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PLANES, TRAINS AND AUTOMOBILES

HOW GREEN TRANSPORT CAN DRIVE MANUFACTURING GROWTH IN THE UK

Simone Gasperin and
Pranesh Narayanan

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SUMMARY

THE NEED FOR AN INDUSTRIAL STRATEGY FOR GREEN TRANSPORT MANUFACTURING

Transport is essential to our lives. Unfortunately, it is currently also the largest source of UK domestic carbon emissions. Along with investment in infrastructure, the production of green transport equipment – electric trains and cars, for example – here in the UK, is the solution, for which there will be high demand, both domestically and abroad. The UK is well placed to capture this green growth potential, with existing areas of advantage and specialisation in transport manufacturing. The government should lean into these strengths, supporting transport manufacturing clusters across the country.

THE UK'S OPPORTUNITIES IN TRANSPORT MANUFACTURING

Where they exist, green transport products such as electric vehicles (EVs) – cars, buses, coaches and vans – are seeing much stronger trade growth than fossil fuel products. Our analysis of the UK's specialisations in transport manufacturing points to several opportunities to use the market disruption that the green transition will cause:

- In **road transport**, the UK can build on a solid manufacturing base to grow the production of **EVs**. The UK also has a specialisation in urban mobility-focussed bicycles. However, battery manufacturing capabilities need to be developed to fully capture future growth opportunities.
- In **civil aerospace**, the UK is a world leader in advanced manufacturing and has a solid and competitive supply chain and innovation ecosystem. **Jet engines and wings** are some key strengths. In the short term, the focus should be on developing the energy efficiency of existing technologies, but the long-term focus should be on zero emission flight.
- **Rail manufacturing** has been recovering in the past decade, but UK specialisation is geared towards assembly. Much of the value is in components – the upstream supply chain.

Maritime is unlikely to be an opportunity for growth in green transport manufacturing – the UK's capabilities are mostly in military productions.

HOW TO INTEGRATE GREEN TRANSPORT MANUFACTURING INTO AN INDUSTRIAL STRATEGY

As the UK government outlines its industrial strategy, green transport manufacturing should be a central focus, addressing major sectors that the government has identified, including clean energy industries and advanced manufacturing. A successful industrial strategy for green transport manufacturing must align fairer and greener transport policies with domestic production opportunities across all transport modes. This requires moving beyond a sectoral approach and embracing a cross-departmental policy planning framework. Specifically, an interministerial committee – comprising the Department for Business and Trade (DBT), Department for Energy Security and Net Zero (DESNZ), Department for Science, Innovation and Technology (DSIT) and Department for Transport (DfT) – could be established, supervised by a dedicated taskforce under the Industrial Strategy Advisory Council.

COMMON CHALLENGES, OPPORTUNITIES AND RECOMMENDATIONS FOR GREEN TRANSPORT MANUFACTURING

Electrification and infrastructure investment to unlock the market for green transport products

Transport decarbonisation hinges on green electrification. Inadequate charging infrastructure and high electricity costs remain major barriers to progress. High industrial electricity costs affect the competitiveness of UK manufacturers of transport equipment, particularly when operating on international markets. While the newly established Great British Energy could provide clean and more affordable energy to businesses, reforming the electricity market is necessary to structurally bring prices down. Further and more diffused investment in electric charging infrastructure, with value added tax (VAT) discounts, could finally create a domestic mass market for EV products.

Strengthening the supply chains for securing competitiveness, growth and resilience

Stronger domestic supply chains are crucial for future competitiveness, resilience and growth across the transport sectors, given their export potential and the commonality of certain production activities. Direct financing through the National Wealth Fund for equity financing and joint ventures with foreign players, alongside British Business Bank support for domestic firms, could play a key supporting role in reinforcing UK transport manufacturing supply chains. National training programmes for transport manufacturing are instrumental in attracting foreign investment, through the availability of a local skilled workforce.

POLICY RECOMMENDATIONS FOR THE TRANSPORT MODES AND PRODUCTS

Road transport

- **Electric vehicles (EVs).** Using fewer fossil fuel cars and producing more EVs are possible in the UK, given that domestic car manufacturing accounts for just 9 per cent of the UK's car registrations. Nonetheless, the inadequacy of charging infrastructure, especially its high upfront costs, hampers the expansion of EV manufacturing. Monetary incentives to lower-income buyers, conditional on EVs being manufactured in the UK, could create a domestic mass market for these products. This would enable manufacturers to plan and invest for the green transition.
- **Buses and coaches.** Expanding investment in public transport is needed to boost demand for buses and coaches. Beyond that, centralising procurement for such vehicles under a publicly owned national entity would provide domestic manufacturers the certainty needed to better plan production capacity and make new investments.
- **Electric batteries.** Investment in gigafactories requires an 'anchor' customer and strong, government-backed financial support. Incentives for buyers linked to domestic content could support the first, while partnerships with specialised East Asian leading firms could be facilitated through the National Wealth Fund, entering joint ventures as a minority shareholder and thus providing long-term equity financial support.
- **Bicycles and e-bicycles (e-bikes).** Increased investment in cycling infrastructure, especially outside London, could drive demand for UK-manufactured bicycles. Levelling tariffs with European counterparts would be essential to counter unfair pricing from China.

Rail transport

Rolling stock manufacturing in the UK will benefit from a planned expansion of UK railways. The newly established Great British Railways should not just operate train services but also purchase and own newly produced trains, ensuring stable procurement volumes, with criteria for reinforcing UK-based supply chains.

Financial support from the National Wealth Fund for foreign investments and from British Business Bank for growing existing players should facilitate supply-chain expansion and efficiency improvements.

Air transport

The UK's leadership in civil aerospace depends on continued investment in research, innovation and engineering capabilities. Strengthening the UK's role in the European aerospace supply chain – coordinated by Airbus – and leading in future zero emission aircraft development will be crucial for maintaining global competitiveness.

THE CASE FOR ACTION

The UK cannot and should not try to be good at manufacturing everything. But there are some sectors that, if supported, could help reinvigorate economic growth by diversifying the economy, share the benefits of growth by supporting clusters of value creation outside London and the South East, and help secure our transition to net zero. Green transport is one of those sectors. Internationally, we have seen what happens when countries try to stick their heads in the sand and avoid the low-carbon transition – they end up being bested by (often Chinese) insurgent competitors. The UK has specialisms in green transport, although some of them are fragile. Now is the time to act to support the UK economy and industry to seize these green growth opportunities.

1. TRANSPORT PRODUCTS FOR GREEN GROWTH

THE UK'S TRANSPORT SYSTEM NEEDS AN UPGRADE

Transport plays a central role in our society. It enables individuals to overcome the great barriers of geography to connect with their families, friends and economic opportunities. It allows society to expand its horizons – today, people and goods move around the world at staggering volumes, accessing new markets, skills and cultures.

However, we still largely use the transport systems of the 19th and 20th centuries, which were not built with modern society in mind. Growth in transport and mobility has driven an explosion of fossil fuel usage and carbon emissions over the past century. In several advanced economies, transport is now the largest source of carbon dioxide (CO_2) emissions. Therefore today we need a transport revolution – putting our vital transport system on a sustainable footing, so that we can continue to reap its great benefits without further compromising the planet and ensuring that our mobility is resilient to the effects of a changing climate.

