action.<sup>12</sup> Although, as explored in Chapter Six, the transition to EVs also presents as a unique opportunity to appeal to their environmental concerns and get more young people into the automotive industry.

### **Careers guidance and apprenticeships**

Stakeholders were particularly concerned about how the image of the industry is relayed to young people and the extent to which this impacts the number of school leavers entering the industry. Many expressed concerns about the quality of careers information, advice and guidance (IAG) in schools and the extent to which it reflects the reality of and opportunities within today’s automotive industry. This finding echoes recent SMF research on careers IAG, which noted the patchy nature of the shape and quality of services and the limited support provided for those pursuing vocational options.<sup>13</sup>

*“I think as long as the industry is presented with Kevin Webster and Phil Mitchell as examples of what the current mechanic is, then we look to distance ourselves from young people even more.” – Industry body stakeholder*

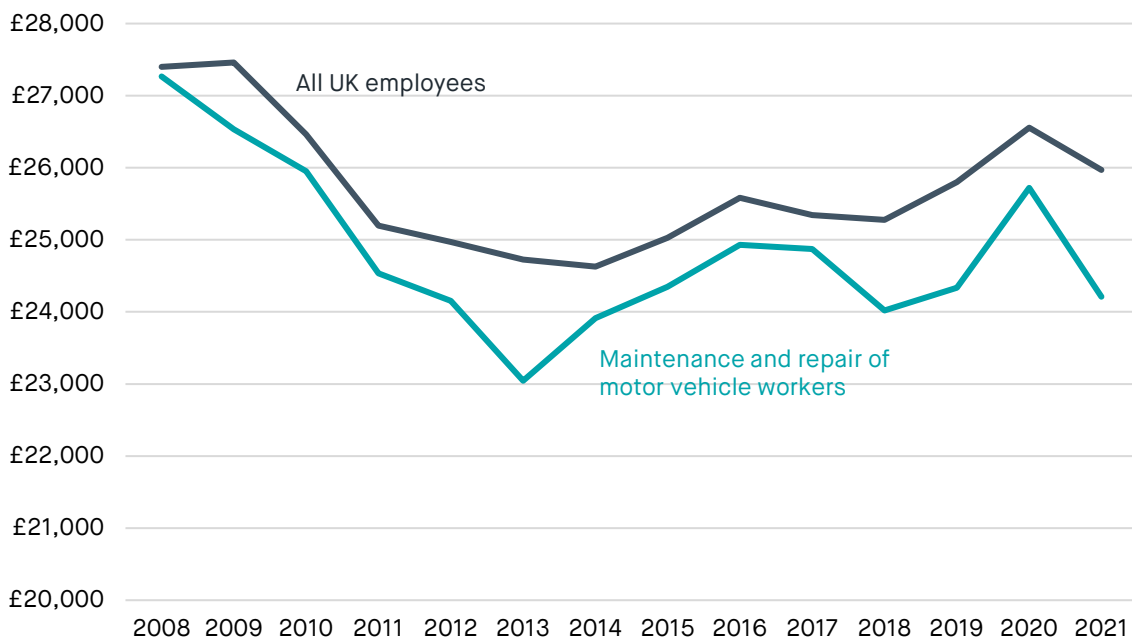
Without further qualitative research, it is difficult to estimate how far young people’s career choices are impacted by this perceived ‘image problem’. It is likely that difficulties in attracting young people may also be reflective of wider challenges with the implementation of apprenticeship policy. Since the introduction of the apprenticeship levy in 2017, the overall number of apprenticeship starts has fallen by around a third. Among young people, the picture is even worse with the proportion of under-19s starting apprenticeships falling by almost half since 2016/17.<sup>14</sup> Industry stakeholders held largely negative views about the success of the apprenticeship levy, indicating that it was viewed as a tax on employers. Additionally, stakeholders provided anecdotal evidence on the impact of the pandemic on furloughed or lost apprenticeship placements. It remains to be seen whether this will have a prolonged effect on the attractiveness of doing an apprenticeship in the industry.

**Remuneration**

Pay is also likely a factor influencing the attractiveness of the industry, which has seen over a decade of real-terms decline. In 2008, technicians’ pay was broadly in line with the UK median. However, since then, technicians’ pay has declined by 11% in real terms and is now around 7% lower than the UK median – as shown in Figure 4. The issue of low pay was also raised by focus group participants, explored in Chapter Four.

The IMI estimates that upskilling for EV repair could provide an earnings premium. Their analysis of salary data for 2020 finds that the on average, job advertisements for vehicle technicians that request EV skills was 10% higher (£3,700) than those which did not.<sup>15</sup>

**Figure 4: Median annual gross pay 2008-2021, £, 2021 prices**



Source: SMF analysis of Annual Survey of Hours and Earnings

### Diversity and inclusion

Diversity and inclusion is a well-recognised challenge in the industry. The latest workforce data shows that of the 141,700 workers employed as vehicle technicians, mechanics and electricians, 98% are male.<sup>16</sup> This is largely typical of capital-intensive fields, such as the automotive industry, construction, and manufacturing.<sup>17</sup> Analysis by Emsi finds that in 2018, the occupation of vehicle technicians, mechanics and electricians had the fifth-lowest share of female workers in the British labour market.<sup>18</sup> While the industry still has a long way to go in improving its diversity, the number of females working in the industry has increased by 2.5 times since 2006, amidst an overall decline in the workforce.<sup>19</sup>

Official data on ethnicity of technicians is far more limited. Further research by the Institute of Motor Industry (IMI) finds that 81% of the overall automotive industry is white-British.<sup>20</sup>

### Retention challenges

As a result of recruitment challenges, it was broadly acknowledged by stakeholders that the workforce is ageing. This may mean that the industry could be reliant on older workers to upskill not just for EVs but to keep pace with evolving vehicle technology, which may raise challenges around motivation to train. Due to the physical demands of the job, it was also indicated that technicians may be more likely to retire earlier than in other non-vocational industries. Across the UK labour market as a whole, the number of over 50s moving into inactivity has increased as a result of the pandemic, although this is most common among professional services.<sup>21</sup>

Official data on the average age of a technician in the UK and their retirement patterns is limited, largely due to a lack of regulatory requirements in the sector. Industry data, indicate that in 2019 almost half of the overall maintenance and repair of motor vehicles industry was under the age of 34. Based on the consensus of stakeholders, it is likely that this is more reflective of the industry as a whole rather than technicians.<sup>22</sup>

Labour market shortages across the UK economy can also be attributed to Brexit. It was estimated that leaving the EU would negatively impact the UK automotive sector and manufacturing supply chains. This is because freedom of movement allowed highly skilled EU workers to transfer between plants without bureaucratic barriers.<sup>23</sup> The extent to which this has happened is unclear, but it is likely to be more of a concern in vehicle manufacturing than for repair technicians.

### Regulation

The government's approach to regulating technicians was noted by stakeholders and focus group participants as being relatively light touch, compared to similar occupations such as electricians and gas engineers. Those working on gas heating systems are required by law to be Gas Safe certified. Additionally, electrical work is subject to a number of statutory regulations such as Electricity at Work Regulations 1989 and The Building Act 2000. In both cases, these legislative frameworks apply to all workers who carry out gas or electrical work.

By comparison, for vehicle technicians, the most relevant legislation pertains to MOT requirements, which ensures that cars, motorcycles and other light vehicles are roadworthy and comply with environmental requirements. MOT testing stations are then regulated by the Driver and Vehicle Standards Agency to ensure vehicles are kept in roadworthy condition and records are appropriately updated on a database. However, not all repair workshops and technicians carry out MOT tests.