The UK's current transport system is holding economic growth back and entrenching inequalities (Frost and Singer Hobbs 2024, Marioni 2024). UK cities are now caught in the worst of both worlds when it comes to connectivity, with poor road infrastructure compared with cities in the US and worse public transport than cities in Europe (Burn-Murdoch 2023). Passengers on the UK rail network pay some of the highest prices in Europe, particularly on the most popular commuter routes (Thévenet and Enriquez 2024). The UK also has some of the lowest levels of active travel (walking, wheeling and cycling) in Europe, owing to underinvestment in infrastructure and a lack of strategic urban planning (Singer Hobbs and Frost 2024). Taken together, high costs and systemic inefficiencies in transport are effectively transaction costs on all productive activity, cholesterol blocking the arteries of a functioning economy.

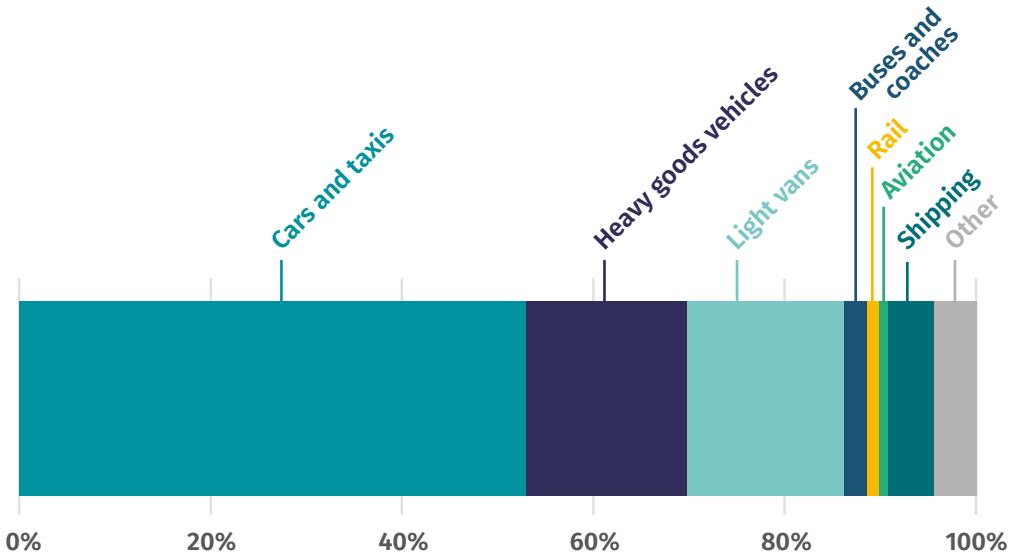
The system is also putting our climate and environment at risk – as already noted, **transport is the biggest source of CO_2 emissions in the UK**, and it has proven very difficult to make progress on this. Petrol and diesel road vehicles, which account for 89 per cent of domestic transport emissions, are the main culprits (figure 1.1). The majority of this comes from fossil fuel powered private cars, but emissions from commercial travel and goods transport (heavy goods vehicles and vans) are also significant. Public transport (trains and buses) account for less than 5 per cent, and is much more sustainable when considering emissions on a per-passenger basis (Ritchie 2023). A transport system that works for the economy, people and planet would have many more public transport services and fewer private cars. Where there is a role for private cars, these should be zero emission vehicles (ZEVs) – ideally battery powered EVs.

Air travel and shipping are not significant contributors to domestic emissions, but they are nonetheless incredibly carbon intensive and contribute significantly to international transport emissions. Air travel has the highest emissions per user and the distribution of these is overwhelmingly skewed towards wealthy frequent fliers (Possible 2023).

FIGURE 1.1

The overwhelming majority of domestic emissions comes from road vehicles

Share of 2022 domestic transport emissions by transport mode



Source: DfT 'Greenhouse gas emissions from transport in 2022' (DfT 2024a)

However, the UK government has an ambition to improve the system, with several policy programmes taking shape since the 2024 general election:

- The new government has pledged to develop a national integrated transport strategy (DfT 2024b).
- A new strategy for rail is emerging, with the commitment to replace the privatised rail franchising system with Great British Railways, consolidating Network Rail's infrastructure with passenger service operations (DfT 2025).
- Metro mayors will be given more powers to develop their regions' rail and bus networks (MHCLG 2024a). And the Buses Bill will deliver up to £1 billion more funding for bus services across England (DfT 2024c).
- Work is underway to build a credible pathway to ZEVs, balancing the needs of consumers and industry (DfT 2024d).

Zero emission buses and electrified rail, powered by clean energy, could not only generate sustainable growth but also improve living standards for vast numbers of people through improved access to transport. Expanding public transport would also mean lower private vehicle usage, which would generate additional benefits such as improved air quality, more efficient journey times and space for more community-minded urban planning.

There remain technological challenges, such as in aviation – decarbonisation is particularly difficult in the aviation industry and truly zero emission long-haul flights are decades away, although innovations in electric aircraft are emerging for short-haul flights. Better rail connectivity could play a role here, but this is likely to have limited scope for large emission reductions without demand reduction and behavioural change (Morgan et al 2025). Maritime transport faces similar difficulties – smaller vessels could feasibly run on electricity, but the largest vessels will take decades to decarbonise and there is higher uncertainty on how to get there. Unlike other transport modes, issues around aviation and shipping also require significant global collaboration.

These changes are part of a significant shift in the trajectory of transport markets, with new investment set to take place, leading to demand and disruption. This creates both challenges and significant opportunities for manufacturers of transport equipment – a significant part of the UK's industrial base and its heritage.

ALL TRANSPORT IS MANUFACTURED

Today, a trip from central London to Edinburgh takes under five hours. Before the invention of railways and motor cars, this journey took a fortnight to complete by stagecoach. The industrial revolution contained within it a transport revolution, driven by the world's first experiment in mass transit systems through **railways**, built by luminaries such as Isambard Kingdom Brunel. But, of course, this was also part of the *industrial* revolution, as demand for railway tracks and locomotives fuelled steelworks, foundries, factories and merchants.

In the 20th century, another transport revolution came – this time the advent of the mass-manufactured **motor car**. Tarmacked motorways and roads multiplied, and factories built to supply vehicles to the wartime front line were converted to produce cars to transport people all over the UK.

Air travel took off in the post-war era, a symbol of globalisation, of increasing horizons. Especially after the widespread diffusion of jet airliners[1] in the late 1950s, air travel rapidly overtook **maritime transport** as the dominant mode of intercontinental travel. This fed demand to commercial aircraft manufacturing, once again evolving out of factories that built warplanes. The UK continues to have leadership in this area.

Investment in new and better modes of transport drives global demand for productive and innovative transport manufacturing. High-value automotive, rail, aerospace and maritime manufacturing continue to be significant sectors in the global economy, providing the world with the equipment needed to transport goods and people.

With the deindustrialisation of Western economies and the global shift of manufacturing supply chains towards Asia, British transport manufacturing took a hit. Hypercompetitive industries in China, Japan and South Korea – developed through decades of long-term industrial policies (Amsden 1989, Okimoto 1989, Wade 1990) – challenged and eventually displaced British competitors. However, transport manufacturing continues to make a significant contribution to British manufacturing industry.

Net zero has already begun to disrupt transport markets – the adoption of net zero policy and targets around the world has led to remarkable growth in the development and deployment of EVs. The most visible winners have been Chinese manufacturers who developed a competitive edge in battery manufacturing along its entire supply chain, reaping the rewards of inward investment from Western companies and building on this with remarkable innovation and industrial policy support and coordination.

It is important to make two points regarding this. First, that there is still an opportunity for UK-based manufacturers to compete, but this window is closing. Second, that a green transport system is broader than road vehicles and so other opportunities must also be assessed.

1 The world's first jet airliner was the British De Havilland Comet, which entered into service in 1952.

THE MANUFACTURING OPPORTUNITIES OF A GREEN TRANSPORT SYSTEM

Someone, somewhere in the world, will have to make the vehicles and components that we need to buy to achieve net zero. Transport manufacturing supply chains are complex and span many countries. Businesses that currently sit in this chain will need to pivot, investing and innovating their way through the market disruption, otherwise they will be competed away by new businesses that emerge to solve the problems of the net zero future rather than the fossil fuel past.

The decline in the UK's manufacturing industry is evident from the diminishing size of its workforce, from the reduction in the share of manufacturing value added over total Gross Domestic Product (GDP) and from the worsening of productivity (Coyle and Mei 2023) and the trade balance for goods (Rowthorn and Coutts 2013; Jacobs et al 2017). However, as highlighted in IPPR's recent work, *Manufacturing matters*, despite the decline of the sector overall, the UK continues to have strong capabilities in transport manufacturing, and these can be leveraged and oriented towards green transport equipment and supply chains (Narayanan et al 2024). Specifically, the UK has the infrastructure, knowledge and innovation centres that provide a launch pad for seizing manufacturing opportunities arising from the transition to a more sustainable transport system.

A successful growth strategy will align those strengths with expected areas of future global demand. Looking across supply chains for transport equipment relative to the **four main modes of transport – road, rail, air and maritime** – we can get a picture of where the growth opportunities lie.

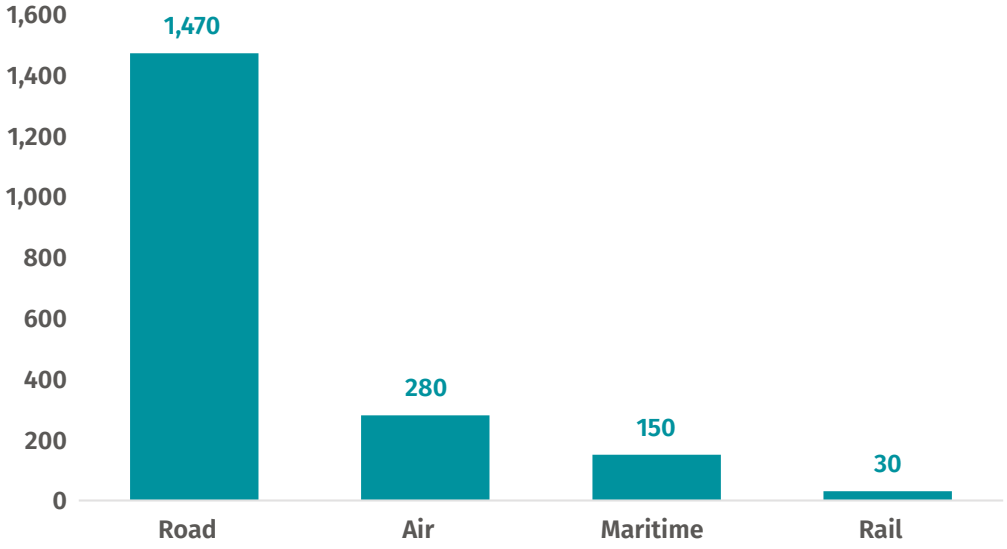
A large part of the growth potential from transport manufacturing comes from securing a bigger share of growing export markets. Our analysis of modern vehicle and equipment supply chains across road, rail, aviation and maritime transport shows that road has by far the largest global trade market (figure 1.2).[2] The manufacturing of road vehicles, both fossil fuel and green, involves components crossing borders several times before they are made into finished products. Aviation and maritime trade exhibit similar characteristics, with the bulk of trade flows coming from components and engines rather than finished goods. Trade flows in the rail supply chain are much lower than for the other modes, suggesting that much of the global value added comes from material inputs and domestic production.

2 This analysis looks at components and end products, but not material inputs.

FIGURE 1.2

The supply chain for road transport is by far the largest trade market of the four modes of transport

Value of global trade flows (2018–22 average, £ billion)



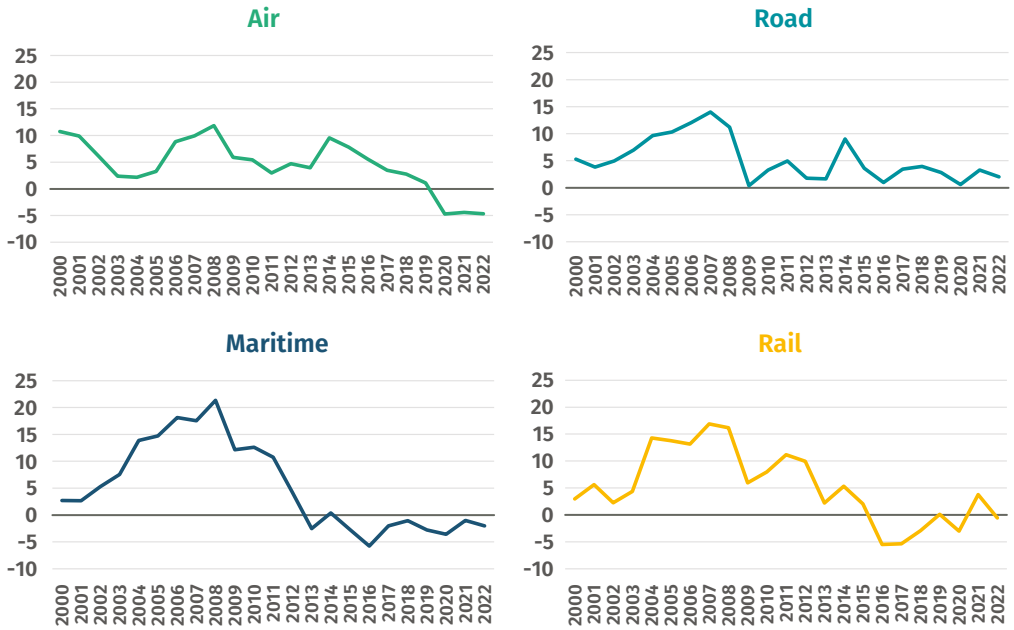
Source: IPPR analysis based on CEPII's BACI trade database (CEPPII 2024)

In recent years, road transport trade flows have seen the most consistent growth, despite disruptions that the Covid-19 pandemic caused (figure 1.3). Growth in trade flows across other modes of transport has been in decline. The obvious route to export growth is, therefore, building capabilities in growing parts of road transport supply chains. However, there has been a significant recovery in demand in air transport supply chains in more recent years (Make UK 2024). Industry reports and our interviewed stakeholders flagged this, but it does not appear in our trade dataset, which ends in 2022.