Across vehicle technicians more broadly, there is no mandatory competency-based standard or licensing scheme in place. This raises challenges for data collection and monitoring, as well as continuous professional development (CPD) and health and safety. The IMI has highlighted concerns that this creates difficulty in complying with Electricity at Work Regulations 1989, which are increasingly relevant to service, maintenance and repair workshops as EVs become a growing feature of their business.<sup>24</sup>

### **Existing skills gaps**

Despite the lack of mandatory accreditation requirements, training courses and accredited qualifications are well-established across trade training providers and further education colleges. While some businesses invest in formal training, stakeholders noted that CPD within the industry tends to be characterised by informal and unstructured learning on-the-job as technology evolves and new problems are encountered. Some stakeholders indicated that this may be a result of hesitant attitudes towards formal learning across the workforce, stemming from negative experiences in school and structured education in the past – as noted earlier within this chapter.

Related to this, there is a concern among some industry stakeholders that an upskilling challenge already exists for servicing, maintaining and repairing modern vehicles. As vehicle technology has progressed (for example through computerised diagnostics and advanced driver assisted systems) the demand for advanced skillsets has increased. Stakeholders indicated that some technicians have faced difficulties in keeping pace with new learning. Quantifying this potential skills gap is extremely challenging, due to the lack of licensing, reporting and accreditation requirements. However, the indication by industry stakeholders that such a gap may already exist raises challenges for just how prepared the current workforce may be to upskill for EVs.

## CHAPTER THREE – EMERGING MARKET TRENDS

As highlighted in the previous chapter, the transition to net zero (and thus EVs) is not the only challenge facing the automotive sector. Given the nature of the industry, continuous innovation and evolution is to be expected with new technologies and services. This chapter outlines some emerging market trends – each in differing stages of development – that may influence businesses and the structure of the industry.

### **Advancement of vehicle technology**

The evolution and advancement of engineering and technology is not a new phenomenon, particularly in the automotive industry. As with the growth of digital technology, vehicles are becoming increasingly ‘smart’ with advanced driver assisted systems (ADAS), computerised diagnostics and connectivity.<sup>25</sup> Many stakeholders described modern vehicles as “a computer on wheels”. For service, maintenance and repair businesses, this requires investment in the necessary equipment as well as training to upskill technicians in digital skills, computing, and software diagnostics. Many manufacturers will provide and support training for technicians, however, this tends to be more so the case among their affiliated franchise dealers.<sup>26</sup>

It is conceivable that smaller independent workshops may find this evolving trend more difficult to adjust to. In a 2016 review of the UK aftermarket, Frost & Sullivan estimated that hundreds of small family-owned workshops would close in the succeeding years in part because *“they cannot hire and retain or equip employees with the necessary skills and experience to stay open, but also because of increasing competition and rising costs for tools, training and equipment”*.<sup>27</sup> Related to this, some industry stakeholders indicated that keeping pace with advanced vehicle technology presents a much more pertinent and immediate skills challenge across the industry than EVs.

### **Connectivity and access to data**

Related to this advancement, modern vehicles are becoming increasingly connected, capturing a wide range of data on mobility and diagnostics which can communicate with other vehicles, infrastructure, pedestrians, and networks. This data is stored in the original equipment manufacturers’ (OEM) database and can be shared with insurance companies, fleet service providers, diagnostic solution providers, and repair workshops. Access to this database is controlled by the OEM and is essential for technicians to carry out routine maintenance and repairs such as software updates, code parts to cars, and update service records. While regulation currently exists to protect the flow of information, parts, and equipment to independent repairers, industry stakeholders expressed concern about its compliance and its future, given the increasingly important role of data sharing.

Under the EU Motor Vehicle Block Exemption Regulation (MVBER), manufacturers are prohibited from forming anti-competitive agreements with companies that have over 30% relevant market share.<sup>28</sup> As well as this, manufacturers are prohibited from restricting the sale of spare parts, repair tools, or diagnostic equipment to distributors or repairers, such as independent businesses.<sup>29</sup> This essentially grants independent workshops protected access to the information, data and tools they need to deliver their core business.

Anecdotal evidence from industry stakeholders suggests that some manufacturers have begun restricting workshops' access to their database, citing cybersecurity concerns. As well as this, the introduction of "over the air" vehicle updates means that software updates can be delivered remotely from a cloud-based server to a connected vehicle by the manufacturer directly, rather than by a workshop. As a result, there is a growing fear in the industry that independent workshops in particular may be locked out of their core business by manufacturers. Stakeholders revealed concerns about competition in the industry if independent workshops are not able to provide consumer choice and competitive pricing against manufacturers and their franchise dealers – this is further explored in Chapter Six. Whether such instances are in breach of MVBER would be for the Competition and Markets Authority (CMA) to decide, but they do raise questions about the fitness of the legislation for today's technology.

Following the UK's exit from the EU, the UK government retained a number of block exemption regulations as part of the transition period, including the MVBER.<sup>30</sup> However, it is due to expire at the end of May 2023. The Competition and Markets Authority (CMA) conducted a preliminary review of the regulation and the various issues launched in March 2022, concluding that the retained MVBER should be replaced with a Motor Vehicle Block Exemption Order (MVBE O).<sup>31</sup> This regime would be broadly similar to the retained MVBER with certain revisions including "a new definition of technical and vehicle information".<sup>32</sup> While this seems positive, the details of the final recommendations have yet to be published, following a second stakeholder consultation over Summer 2022.

Last year, the EU also consulted on the future of the MVBER to evaluate key competition issues in the vehicle aftermarket. The Commission highlighted the increasing importance of data as one of three key "intense pressures" on the sector to adapt, concluding that "*some provisions may need updating, in particular, to reflect the importance that access to data is likely to have as a factor of competition*".<sup>33</sup>

Industry stakeholders indicated that any new regulation that is insufficient in protecting the flow of diagnostic information and access to data would have a severe negative impact on independent service, maintenance and repair businesses. The implications of this are explored in Chapter Five.

*"It's hugely important for the independent aftermarket to not be locked out of communicating with vehicles and getting access to technical data [from manufacturers]. There is potential, if the government doesn't do anything about this, that it will destroy the independent aftermarket." – Industry stakeholder, roundtable participant*



## EV adoption

Electrification is another technological advancement that will likely have “a great and enduring effect on the automotive aftermarket”, according to McKinsey.<sup>34</sup> EVs are not necessarily new technology, but with more drivers making the switch away from ICEV, EV adoption is a growing trend that will likely start to take effect in the coming years. The subsequent chapters of this report mainly focus on how increased uptake of EVs will impact the skills demands of technicians, however, it’s also worth noting how EVs may affect the size of demand for routine maintenance as well.

## EV maintenance costs

Battery-powered electric vehicles (BEVs) have simpler powertrains with fewer moving components than ICEVs or hybrid EVs. This means that less maintenance is likely to be required where components see less wear and tear, or simply do not exist, such as clutches, transmission belts, and exhaust systems.<sup>35</sup> As a result, it is estimated that overall maintenance costs for BEVs could be 40% lower than for an ICEV – as shown in Figure 5. Further evidence supports this finding – analysis of the French aftermarket by EY estimates that an entire EV fleet may result in a 35% overall drop in parts consumption compared with ICEVs.<sup>36</sup> McKinsey also estimates that across the top four European markets (UK, Germany, France and Italy) the impact of automotive trends including EVs, connected cars and e-commerce could see 30-40% of aftermarket profits redistributed along the value chain in 2030.<sup>37</sup>

Industry stakeholders and focus group participants also recognised uncertainty around future of maintenance demand and job security.

*“EVs don’t use the brakes as much so that maintenance side of the work is going to drop off with EVs. It’s kind of like, well, we’re in a mess. We don’t know what’s going to happen” – 36-year-old ICEV and EV technician*

*“It’s not just the independents, the main dealer is going to get it too. If you need to do 50% less work on every (electric) vehicle, you’re going to need 50% less staff. [...] You don’t know what the future holds really. But basically, we’re not all going to be in the same job in eight and a half years’ time” – 47-year-old ICEV technician*

*“EVs have about half the maintenance costs – so there could be a halving or so reduction in the need for [maintenance].” – Government official stakeholder*

It is also estimated that these effects could be, in part, offset by increasing maintenance costs of those who do not switch to an EV and continue to drive ageing ICEVs.<sup>38</sup> It is likely too soon to tell how this particular market trend will play out in the UK, but it is worth considering how any changes in demand for servicing, repairs and maintenance will affect businesses of varying sizes and models (i.e. franchise dealers and independents).



Figure 5: Repair costs of a vehicle by powertrain type

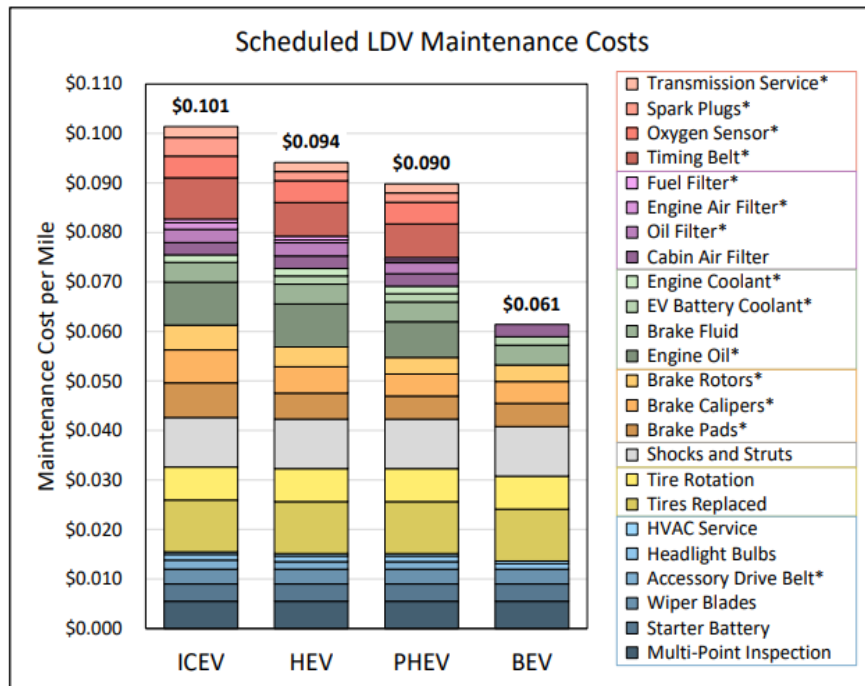


FIGURE ES-4 Per-mile maintenance costs by powertrain (\*Service intervals that vary by powertrain)

Source: Argonne National Laboratory, US Department of Energy

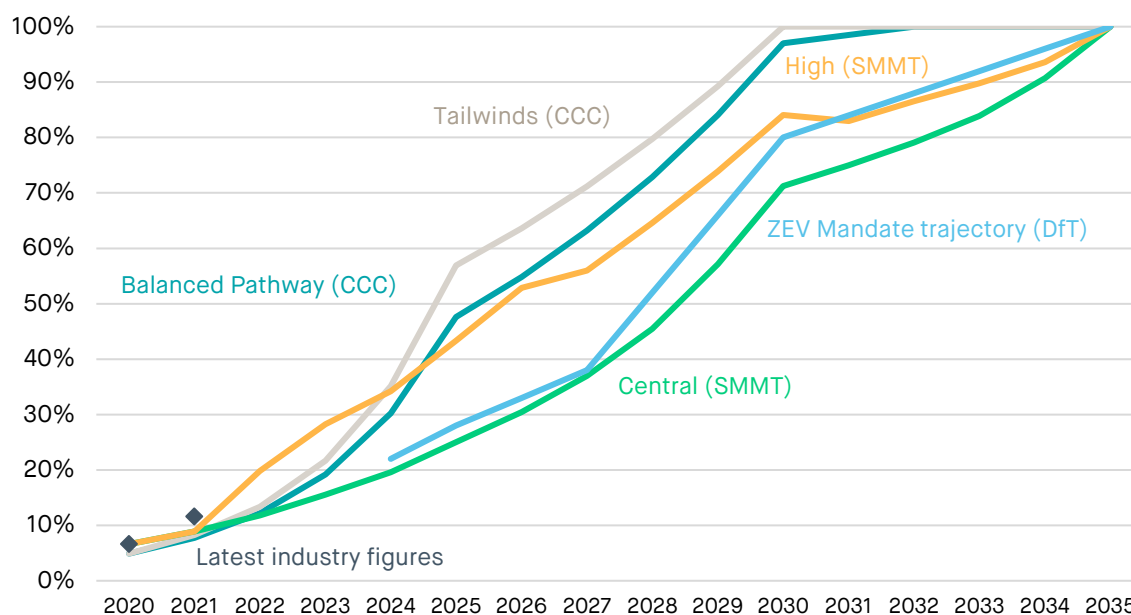
### EV uptake

Thus far, the uptake of EVs is progressing more quickly than official bodies and the industry previously projected – as shown in Figure 6. In 2021, BEVs comprised 11.6% of new car sales, outpacing even the most optimistic scenarios from the SMMT (8.9%) and the CCC (8.2%). The CCC’s core scenario (Balanced Pathway) estimated BEVs’ market share to be 7.7% in 2021. The government’s proposed ZEV mandate will set binding goals for EV uptake by way of an obligation on vehicle manufacturers to sell EVs as a proportion of their overall vehicle sales from 2024. In effect, this would create a new mandated trajectory to 2035 that draws on the Office for Budget Responsibility (OBR), CCC and SMMT’s scenarios.

In the context of overall cars on the road, EVs currently represent just around 2% of the UK car parc. For much of the aftermarket, this emerging trend is seen as a medium-term development that will have greater relevance in the latter half of the decade. SMF analysis of the ZEV mandate finds that BEVs are estimated to reach around a quarter (23%) of the total cars on the road by 2030 and about half (52%) by 2035 – as shown in Figure 7.<sup>39</sup>

The impact of this level of market penetration will look different for independent workshops and franchise dealers as they tend to operate on cars of different ages. New EVs purchased under warranty are likely to be serviced directly by the manufacturer or through a franchise dealer. While independent workshops can service cars under warranty, it is far less likely. Stakeholders described how small independent workshops are often up to five years behind the new car market. As such, uptake of EVs will likely have a phased effect on the aftermarket.

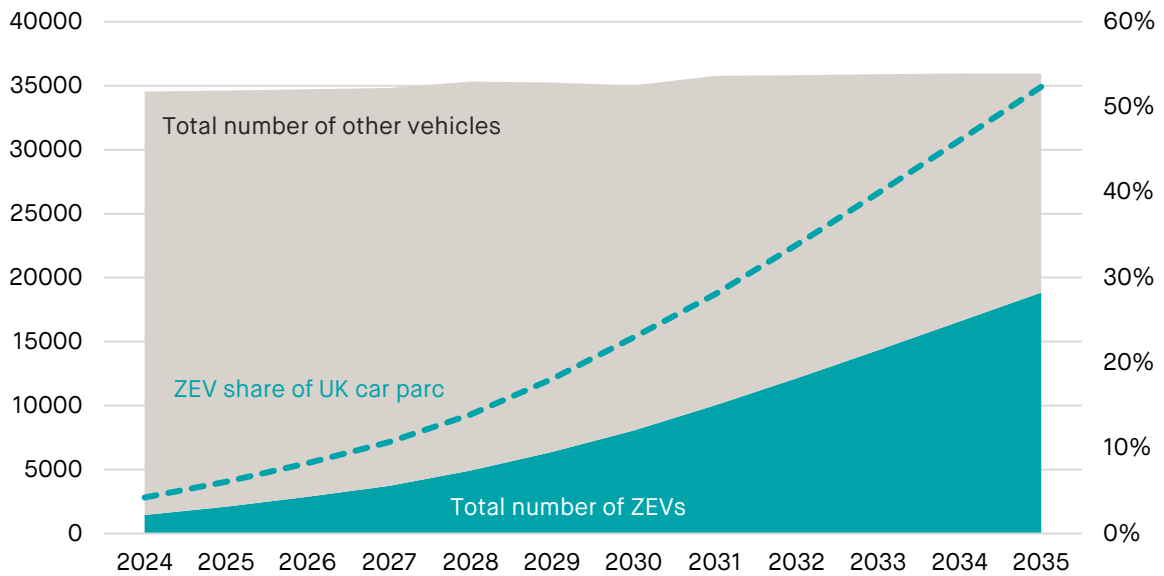
**Figure 6: Modelled scenarios for BEV uptake as a share of new car sales**



Source: SMF analysis of CCC 6<sup>th</sup> Carbon Budget, SMMT uptake scenarios, and DfT ZEV Mandate preferred trajectory

Note: CCC Balanced Pathway scenario assumes a 2032 phase-out date for petrol-diesel cars. CCC Headwinds scenario assumes a 2035 phase-out date for petrol-diesel cars. The government announced in November 2020 that a ban on the sale of new petrol-diesel cars would be introduced from 2030.