FIGURE 1.3

Road is the only transport mode that has seen continuous positive growth in trade since 2000

Five-year rolling average growth rates in global supply-chain trade flows by transport mode (%)



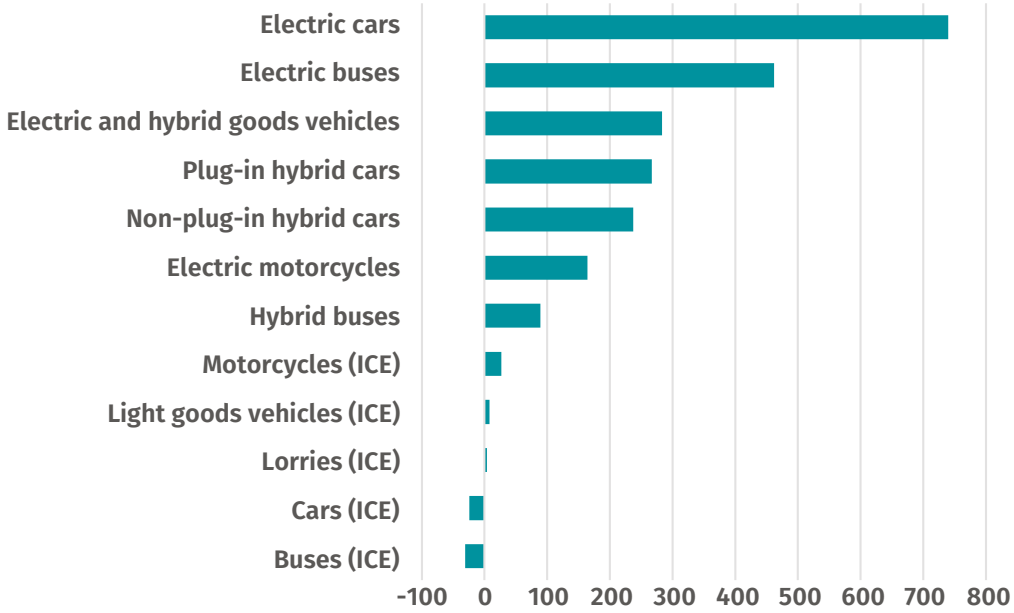
Source: IPPR analysis based on CEPII's BACI trade database (CEPPII 2024)

There is evidence that, where net zero technologies exist, they are seeing much stronger growth in trade than their fossil fuel alternatives. For example, average growth rates in trade flows for zero emission road vehicles are much stronger than for internal combustion engine equivalents (figure 1.4). While zero emission vehicles (ZEVs) are growing from a low base, this shows that consumers and businesses think they are the future. There is a good chance that the world has already reached a peak in combustion engine vehicles (BloombergNEF 2023). A similar trend is being seen in rail, where electrification is the priority. The railway system in India, for example, is one of the largest rail networks in the world, it began a programme of electrification in 2015 that has made rapid progress (Ferris 2024) and the country is on track to hit almost 100 per cent electrification in 2025. This trend is also borne out in trade flows, where diesel locomotives have been shrinking while electric models have been growing.

FIGURE 1.4

Zero emission road vehicles have seen much stronger growth in trade than internal combustion engine (ICE) vehicles in recent years

Growth in global export values by vehicle type between 2018 and 2022 (%)



Source: IPPR analysis based on CEPII's BACI trade database (CEPPII 2024)
Note: ICE = internal combustion engine.

Other growth opportunities are likely to be more domestically focussed, with a higher role for public investment in transport infrastructure and services. Public investment in areas where the UK has manufacturing potential, particularly bus and rail manufacturing, can generate growth. Procurement of vehicles for public transport systems can boost domestic supply chain competitiveness and provide an opportunity to expand exports in the longer term.

THE ROLE OF INDUSTRIAL STRATEGY FOR GREEN TRANSPORT MANUFACTURING

Transport manufacturing has the potential to drive green economic growth across the UK, improving the economy's overall competitiveness and resilience in a world that is increasingly facing trade disruptions.

This is where the government's industrial strategy is so vital. The UK's transport manufacturers are an economic strength, but their continued success is not guaranteed without strategic government support. Other major economies – notably China but also the US and the EU – are actively supporting their industries in this. The UK must join the race or it will lose out on strategically and economically important capabilities that are necessary for a truly 21st-century economy.

In *Invest 2035*, the new government's industrial strategy green paper, advanced manufacturing and clean energy industries are highlighted as two of the eight priority areas for building UK competitiveness (DBT 2024). Green transport manufacturing sits across both areas. Supporting transport manufacturers is essential to arresting the decline of the diversity of the UK economy as it will generate productivity gains and regionally balanced, export-led growth.

Encouraging these manufacturers to innovate towards green transport equipment ensures their future competitiveness and advances the UK's goal to take bold leadership in the net zero transition both at home and abroad.

In the rest of this report, we assess the UK's capabilities and opportunities in transport manufacturing across the four modes of transport (chapter 2), outline its regional clustering (chapter 3) and, on that basis, develop a comprehensive set of recommendations amounting to an industrial strategy for green transport manufacturing in the UK (chapter 4), before offering our conclusions (chapter 5).

2. THE UK'S COMPARATIVE SPECIALISATION IN TRANSPORT MANUFACTURING

THE SIZE OF TRANSPORT MANUFACTURING IN THE UK

Around 5,000 enterprises in the UK are directly involved in transport manufacturing. They directly account for 1.1 per cent of the national economy and 0.8 per cent of total employment.[3] **Transport manufacturing is the second largest broad category of manufactured products in the UK** – after the manufacture of food and beverages – and it represents almost a 10th of the overall national manufacturing sector in terms of value added and employment.

Within transport manufacturing, almost half of total employees and value added is captured by the production of motor vehicles for road transport, followed by aerospace,[4] shipbuilding,[5] rail and other transport vehicles (including bicycles) (figure 2.1).

While most of the growth opportunities in absolute terms reside in car making and aerospace, with capacity to capture both domestic and foreign markets, other more domestically focussed activities such as bus and rolling stock manufacturing still display a significant potential for economic expansion. Moreover, their importance goes further and has to do with common intersectoral relations regarding skills, components, civil engineering infrastructure, access to basic materials and critical minerals, and the availability of software.

3 These are the authors' estimates based on Office for National Statistics' (ONS) Annual Business Survey data and include the following categories: manufacture of motor vehicles and components; manufacture of railway locomotives and rolling stock; manufacture of air and spacecraft and related machinery; manufacture of ships and boats; and manufacture of transport equipment not elsewhere classified.

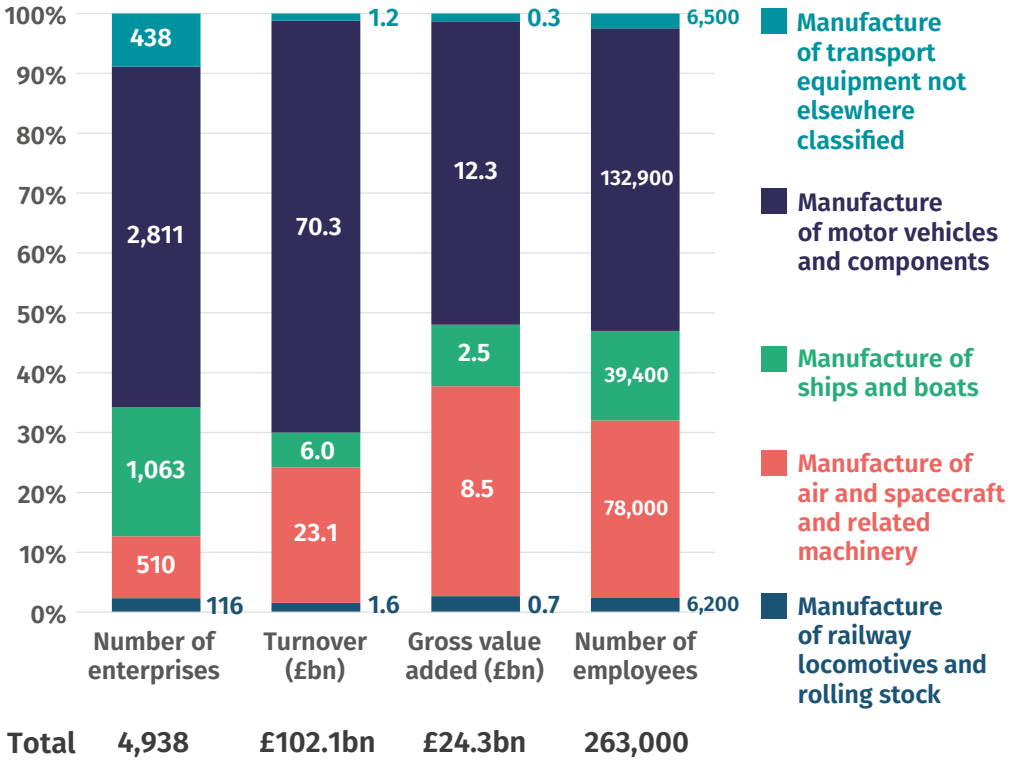
4 Data for the manufacturing of aircraft and ships is taken from the ONS's Structural Business Survey and includes military productions.

5 Shipbuilding includes military productions, representing the predominant share of UK shipbuilding activities, but also specialised vessels for infrastructure.

FIGURE 2.1

The size of transport manufacturing in the UK

Absolute values and shares (%) of UK transport manufacturing activities in the year 2022



Source: IPPR analysis based on ONS Annual Business Survey (ONS 2024b) and Business Register and Employment Survey (ONS 2024a)
Note: Data for the manufacturing of aircraft and ships includes military productions.

TRANSPORT MANUFACTURING IN THE UK VERSUS THE REST OF EUROPE

Road transport manufacturing

The long history of the British motor industry has been marked by periods of success and crisis (Owen 1999). While far ahead of France and West Germany until the late 1950s, Britain's car manufacturing industry faced an existential crisis in the following decades. This was eventually overcome through the painful rationalisation of the state-owned British Leyland during the 1970s and the implementation of far-sighted policies in the 1980s to attract foreign investment (Pourvand 2013) – most notably from Japanese companies Nissan and Toyota.

Today, the automotive sector, particularly the segment concerning the production of passenger cars, is the most relevant within the road transport category. It is also the largest exporter of goods, accounting for 13.9 per cent of total UK goods exports (Croucher and Marongiu 2024).

However, the number of cars produced in recent years has fallen to levels last seen in the early 1950s. With just 779,584 units built in 2024 (SMMT 2025a), car production is down by 55 per cent compared with 2016, when production started to gradually decline, while globally it has remained broadly on the same levels despite fluctuations during the Covid-19 pandemic period (OICA 2017a, 2024a).

Other European countries have faced similar challenges too. UK production of passenger cars, while remaining behind Germany and Spain, has been close to other leading European manufacturers such as France and Slovakia, and is far ahead of Italy and Poland (table 2.1). **The UK is currently the sixth largest manufacturer of passenger cars in Europe.** This intermediate European ranking of the UK car manufacturing industry is also reflected in structural business data on employment and gross value added.[6]

TABLE 2.1

Number of passenger cars manufactured in 2023 by country

Rank	Country	Number of cars manufactured
1	China	26,123,757
2	Japan	7,765,428
3	India	4,783,628
4	Germany	4,109,371
5	South Korea	3,908,747
6	Spain	1,907,050
7	Brazil	1,781,612
8	US	1,745,171
9	Czech Republic	1,397,816
10	Indonesia	1,180,355
11	Iran	1,087,295
12	Slovakia	1,080,000
13	France	1,026,690
14	Turkey	952,667
15	**UK**	**905,117**
16	Mexico	903,753
17	Malaysia	724,891
18	Thailand	580,857
19	Italy	541,953
20	Russia	526,439
21	Romania	513,050
22	Hungary	507,225
23	Morocco	471,950
24	Uzbekistan	421,414
25	Canada	376,588
26	South Africa	336,980
27	Argentina	304,783
28	Poland	299,300
29	Belgium	285,159
30	Sweden	276,750

Total	**Europe (EU27+UK)**	**13,409,424**
Total	**World**	**68,020,264**

Source: OICA 'World motor vehicle production by country/region and type – passenger cars' (OICA 2024a)

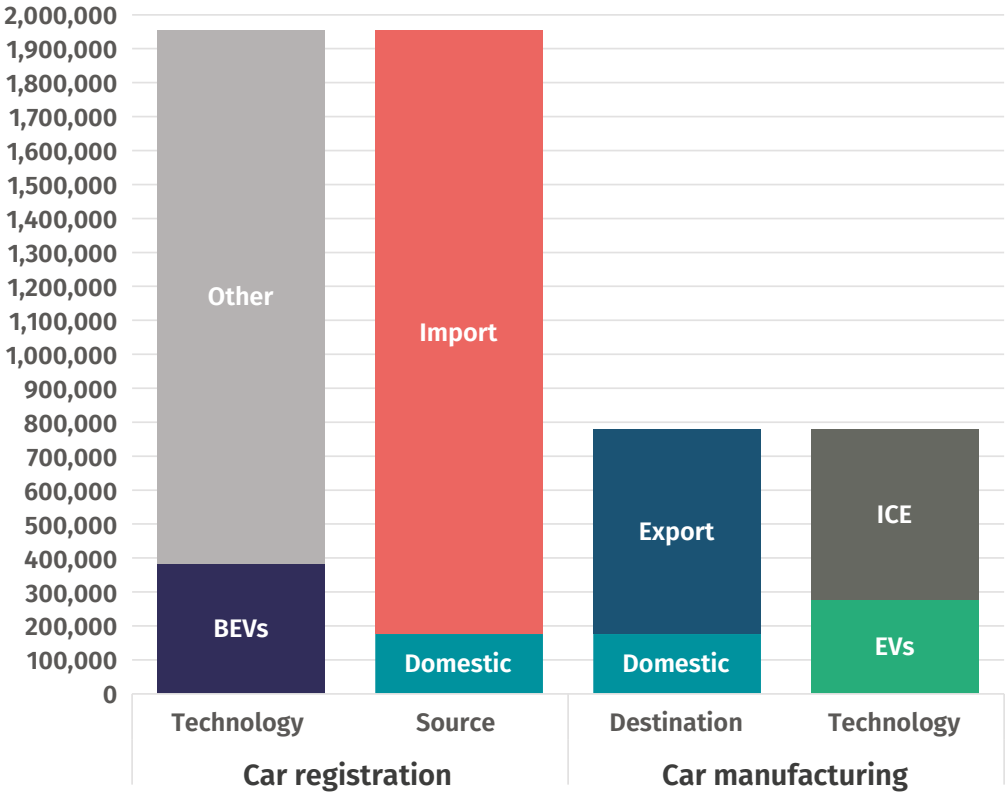
6 When it comes to 'manufacture of motor vehicle', the UK surpasses Spain and Italy (Eurostat 2024).

As reported in figure 2.2, more than 600,000 vehicles manufactured in the UK are exported – approximately 77.5 per cent of total manufactured units. Traditional internal combustion engine models still dominate production, with more than half a million making up 64.6 per cent of all vehicles manufactured.

FIGURE 2.2

Car manufacturing in the UK is now 2.5 times lower than car registration

Car registration in the UK by technology and source compared with car manufacturing in the UK by destination and technology in 2024



Source: IPPR analysis based on SMMT 'UK car manufacturing' (SMMT 2025a) and 'December 2024 new car registrations' (SMMT 2025b)

Notes: BEVs = battery electric vehicles, 'EVs' here refers to the broader category of EVs including plug-in hybrid and hybrid electric vehicles and ICE = internal combustion engine.

Looking at which parts of the car British industry produces, the UK's relative strength in car assembly and bodies for motor vehicles is **not adequately matched by the manufacturing of components**. For instance, the UK significantly falls behind Italy in making electrical and electronic equipment and in the production of parts and accessories for motor vehicles, with less than half the production value,[7] despite assembling more than twice as many cars annually.