**Figure 7: Overall car parc outlook, Department for Transport’s preferred ZEV mandate trajectory, 2024-2035, (‘000s)**



Source: SMF analysis of DfT’s preferred trajectory in the ZEV mandate, SMMT

Note: Other vehicles include ICEVs and hybrid EVs

### Ownership patterns

The evolution of mobility as a service may impact the service, maintenance and repair industry. As with other consumer markets such as TV and music, leasing and subscription-based models are beginning to offer drivers different options for car ownership. These models usually operate through a market provider, manufacturer or franchise and can include repair and maintenance agreements with a designated main dealer, rather than an independent workshop.

While data on the uptake of these options are limited, initial evidence indicates a growing popularity. The subscription service Mycardirect, for example, saw its EV uptake grow to 28% of its overall vehicle fleet, doubling the current UK new car market share. The service allows drivers the flexibility to switch vehicles within their subscription contract period if they decide not to continue with an EV. They believe this provides more apprehensive consumers the reassurance of being able to trial an EV – although they report that no customer has actually made the switch back to petrol/diesel.<sup>40</sup> Manufacturers Jaguar Land Rover, Volvo, and Hyundai have also introduced subscription services in the UK.

The nature of these models could raise important questions around competition in the repairs and maintenance industry if manufacturers or other market players are able to essentially control where and how their vehicles are serviced. Additionally, transparency of subscription models matters for consumer protection, so that drivers are aware of what they’re paying for, including but not limited to the servicing agreement. Policymakers should monitor these factors of competition and consumer protection as the transport and mobility sector evolves.

## Retrofitting ICEVs to EVs

Transitioning to EVs will bring opportunities and challenges for UK drivers, the economy and the environment. The upfront cost of an EV is one of the key barriers that prevents drivers from switching.<sup>41</sup> As well as this, environmentalists raise concerns about the waste created from scrapped cars and the emissions produced from manufacturing new (electric) vehicles. In response to these challenges, retrofitting a working ICEV to an EV may be a possible solution.

At this stage, the market for retrofitting vehicles is relatively niche due to the associated costs. As a result, retrofitting tends to occur among high-value or classic cars, where the costs are more worthwhile.<sup>42</sup> For example, London Electric convert Land Rover Defenders, classic Minis, VW Beetles, Campers and others for an estimated budget of £30,000.<sup>43</sup> By comparison, the average cost of an EV is £44,000, with models as low as £17,350.<sup>44</sup>

Looking abroad, businesses are driving innovation and investment in retrofit to make it an affordable option for small popular ICEVs. In India, EV manufacturer Omega Seiki Mobility has recently invested USD \$25 million into a retrofit facility for small and light vehicles, which is set to open later this year.<sup>45</sup> Additionally, a start-up in France, Transition-One, retrofits small cars (e.g. Fiat 500, Renault Clio, BMW Mini) to EVs and is aiming to reduce the conversion cost to around €5,000.<sup>46</sup> Although the results of converted cars are mixed with a limited range meaning that these vehicles would be best suited for short trips or city-living.<sup>47</sup>

Overall, industry stakeholders were sceptical of the opportunity to scale retrofit as a mass-market solution in the UK at a lower cost than the ticket price of an EV.

## CHAPTER FOUR – UPSKILLING FOR EV REPAIR

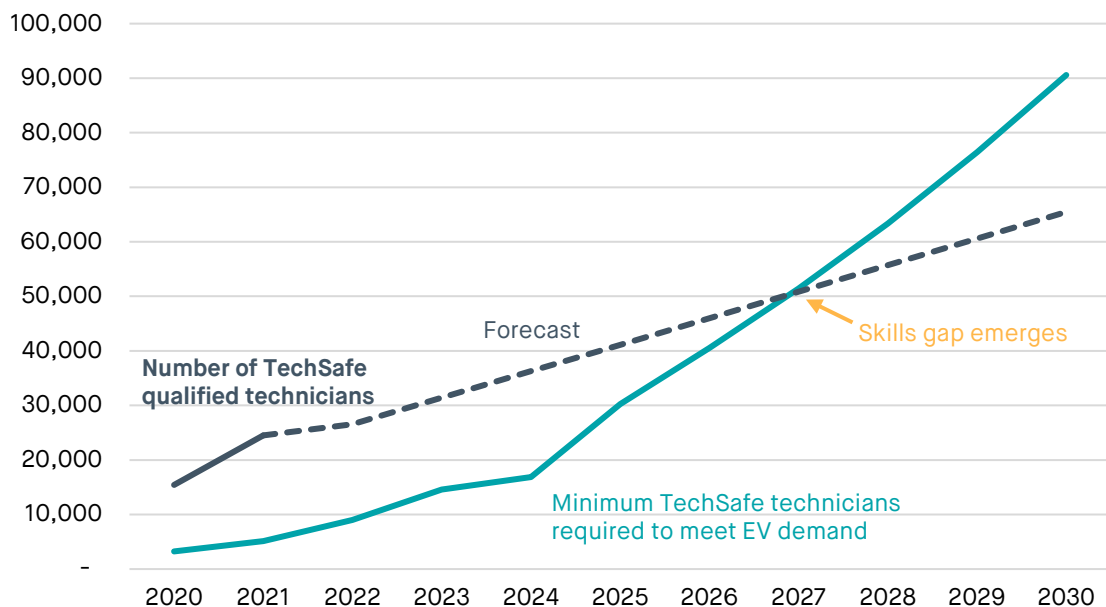
As the uptake of EVs increase, the skills demand for technicians are also set to evolve. Working on electrical systems and high-voltage electrified powertrains requires new skills and knowledge to fix faults and, critically, to work safely. This chapter explores the extent of the skills gap for EV maintenance and the landscape for the training to upskill technicians.

### EV repair skills gap

There is currently limited evidence on the size of the EV skills gap in the repair and maintenance workforce. This is partly due to a lack of mandatory qualifications and accreditation in the industry, which makes measuring the existing skill level of workers challenging. As well as this, stakeholders highlighted challenges in estimating future demand for EV repair skills as discussed in Chapter Three.

Existing estimates indicate that around 1 in 10 technicians are trained to work on EVs. A survey commissioned by Transport Scotland in 2019 found that 10% of vehicle repair and maintenance staff in Scotland had recognised qualifications (such as TechSafe) to enable them to work safely on EVs.<sup>48</sup> As well as this, the Institute of Motor Industry (IMI) finds that the proportion of workers who are currently TechSafe qualified<sup>ii</sup> is growing, rising from 7% in 2021 to 11% in 2022 with 24,507 technicians now trained.<sup>49</sup>

**Figure 8: Forecast gap between predicted EVs on UK roads and IMI TechSafe EV technicians (updated April 2022)**



Source: IMI modelling based on SMMT high EV uptake scenario

<sup>ii</sup> TechSafe is the IMI professional accreditation that recognises technicians who are appropriately trained in EVs and other safety-critical vehicle systems such as advanced driver assistance systems (Level 2 – 4). The IMI EV qualifications are explored further below in this chapter.

The IMI has produced the only estimate for this potential skills gap in the UK – as shown in Figure 8. This modelling, based on the SMMT’s high EV uptake scenario, indicates that currently there is a notable surplus of over 19,000 technicians trained to work on EVs compared to how many are required. This is a welcome finding for the industry and the broader green skills agenda – drivers should be reassured that a lack of trained EV technicians is no barrier to EV uptake today. Given that current uptake figures are exceeding the SMMT’s high scenario, it is possible that the number of technicians currently required is higher, reducing the surplus. Although this is likely to be a small reduction.

However, a skills gap is expected to materialise by 2027, creating a shortfall of 25,100 TechSafe technicians by 2030. It is unclear where this gap may emerge. Given that the impact of EVs on the repair and maintenance industry is likely to be phased, the timing of upskilling will differ based on the type of workshop. Technicians working for franchise dealers are more likely to undergo EV repair training earlier than small independents, due to their relationship with vehicle manufacturers.<sup>50</sup> As a result, it is conceivable that the skills gap may emerge as the demand for EV repair skills begins to reach small independent workshops and where these businesses face barriers to investing in training and equipment. Industry stakeholders raised concerns over competition in the market if small independent workshops are unable to upskill and provide choice for consumers.

Stakeholders also warned that a potential skills gap could reduce the quality of repairs and/or raise the costs of repairs which may harm consumer confidence in EVs. Ultimately, this could jeopardize the mobility of the UK, the safety of drivers and technicians, as well as undermine efforts to reduce emissions.

## **Training and qualifications**

The repair and maintenance industry is characterised by formal and informal approaches to training and CPD. Anecdotal evidence from stakeholders suggests that there is a legacy of informal on-the-job training as technicians are not required to have any form of professional licensing. Given the dangers of working on high-voltage vehicles, stakeholders and focus group participants agreed on the need for formalised, professional and accredited training routes to prepare technicians for EV repair and maintenance. The landscape for this is already in development, however, more can be done to support providers and businesses in meeting future skills demands.

The training landscape for repairing and maintaining EVs is currently focused on upskilling the existing vehicle technician workforce, rather than training new entrants, due to the prior skills and knowledge required. As a result, qualifications tend to be delivered in short training courses whereby technicians can progress through levels flexibly. The IMI’s qualifications are likely to be the most well-known within the industry, offering two-day courses from Level 1 EV awareness to Level 4 diagnosis, testing and repair. Qualifications are also offered through City and Guilds and other awarding bodies, and are delivered by a range of providers including trade providers, manufacturers, and further education colleges.

Stakeholders indicated that the government is hesitant to regulate standards within the repair and maintenance industry. As such, there is no mandatory accreditation or licensing required of vehicle technicians (as highlighted in Chapter Two). In place of this the IMI developed a market-based TechSafe accreditation and licensing register, which became an officially endorsed (voluntary) standard by the Government's Office for Low Emission Vehicles in 2019.<sup>51</sup> As part of maintaining this accreditation and appearing on the online register, technicians must meet CPD requirements over a three-year period. The Motor Ombudsman also offers voluntary accreditation for vehicle repair businesses with Chartered Trading Standards Institute-approved Codes of Practice. It is unclear how many workshops hold this accreditation.

### Quality of training

Some industry stakeholders expressed concern about the quality of training for EV repair courses and adult learning more broadly. A central concern was that the regulation and enforcement of standards for technical skills creates a perverse incentive to teach courses for certification rather than for understanding. This is because Ofqual's inspections of training providers focuses on the assessment process rather than knowledge taught. It was suggested that as a result, courses can become a box-ticking exercise that do not adequately prepare and equip learners with the skills and knowledge needed to work safely on EVs. One training provider indicated that "*the vast majority of mechanics don't understand electricity*". While colleges are subjected to Ofsted's teaching inspections, one stakeholder indicated that inspectors may lack sufficient knowledge of EVs and electricity to sufficiently judge the course's content.

### Cost barriers for colleges

FE colleges face significant budget constraints due to a legacy of underfunding, limiting their capacity to innovate and invest in new course offers. Stakeholders highlighted how colleges are often unable to afford the cost of equipment for EV safety and repair courses, such as vehicles, battery cells and lockout trainers.

In 2021, the Department for Education ran Strategic Development Fund (SDF) pilots as part of the Local Skills Improvement Plan (LSIP) trailblazers to support colleges in improving their offer for emerging skills, such as green and digital. We spoke to two college groups in receipt of the SDF who used their grant funding to purchase EV repair equipment and develop their course offer, where previously they were unable to. Both colleges reported a positive experience of the scheme, particularly in providing the funds and capacity for more strategic planning of skills for their local area. Upon reflection, one college informed us that their training offer was now likely ahead of local demand, meaning that they felt prepared for the emerging skills needs in future.

The SDF and LSIP pilots are a positive step in the planning and delivery of future skills needs. Currently, just 18 college groups received this pilot funding out of a total 200 colleges in England. Policymakers should look to learn the lessons from this pilot scheme to support a wider group of colleges that continue to face funding challenges in developing new courses and meeting equipment costs.

### Transport Scotland's emerging skills

In comparison to England's market-led approach, Scotland employed a state-coordinated approach to upskilling the repair and maintenance workforce for EVs. In 2017/18, working together, Transport Scotland and Energy Skills Partnership (ESP) identified the repair and maintenance of EVs as a key emerging skills area. ESP is the college sector agency, funded by the Scottish Funding Council to lead on energy, engineering, construction and STEM skills needs.

ESP employed a "train the trainer" approach to upskill all 16 colleges in Scotland for EV repair and maintenance. Transport Scotland provided the funding to colleges for their staff to participate in the training and to purchase necessary equipment, such as EVs and safety tools. Now, staff at every college are trained to IMI Level 3 Vehicle System Repair and Replacement and are prepared to deliver training for local businesses and technicians as demand arises.

### Apprenticeship standards

Institute for Apprenticeships and Technical Education (IfATE) is currently working with the industry to update apprenticeship standards for becoming a motor vehicle service and maintenance technician.<sup>52</sup> Detail on what this will include remain to be seen, but stakeholders indicated that the knowledge, skills and behaviour requirements will reflect the increasing uptake of EVs. Stakeholders cautioned how the implementation of these updated standards could impact smaller independent workshops looking to take on an apprentice, given that EV demand is lower among their customer bases. Announced reforms on the apprenticeship levy in the Chancellor's Spring Statement 2022 are welcome. As part of this, policymakers should look to include greater flexibility within the delivery of apprenticeships so that apprentices can be shared between small businesses and gain a multitude of experience.



## CHAPTER FIVE – BARRIERS TO PARTICIPATING IN TRAINING

This chapter outlines the structural and attitudinal barriers for technicians to participate in EV repair and maintenance training. Overall, focus group participants demonstrated a reluctant willingness to retrain, as well as doubts about EV technology and infrastructure. Due to the sample size, it is not possible to draw conclusions based on the individual characteristics of workers.

### Structural barriers

Focus group participants highlighted a lack incentives to retrain, including low demand, low confidence in policy plans and infrastructure, and low pay.

#### Low demand

Focus group participants had varying levels of exposure to EVs – around half had either rarely or never worked on them. For these technicians, the lack of demand in their local area and for their business type meant that they were not incentivised to retrain yet.

*“The workload that's coming through – our regular trade – is servicing mainly petrol and diesel vehicles, so it's not the time yet.” - 47-year-old ICEV technician*

Most participants admitted that retraining would be required at some point in order to maintain job security. There was a general lack of consensus over when this point would be – some participants indicated that it could be within 2-3 years while others did not expect to retrain until at least 2030. Those that had already participated in training for EV repair explained that job security was the main motivator for doing so.