The UK's relatively weaker specialisation in making automotive components is also reflected in production value figures for single products, where the UK features among the top five European producers[8] only with regards to bodies (fifth) and seats (fourth) for motor vehicles. It also shows up in trade figures, where the UK

7 Authors' analysis based on the ONS's Annual Business Survey (ONS 2024b) and Eurostat's structural business data (Eurostat 2024).

8 Germany consistently ranks as the European leader in the production of automotive components.

has a marginal revealed comparative advantage in finished combustion engine and zero emission cars but no such results for components or subcomponents of these vehicles. However, EVs represent a significant opportunity for growth of the UK economy, and UK manufacturing specifically (Smith et al 2025).

When it comes to the manufacturing of large buses and coaches, the UK has been losing ground in the past decade, with production levels down from over 3,000 units in 2016 to only 560 in 2023[9] (OICA 2017b, 2024b). Nevertheless, **the UK still ranks fifth in Europe when it comes to the production of motor vehicles for the transport of 10 or more people and to bus bodies**. Available production data shows UK leadership in re-treaded rubber tyres for buses, but also foreign dependency on major components in both traditional internal combustion engines and electric buses, as our stakeholders confirmed. The UK had a small comparative advantage in finished hybrid buses between 2018 and 2022 but not in any other types of buses.

While remaining a relatively small economic activity, UK bicycle manufacturing displays a significant potential. Recent growth in production and exports represents a modest signal of a domestic industry renewal. In fact, after Raleigh's closure of its Nottingham factory in 2002, the UK annual production of bicycles fell from over 1 million in 2000 to just 20,000, 10 years later, while overall European production only marginally declined from 14.5 million in 2000 to 12.2 million in 2010 (CONEBI 2021). Since 2010, UK bicycle manufacturing has been recovering, driven by its specialisation in urban mobility, with leading companies such as the London-based Brompton and Bradford-on-Avon's Moulton Bicycle Company. One indication of this trend is the steady growth of exports since the early 2000s, reaching approximately £114 million in 2022. However, **bicycle manufacturing in the UK still ranks well behind other European countries when it comes to assembling the finished product (12th)**, while it does slightly better in making parts and accessories (sixth position in Europe).

Rail transport manufacturing

The UK went from being the country that invented the first modern rail locomotive with Richard Trevithick in 1804 (Allen 2009), to seeing its rolling stock manufacturing capacity almost wiped out at the beginning of this century.

Decades of underinvestment dating back before the privatisation of British Rail have profoundly affected the UK rail manufacturing industry and its supply chain. Unlike France (Alstom), Germany (Siemens), Italy (AnsaldoBreda), Poland (PESA), Spain (CAF) and Switzerland (Stadler), until a few years ago, the UK had not retained a domestic manufacturer of rolling stock ever since Alstom's acquisition of Metro-Cammell in 1989 and the privatisation of British Rail Engineering Limited (BREL) in the same year.[10]

Nevertheless, assembly of trains made a comeback in the 2010s, driven by demand for the renovation of rolling stocks. And foreign players – CAF in Newport, Hitachi Rail in Newton Aycliffe and Siemens in Goole – have opened new assembly lines recently to serve the UK domestic market.

While the UK ranks similarly to Italy and Spain in rolling stock assembly, its intermediate supply chain remains a weak point. Most parts and components for rolling stock are imported from leading manufacturing nations, with the UK ranking only 10th in Europe in terms of overall production value – which in Europe has been valued at more than £7.5 billion on an average annual basis in recent years. Components and materials are crucial to rolling stock assembly, contributing the

9 The last year for which data is available.

10 BREL was acquired by the Swiss–Swedish company ABB in 1992. In 2001, the Canadian Bombardier Transportation took over Adtranz – a joint venture between ABB and Daimler-Benz – thereby gaining ownership of the Derby works. In 2021, Alstom acquired Bombardier Transportation.

majority of the final product's value and accounting for 51 per cent of trade flows in the rolling stock supply chain. Beyond the car body, the rolling stock value chain includes bogies, wheelsets, braking systems, doors, the heating, ventilation and air conditioning (HVAC) system and traction equipment. In terms of materials, steel[11] is the most critical for rail manufacturers, accounting for more than half of the manufacturing costs of rolling stock producers.

Air transport manufacturing

In civil aerospace manufacturing, the UK has been successful in capitalising on its early technological pioneers, such as the Filton-based Bristol Aerospace Company (BAC), which built the largest civil commercial aircraft in the world in 1949, and de Havilland in Broughton, which produced the 'Comet', the world's first passenger jet airliner. In the following decades, government intervention strengthened the UK's productive and technological leadership in the sector (Pourvand 2013). For instance, the nationalisation of Rolls-Royce in 1971 enabled the development of its pioneering RB211 engine, which later became the foundation of the company's success. Moreover, while the Concorde project ultimately proved commercially unviable, the associated investments made in the 1960s were instrumental in building technological capabilities that later shaped the UK's competitive edge in commercial aircraft manufacturing. In fact, Concorde enabled the then state-owned British Aerospace to join the Airbus consortium in 1979.

To this day, **the UK remains a true leader in air transport manufacturing, with production and employment figures comparable to Germany and second only to France among European nations**.[12] Beyond being a leader in designing and manufacturing major components such as **jet engines and wings**, the UK also has a wide range of **competitive suppliers of smaller components**, well integrated within the domestic and global aerospace value chain.

The civil aerospace industry is a truly global one. No single country in Europe manufactures large commercial aircrafts, each specialising in one or two major components, with Airbus in France mostly assembling the aircrafts. From a trade perspective, the UK has clear strengths in exporting products related to air transport equipment – here the UK's average revealed comparative advantage within the supply chain is higher even than China's. Specialisations are primarily in wide-body engines through Rolls-Royce and in wings through Airbus. The UK is also a major producer of helicopters with Leonardo.

The UK scores particularly well in the more granular supply chain for aircraft components. It ranks second in Europe for parts of aircrafts and fifth for parts of civil engines. It also has leadership in smaller components such as seats for aircraft (ranked first) and plastic parts (ranked third). From a trade perspective, the UK has significant revealed comparative advantage in these components – wings, seats, turbojets, propellers and undercarriages are all clear exporting strengths. Meanwhile there is less emphasis on exports of finished products, where the UK has no clear revealed comparative advantage, for previously mentioned reasons relating to the nature of the aerospace manufacturing industry.

Maritime transport manufacturing

British shipbuilding, which once underpinned the most powerful naval fleet in the world, has suffered a dramatic decline over the past century. In fact, its downfall has few historical comparisons. In 1892, the UK's share of global commercial shipbuilding was over 80 per cent, and 60 years later Britain

11 Because of their need for steel materials, rolling stock companies have established close partnerships with steel producers. For example, China's CRRC signed a cooperation agreement with the national steel giant Baowu Steel in 2020 (Seetao 2020).

12 Authors' analysis based on the ONS's Annual Business Survey (ONS 2024b) and Eurostat's structural business data (Eurostat 2024).

was still the largest shipbuilding nation in the world (Stott 2023). Today, the UK's share is virtually zero, with production having fallen from over 1 million gross tons (GT) of commercial ships produced until the mid-1970s, to fewer than 100,000 in recent times.

In the past 60 years, the dominance of Japanese players first in the 1960s, the entrance of South Korean competitors in the late 1970s and the meteoric rise of China's shipbuilders in the early 2000s have radically transformed global shipbuilding. Higher competition has led to regional concentration of productions and segmentation of the market.