*“My concern is if you don't move with it, you don't train, then you're going to become obsolete, which isn't the direction I want to go in.”- 47-year-old ICEV technician*

*“I thought I've got to jump on the train or else I'll be left behind.”- 36-year-old ICEV and EV technician*

One participant explained that they would continue solely repairing ICEVs for the remainder of their career, as their business specialised in vintage cars.

*“Honestly, I don't feel that I need to [train for EV repairs]. Obviously, the job I'm in is secure. I think I'm basically working on all diesel Land Rovers and petrol Lotuses' and things like that. So electric for me is a no-go.”- 42-year-old ICEV technician*

#### Low confidence in government policy and infrastructure

Most participants expressed strong doubts in the achievability of the government's plans to decarbonise road transport. Most participants felt that the government's ban on the sale of new petrol-diesel cars from 2030 would not be feasible because the charging infrastructure would not be able to support it. As a result, some participants expected to delay their training even further or to not upskill at all.

*“The problem is you’ve got somebody in the government that has said that electric is the way forward, but they don’t really know the ins and outs of it. They’re pushing it but we’ve got no infrastructure to run electric vehicles. There are not enough charging points if you live in a terraced house... The idea is great, let’s all go electric but the infrastructure is miles off.” – 47-year-old ICEV technician*

*“I don’t know whether I believe that in 2030 we’re going to fully migrate over to totally electric vehicles. [...] My belief is that the infrastructure is not there and won’t be there in eight years’ time to support fully electric.” – 35-year-old ICEV and EV technician*

There was also some confusion among the group as to whether the 2030 ban would apply to all cars on the road, rather than just the sale of new cars, which likely contributed to the lack of belief in the government’s plans. This raises concerns about the broader public awareness and understanding of government plans. If those working in the industry do not fully understand policy plans, it is unlikely that consumers do either. Policymakers need to improve their communication of key dates and strategies for phasing out ICEVs, particularly among workers that are essential to the success of those plans.

### Fair pay

Remuneration was also a key barrier for participants, which reflects the broader workforce challenge of declining real terms pay, as highlighted in Chapter Two. Many participants indicated that currently, they do not feel as though their pay is high enough to warrant continuous upskilling, not just for EVs but to keep pace with advancing vehicle technology as well. As a result, participants likened it to taking on multiple jobs and additional safety risks for the same remuneration, which was not attractive.

*“We’re required to do training on all these new systems for three or four different professions and the wages don’t reflect it at all. We’re one of the lowest-paid trades, and probably one of the most highly trained.” – 47-year-old ICEV technician*

*“The problem is, we’ve got to work on air con systems, which is pressurized gas, hot engines, and now EVs. But you go speak to any electrician and he’s on £40,000 a year. And I’m still knocking about on £22,000. We’re not getting paid the money in order to be taking on all these responsibilities.” – 36-year-old, ICEV and EV technician*

*“They’re going to have to pay us a lot more money. If there’s a danger of you potentially killing yourself, we’re going to have to make sure that people are up to scratch. The problem is people will kill themselves by a lack of knowledge or concentration.” – 35-year-old ICEV and EV technician*

One participant indicated that aligning new pay structures with an accredited training route could incentivise technicians to upskill. Across the focus group, there was overwhelming support for an accreditation scheme – as explored in Chapter Six.

*“The pay structure in this trade in general needs a massive overhaul to get to a certain accreditation. It would be a lot easier to get people through that accreditation if the money was there.” – 36-year-old, ICEV and EV technician*

Existing research indicates that green jobs in the US carry a salary premium compared to the national average.<sup>53</sup> As well as this, IMI analysis of salary data for 2020 shows an earning premium of more than 10% for EV-qualified vehicle technicians compared to non-EV vehicle technicians.<sup>54</sup> It is unclear how these roles are distributed, both geographically and in terms of business type. However, if EV technician roles do already attract higher pay, then this should be better communicated to existing and future technicians to improve the attractiveness of the industry.

### Cost

The cost of training was a secondary barrier for some participants. The cost of IMI courses varies between providers and the course level with some costing over £1,000 for two days. However, participants were not directly aware of the price – this is likely because they are not planning on taking part in training in the short-term.

Participants recognised that small independent workshops may face greater cost-related barriers for investing in equipment and training. Some suggested that small businesses may require financial support to upskill their technicians. The IMI has also recognised the differences in training budgets of independent garages compared to the franchise network, and the challenges that creates for the EV transition. To resolve this challenge, the IMI estimates that a government investment of £15 million could support the training of 75,000 EV technicians, in the context of the £1.9 billion committed in the 2020 Spending Review to supporting the transition to zero-emission vehicles for charging infrastructure and consumer incentives.<sup>55</sup>

### Attitudinal barriers

Attitudinal barriers towards working on EVs were also a key factor which may hinder participants’ willingness to upskill, such as a doubts about EV technology and of learning more broadly.

### Preference for mechanical vehicles

Many participants indicated that they would not enjoy repairing and maintaining EVs because they had a strong preference for mechanical work. The idea of “fixing things with their hands” initially attracted them to the role, which is less relevant to EVs as they have fewer moving parts. As well as this, participants noted that the increasing computerisation of fault finding and diagnostics was less exciting. This was the case even among the younger participants (aged 20 and 27 years old).

*“I don’t particularly want to work on electric cars, not because they’re electric, but I’m a mechanic, you know, I work with nuts and bolts and now it’s becoming plugging into computers. The apprentices we’re taking on now, the first thing we’re asking is ‘are you computer literate?’. The future is going to be reliant on people who can work using a computer like we use a spanner.” – 47-year-old ICEV technician*

*“I wouldn’t mind working on EVs but obviously, you just plug it into the computer and it tells you what’s wrong with it. Whereas, I like working with [ICE] vehicles where you have to actually work out what is wrong with it yourself.” – 27-year-old ICE technician*

*“Anything with an engine, that tends to be what attracted us to the trade in the first place. I don’t think anyone’s excited about electric vehicles. They are great, they function well, but it doesn’t excite me like one that makes some noise from the exhaust.” – 40-year-old ICEV and EV technician*

*“I came into the trade as a mechanic. I like fixing cars, mechanical work, but now I’m going to have to go and get the [EV] courses or else I’ll be out of a job.” – 47-year-old ICEV technician*

Industry stakeholders pushed back on the notion that computerised diagnostics produced all of the answers – technicians would still have to interpret the codes and faults. It is likely that further information and communication is required about the day-to-day tasks of working on EVs. This should be a key feature of any campaign to increase the attractiveness of the industry for existing workers and new entrants.

### **Doubts about EV technology**

Participants also indicated that they had doubts about the reliability, cost, and environmental benefits of EVs. While this was not directly raised as a barrier to retraining, these narratives have a cumulative effect in building negative attitudes towards EVs.

*“People aren’t going to want to own [an EV], because if the battery goes dead, you’re talking £5,000 for a repair. People don’t want to do that. They’re going to rent the cars so they can give them back after three years. And then the dealerships are going to be left with hundreds of cars that people don’t want to buy.” – 36-year-old EV and ICEV technician*

*“I don’t think electric vehicles are even that much more eco-friendly when you think about the cost of making [it]. For electric, you’ve got to get the lithium ion for it.” – 20-year-old ICEV technician*

### **Anxiety about high-voltage vehicles**

For some, the hesitancy around working on EVs related to the health and safety risks of high-voltage vehicles. These participants indicated that some level of anxiety would still likely be present even after hypothetically participating in training.

*“When it comes to electrics, diagnosing electrical faults is probably my main skill if you like. But when it comes to working on high voltage vehicles, I actually get quite anxious about it, because one mistake and it could be game over.” – 40-year-old, ICEV and EV technician*

*“I would be scared of being electrocuted - you go from something that can just give you a little shock to something that could fry you instantly... don’t like that.” – 20-year-old ICEV technician*

Some participants were less concerned about these risks due to the safety equipment and settings that would be available to protect them.