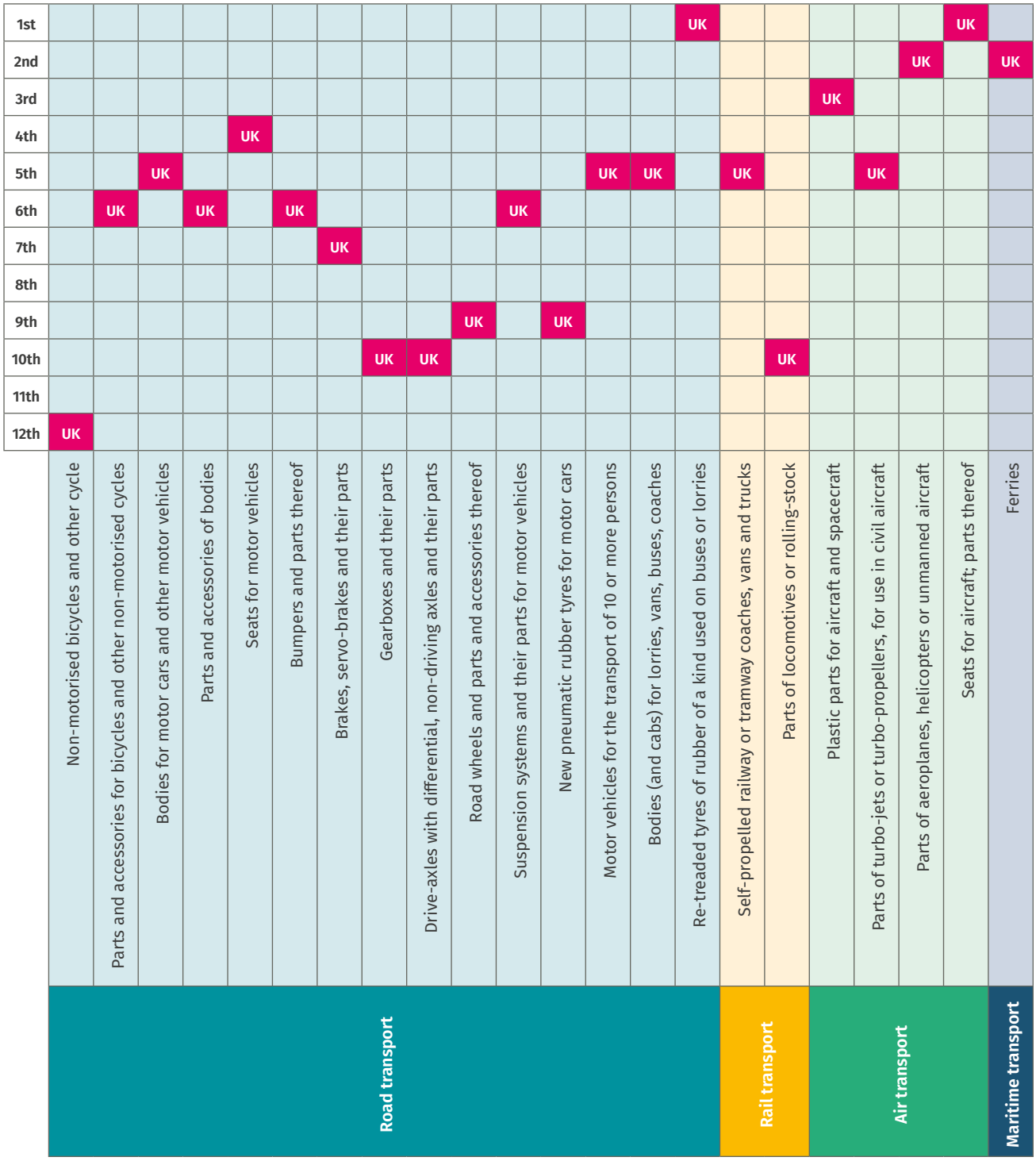
For instance, certain European countries – France with Chantiers de l'Atlantique, Germany with Meyer Werft, Finland with Meyer Turku and Italy with Fincantieri – are specialised in building cruise liners. But in all other segments (bulk carriers, oil tankers, container ships, liquefied natural gas [LNG] carriers and general cargo), production outside the three giant shipbuilding nations – China, Japan and South Korea – is virtually non-existent (Statista 2023). Other European nations – Spain with Navantia and the UK with BAE Systems in particular – have largely focussed on military productions. In other cases, companies such the Dutch shipbuilder Damen have specialised in yachts, small ferries, fishing vessels, dredgers and other niche workboats.

Structural business data reporting sectoral aggregate figures indicates substantial shipbuilding capacity in the UK, although the manufacturing of military vessels, rather than civil maritime transport, largely explains this. Available data on specific products highlights the UK's positive ranking in ferry manufacturing (second) relative to other European countries (figure 2.3). However, this remains significantly smaller when compared with East Asia's dominant shipbuilders.

FIGURE 2.3

The UK's ranking in transport manufacturing supply chains across Europe

Relative position of the UK compared with EU27 countries, measured in average production values over the years 2019–23



Source: IPPR analysis of ONS 'UK manufacturers' sales by product: 2023' (ONS 2024c) and Eurostat 'Sold production, exports and imports' (no date)

Note: Products were included when the availability of data allowed for a comparison between the UK and EU countries over recent years.

3. THE UK GREEN TRANSPORT MANUFACTURING LANDSCAPE

Transport manufacturing is spread across the UK and represents a major source of regional economic growth and potential for levelling up. Figure 3.1 illustrates the main manufacturing sites by type of product.

While transport manufacturing is primarily concentrated in England, other devolved nations of the UK also host relevant production sites, including Airbus and CAF's plants in Wales, the Alexander Dennis factory in Scotland and the Wrightbus facility in Northern Ireland. Additionally, Scotland and Northern Ireland are home to most of the UK's civil shipyards.

Nevertheless, it is more relevant to analyse the existence of manufacturing clusters in defined and restricted areas, as these can provide the habitat for the cross-fertilisation of tacit knowledge, skills and technologies.

The presence of transport manufacturing clusters is proof that the UK does have strengths in areas where knowledge, infrastructure and capital can be shared to competitively produce transport equipment and associated components.

Beyond ensuring that the UK economy is diversified and competitive in an increasingly uncertain world, transport manufacturing clusters provide opportunities for economic growth in areas outside of traditional economic powerhouse zones – London and the South East. Transport manufacturing therefore represents a strategic lever for levelling up and regional growth rebalancing.

Transport manufacturing clusters have a cross-sectoral nature in the following cases:

- **Cheshire and North Wales**, with Airbus's plant for wings manufacturing and the car-making plants of Stellantis and Jaguar Land Rover in Ellesmere Port and Halewood respectively
- **Derby**, with Rolls-Royce's production of jet engines, Toyota's car assembly and Alstom's rolling stock manufacturing.