*“I don’t mind working on them because they’ve got fail-safe devices so it’s not like you’re just grabbing random wires.” – 47-year-old ICEV technician*

### **Apprehension towards new skills and knowledge**

Chapter Two highlighted challenges within the industry related to instances of poor prior experiences of formal education. As a result, industry stakeholders indicated that there is an apprehension among some technicians towards participating in formal learning. While some participants echoed these attitudes, the core apprehension was around the need to continually upskill and take on new information and knowledge.

*“For a lot of the guys on here that did their apprenticeship 20 plus years ago, it’s not the natural progression... it’s not what we originally trained for. [...] It’s like a sidestep. So we don’t have the core skills from the original training.”- 35-year-old ICEV and EV technician*

*“We’re still talking about the fundamentals of motor mechanics. But the apprehension comes from the specialist knowledge from each of the electrical manufacturers, all the new parts and the new ways which many of these new vehicles are being configured, and require constant monitoring and updating.” – 63-year-old ICEV and EV technician*

## CHAPTER SIX – POLICY CONSIDERATIONS

The initial research question of this report was to investigate how prepared vehicle technicians are for the upskilling transition to EVs. The findings indicate that in the short-term, upskilling is progressing well among an emerging EV workforce with a current estimated surplus of trained EV technicians to meet existing and near-future demand.<sup>56</sup> While challenges lay ahead for recruitment and training participation, these are perceived to be medium-term, granting policymakers and industry the opportunity to develop and implement solutions.

More broadly than the upskilling agenda, the research findings also reveal further questions about competition, demand and the future structure of the repairs industry. It is beyond the scope of this report to answer these questions in their entirety, but we note their significance as an opportunity for policymakers, think tanks and industry stakeholders to consider and address.

### Recommendations

#### Improve the attractiveness of the industry to get more young people into vehicle repairs

The transition to EVs creates a unique opportunity to recruit more young people and those from underrepresented backgrounds into the automotive industry. EV technician roles are highly skilled, good jobs that contribute to a greener transport sector and economy. However, currently these benefits are not being effectively communicated with students, schools and colleges, or wider society.

Chapter Two highlighted how the industry perceives itself to have an ‘image problem’ based on false or outdated stereotypes of mechanics or garages that are reinforced through culture, media, and careers information, advice and guidance (IAG). It was believed by stakeholders that these perceptions contributed to the decline of young people entering the sector. This is not just an automotive issue, but a challenge that relates to the political and social value assigned to vocational trades more broadly.<sup>57</sup> Previous research by the SMF also reveals that students tend to receive weaker IAG for apprenticeships and vocational routes, compared to university.<sup>58</sup> It is likely that difficulties in attracting young people may also be reflective of wider challenges with apprenticeship policy, whereby young people have seen the biggest decline in apprenticeship starts since the levy was introduced in 2017.<sup>59</sup>

As well as this, the vehicle repairs industry is a predominantly white male workforce. Increasing diversity in the sector should be a key objective of policymakers, employers and trade bodies to ensure that green job opportunities are seized upon as a vehicle for social mobility.

**Policymakers should work with industry leaders and education providers to launch an attractive green careers campaign to get young people and those from underrepresented backgrounds into EV repairs.** This campaign should draw on a policy-led improvement of IAG services for young people and adults, as well as an industry-led information campaign to emphasise the technological and environmental benefits of an EV repairs career.

The Department for Education should work with schools, FE colleges, employers, industry bodies and charities to improve IAG on vocational routes. The SMF has already called for a minimum level of personalised careers support and for all apprenticeship opportunities to be listed on the UCAS system.<sup>60</sup> IAG is not just for young people – adults are largely unaware of IAG services and face significant barriers to accessing them. As previously recommended by the SMF, policymakers should also engage in a large-scale outreach programme to promote adult education and careers services. This should be of particular political significance to ensure the success of the incoming Lifelong Loan Entitlement.

Industry actors should also launch an information campaign to increase the attractiveness of auto repairs, appealing to young people's environmental and technological interests. EVs represent exciting technology that help reduce emissions, and involve working with data, software, and diagnostics. Young people are passionate about the environment, with two-thirds (65%) of 18-24 year olds saying they would prefer a job in the green economy than one outside it, according to a Department for Business Energy and Industrial Strategy survey.<sup>61</sup> As well as this, evidence indicates that there is a salary premium to EV technician roles compared with ICEV.<sup>62</sup> These factors should be clearly communicated to prospective workers as well as existing workers to improve the trade's appeal and mitigate some of the negative attitudes towards EV technology.

**Policymakers should consult with key low-carbon industries, including EV repairs, as part of the Apprenticeship Levy reform to ensure a pipeline of green apprentices for the future.** Following five years of challenges and poor implementation, the SMF welcomes the review of the Apprenticeship Levy announced in the Chancellor's Spring Statement 2022. Critical to this review should be designing a system that allows for greater flexibility and appropriate use of funds to solve the UK's ongoing productivity puzzle and to deliver net zero. Due to the business structure of many industries undergoing a transition to low-carbon services, such as auto repair, home heat and construction, policymakers should look to include these key stakeholders in the levy consultation. These industries rely on sole trader workforces or micro businesses, which are often unable to take on apprentices due to capacity and resource constraints, and the inflexibility of the levy. Policymakers should look to learn lessons from market solutions and Shared Apprenticeship Schemes, such as Cyfle Building Skills, which enable apprentices to be shared across different trades, sole traders and SMEs.<sup>63</sup>

### **Develop a medium-term credible plan to upskill technicians for EVs**

Our research findings indicate that the EV transition is considered to be a medium-term event for the majority of workshops who expect to invest in upskilling towards the end of the decade. This is reasonable given that EVs currently comprise around 2% of the overall car parc – a significant proportion of which will be under warranty and serviced primarily by their franchise dealer for multiple years. It is therefore likely that the current estimated surplus of trained EV technicians work in more specialist workshops, larger retail chains, and franchise dealers. There are also positive indications that trade bodies and training providers are strategically planning and preparing for delivering this upskilling transition.



These are welcome findings that the vehicle repair market has delivered with relatively little direct government intervention – the wider incentives and penalties for drivers to transition to EVs have provided a confident signal to the repairs industry to invest and upskill. However, success thus far is not guaranteed ahead. It is possible that technicians, businesses and training providers with a keen interest in EVs and the resources to invest have been able to transition first, similar to early adopters in the wider market for EVs. However, as highlighted in Chapter Four and Five, barriers to upskilling still exist across the industry.

### **Build confidence in policy plans**

For existing technicians, one of the key barriers to upskilling relates to low confidence in policy plans for charging infrastructure to support EV uptake. While it is beyond the scope of this report to make specific recommendations on charging infrastructure policy, **it is necessary for overall market confidence that policymakers ensure all drivers have access to affordable, reliable and convenient charging.** A previous SMF report on this topic recommends increasing local authorities' funding for chargepoint installation costs; sharing best practice between central government and local government; and improving coordination between Distribution Network Operators and local authorities to identify and invest where the distribution network needs strengthening.<sup>64</sup>

As well as this, the focus group findings revealed a potential lack of understanding of the 2030 phase-out date for the sale of new petrol/diesel vehicles. This raises concerns about the broader public awareness and understanding of government plans. If those working in the industry do not fully understand policy plans, it is unlikely that consumers do either. **Policymakers should improve their communication of key dates and strategies for phasing out ICEVs, particularly among workers that are essential to the success of those plans.**

In the medium-term, as small independent workshops look to upskill their technicians, they may face barriers with the capital costs of equipment and training. At this point, it is too early to suggest whether a policy response may be necessary. Policymakers will need to consider whether supporting small garages, for example through incentives, is in the interest of fair competition in the auto industry. The future of this industry structure and competition is discussed further below.

### **Support colleges to plan for EV repair skills demand and deliver training**

As highlighted in Chapter Four, many colleges lack the capacity and capital to identify emerging skills and set a medium or long-term strategy for developing and delivering new course content. Feedback from colleges that received the Strategic Development Fund highlighted how those additional funds enabled them to work with local businesses to write new course content and purchase vehicles in preparation for the upcoming expected demand. Given the lead time that is available here for EV repair skills, **policymakers should look to learn the lessons from the Strategic Development Fund pilot to support a wider group of colleges that continue to face funding challenges in strategically planning for and investing in emerging skills.**



**As part of this strategic planning, manufacturers, industry bodies and training providers should consider working together to develop a clear accredited training route that teaches the fundamentals of electricity sufficiently prior to upskilling for EVs.** Anxiety about high-voltage vehicles and the risks associated with working on them also act as a barrier for existing technicians. This may, in part, stem from what industry stakeholders described as a lack of electrical skills and a technical understanding of electricity more broadly across the industry. As a result, many market-based training providers are introducing additional resources for technicians to complete prior to participating in EV repair courses, separate from the qualification course content. Some stakeholders suggested these resources included short at-home PowerPoint presentation or reading materials. This fundamental knowledge is critical to understanding working safely and fixing faults on a high-voltage vehicle. Therefore, a high-quality, accredited offer should be developed for technicians as a prerequisite to their broader EV repairs training.

### **Introduce a mandatory licence to operate in the repair and maintenance industry**

The auto repairs industry is characterised by light-touch regulation with no mandatory accreditation or licensing requirements for technicians outside of annual MOTs. Not all technicians and workshops offer MOTs, meaning that some technicians performing routine vehicle maintenance and repairs could have zero formal automotive training or qualifications. Due to this lack of regulation, there is limited data to even investigate the size of the unqualified workforce. Three in ten (30.23%) of cars failed their MOT in 2021, of which around one in ten (8.5%) failed with at least one dangerous item.<sup>65</sup> While it is not possible to attribute these failures to any single source, policymakers should be striving for the highest safety for technicians, drivers, and pedestrians, particularly given the damage that is possible with high-voltage vehicles. In contrast, comparative trades such as gas heating engineers are required by law to have, at minimum, a Gas Safe certification that must be renewed every three years to work on gas boilers.

**Policymakers should establish a technician's licensing scheme with an integrated safety certification.** Following a lack of government action in response to repeated calls for a licensing scheme, the IMI introduced its own market-based EV voluntary licence to practise in 2013.<sup>66</sup> This is now integrated as part of the IMI's EV TechSafe accreditation. In 2018, the Department for Transport confirmed its support for the introduction of a regulatory standard or licence to practise to ensure technicians are well trained in the skills needed to work safely.<sup>67</sup> However, it is unclear what progress has been made here. The Office for Low Emission Vehicles officially endorsed the IMI voluntary standard in 2019, indicating that the government does not intend on pursuing further regulation.<sup>68</sup> As well as this, the Motor Ombudsman has its own separate accreditation badge for workshops through the Chartered Trading Standards Institute-approved Codes of Practice, which does not apply to individual technicians. This approach to achieving safety and high standards is both patchy and complex. The Department for Transport should look to establish a technician's licensing scheme, similar to the recently announced National Landlord's Register for the private rented sector, so that at a minimum, all technicians and workshops are registered and traceable.

Policymakers should also introduce a mandatory safety certification that is integrated into the licensing scheme that includes high-voltage vehicle safety. Taken together, these mechanisms can contribute to professionalising the industry in line with similar trades such as electricians or gas workers, thus improving its attractiveness in the labour market.

All focus group participants were supportive of an introduction of a mandatory register and accreditation.

*“As time and technology has moved on, there’s a requirement for people in other professions to have a special qualification. More of these things ought to be implemented, at a reasonable price. Like a licence to operate. It separates the wheat from the chaff and tells everyone with a record online of your accreditation and your reputation.” – 63-year-old ICEV and EV technician*

Participants offered the caveat that given the legacy of a lack of formal qualifications in the industry, caution and fairness should be exercised with older technicians that may be highly skilled but lack a ‘paper trail’ of certification.

Additionally, industry stakeholders highlighted that a skills lag currently exists in the industry for advanced technology and electrical skills more broadly. This was partly related to the speed of vehicle technological advancement (meaning that a lag is inevitable) and partly due to the nature of CPD in the industry, which is often informal and on-the-job. Introducing a mandatory licensing scheme and accreditation into the market, alongside a credible plan to invest in upskilling for EVs, could provide the signals and structure to the industry to mitigate this lag.

### **Create the conditions for fair competition**

Competition within the auto repairs industry is currently characterised as monopolistic, and is protected by policies such as the Motor Vehicle Block Exemption Regulation (MVBBER). Essentially, this provides the legal right for the independent repairs market to access the materials and information required from manufacturers to repair and service their vehicles. The existence of a market that is independent from manufacturers and their franchise agreements provides consumer choice on various economic, social and personal factors. If policymakers judge this to be a good thing, which social market theory suggests it is, they should therefore be mindful of behaviours that could jeopardise competition by undermining the principles of an independent market.

This report identifies emerging trends that could jeopardise competition within the auto repairs market by undermining these principles of an independent market. These trends include reduced data-sharing and software accessibility; bundled repairs and servicing packages for leasing and subscription models; and, more tentatively, EV upskilling.

**Policymakers should introduce a renewed MVBER that ensures the independent sector has sufficient legal access to materials, information and connectivity.** The EU MVBER legislation was retained by the UK as part of the Brexit transition period and is due to expire at the end of May 2023. The EU Commission and the UK CMA are in the process of consulting on updated regulation that will replace the existing MVBER – both of which recognise the increasingly important role of technical information and in-vehicle data in market competition. The CMA’s preliminary review published this summer recommended that the retained MVBER be replaced by a broadly similar motor vehicle block exemption order (MVBE) that would ensure continuity while also including amendments to improve the block exemption and reflect market developments. This recommendation is welcome in principle, however, the details of the second consultation response remain to be seen. CMA policymakers should ensure that a new MVBE sufficiently addresses claims of manufacturers limiting software access and connectivity (as described by stakeholders in Chapter Three).

Industry stakeholders expressed concern that the UK government would attempt to implement its own version of the legislation, despite having limited institutional expertise on the subject due to primarily EU government oversight for the past 20 years. Stakeholders’ preference would be to implement legislation in line with the EU’s updates. The CMA’s preliminary review left the question of diverging from the EU’s approach open, deciding to be *“guided by what is best for UK consumers and businesses when balancing these considerations”*.<sup>69</sup> In its upcoming second consultation response, the CMA should form a clear judgement on whether the EU’s updated legislation is sufficient in enabling fair competition for the independent repairs market, and whether the UK government has sufficient institutional expertise to implement its own bespoke legislation.

**Policymakers should be mindful of the competition implications of evolving leasing and subscription services that include maintenance packages.** The nature of these business models raises important questions around consumer choice and transparency, if manufacturers or third parties are able to control where vehicles are serviced. Previous SMF research highlights the risks of increased bundling in telecoms which may provide lessons for policymakers – namely that bundling services can decrease the likelihood of an individual switching supplier for a given product.<sup>70</sup>

Looking ahead, the existence of a productive independent market matters for competition, but the structure of that market may evolve and should be allowed to so long as it is still delivering good consumer outcomes. Industry stakeholders are passionate about supporting small independent workshops to keep pace with technological advancements and upskill, such as for the transition to EVs. However, in some cases, consolidation could leverage more capital and resources to invest in skills and equipment, which ultimately may be more beneficial for employers, workers, and consumers. This may be of particular relevance if the uptake of EVs over the long-term causes a reduction in the demand for maintenance, and thus technicians. **Industry bodies, employers and policymakers should use this lead time to think coherently about the future structure of demand and labour in the auto repairs industry, and look to support businesses and workers through any restructure.**

## ENDNOTES

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