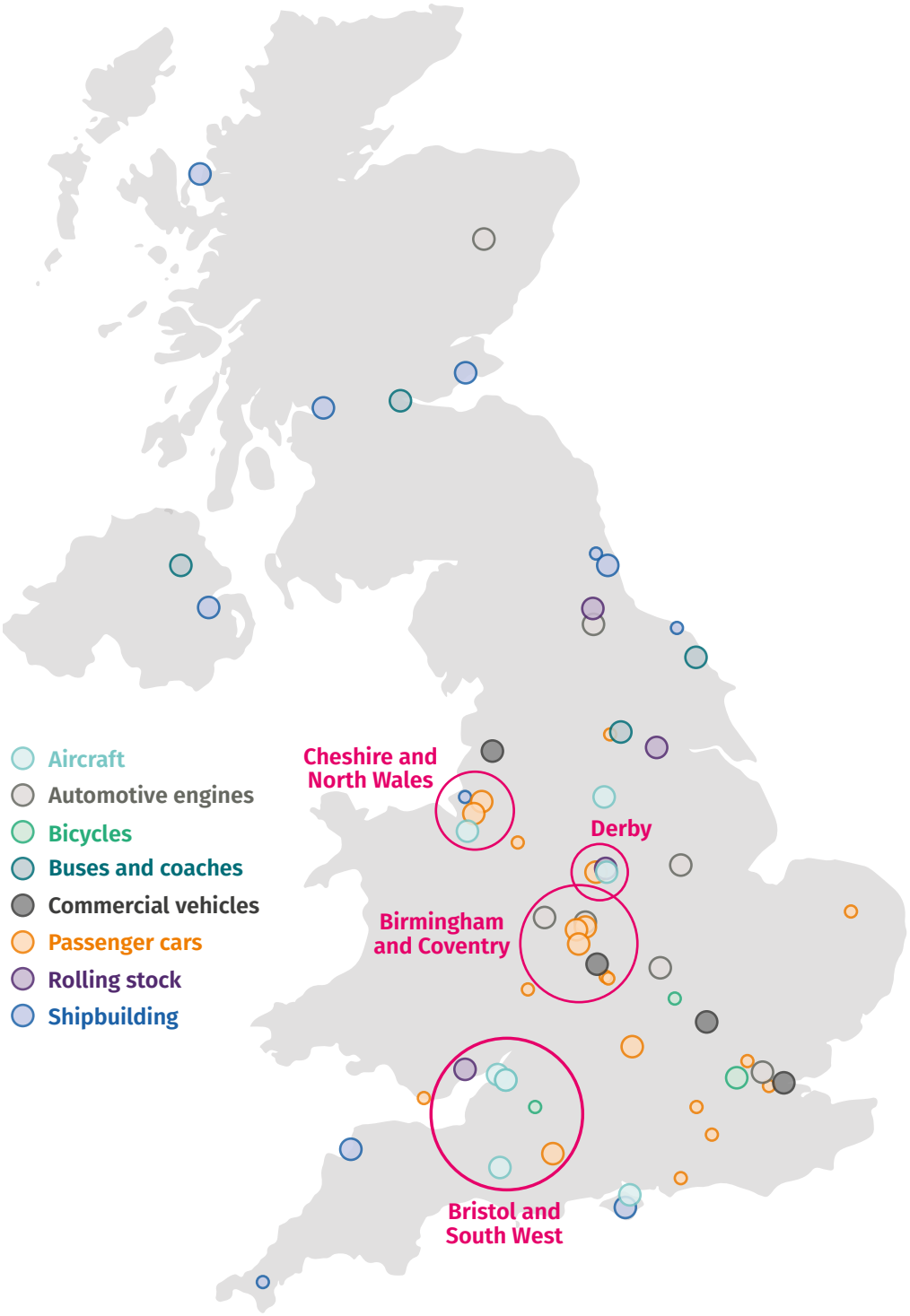
However, sector-specific transport manufacturing clusters are also evident:

- **Bristol and its surrounding areas in the South West/South**, with Airbus and GKN's productions for aircraft wings in Bristol, Leonardo's helicopters in Yeovil and GKN's aerostructures in Cowes
- **Birmingham and Coventry**, with the car manufacturing plants of Jaguar Land Rover and Aston Martin, as well as the engine manufacturing sites of Dennis Eagle and Jaguar Land Rover.

FIGURE 3.1

Geographical localisation of transport manufacturing facilities in the UK, 2025

Localisation of production units according to main type of production activity and main clusters



Source: IPPR analysis

Notes: Smaller circles represent marginal production units. Pink-coloured circles represent clusters.

4. AN INDUSTRIAL STRATEGY FOR GREEN TRANSPORT MANUFACTURING

Previous IPPR work on industrial strategy – *A second wind* (Gasperin and Emden 2024) and *The heatwave* (Gasperin et al 2024) – focussed on specific sub-sectors within the wind manufacturing supply chain, and the heating manufacturing sector. Here, we expand our analysis and policy recommendations across different sectors, tailoring each to its unique characteristics while uniting them under a comprehensive industrial strategy for green transport manufacturing.

TAILORING INDUSTRIAL STRATEGY TO GREEN TRANSPORT MANUFACTURING

In IPPR's *Making markets in practices* (Alvis et al 2023), a fundamental methodological distinction was outlined between the broad industrial strategy and the specific industrial policies. The former was defined as "a broader economy-wide planning process, combining industrial policies, to achieve economic, social, or developmental outcomes", while the latter were intended as "targeted government actions aimed at promoting the specialisation, competitiveness or capabilities of specific sectors and industries". This distinction is crucial for positioning an industrial strategy for green transport manufacturing at the core of the government's broader industrial strategy. It also underscores the need for a holistic approach that integrates multiple interconnected sectors, each requiring dedicated support through targeted industrial policies.

Before discussing the specific policies, summarised in Table 4.1 at the end of this chapter, it is important to outline the governance and planning framework of a successful **industrial strategy** for green transport manufacturing.

In terms of its **governance elements**:

- **An industrial strategy for the green transport sector should aim at exploiting the growth potential of an increasing demand for green transport products – not only ensuring compatibility with a greener transport system, but also actively serving as an enabler of it.** This goes beyond simply greening the production processes for transport equipment. It requires recognising that the shift to a green transport system can drive domestic manufacturing for green transport products.
- **The industrial strategy for green transport manufacturing should have a cross-sectoral approach. First, it should recognise the opportunity of multimodal mobility in a greener transport system** (Frost and Singer Hobbs 2024). This means buses, trains and bicycles are all necessary, above and beyond cars. In fact, a better transport system would reduce the overall number of cars while expanding EVs and integrated public transport. **Second, the industrial strategy should exploit the commonality in certain supply chains and productive activities across the different modes of transport.** Some suppliers of components in road supply chains will be able to supply the rail industry as well, for example.

The **planning** process for the industrial strategy on green transport manufacturing needs to reflect the strict interrelation between manufacturing and transport systems. It should also integrate cross-sectoral elements that impact multiple transport sectors, particularly in relation to infrastructure and supply chains:

- **The industrial strategy for green transport manufacturing should break down siloed divisions across government departments and establish an institutional framework where different perspectives can be reconciled under a coherent planning process.** This could be achieved through a dedicated interministerial technical committee comprising representatives from DBT, DESNZ, DfT and DSIT. Additionally, the planning process could be supported and later overseen by a special taskforce under the Industrial Strategy Advisory Council. This taskforce could include representatives from manufacturers, transport authorities and civil society organisations, ensuring a balanced and inclusive approach.

CROSS-CUTTING CHALLENGES, OPPORTUNITIES AND RECOMMENDATIONS FOR GREEN TRANSPORT MANUFACTURING

The electrification challenge

As IPPR has previously recommended, beyond repurposing the structure of the overall transport system (Frost and Singer Hobbs 2024), its **decarbonisation will fundamentally be about electrification**, particularly in the case of road vehicles (Emden 2024).

The electrification of other transport modes is already technologically and commercially viable, with the exception of air transport. However, significant economic and infrastructural challenges still need to be addressed to unlock the full potential of and demand for electric transport equipment. **The UK's relative scarcity of electric charging infrastructure represents a significant challenge** for the further adoption of both passenger EVs and buses, while it has been part of the success of China's EV rollout, particularly of electric buses (You 2023). Similarly, the railway system in Great Britain is still far from being fully electrified: while 71 per cent of railway vehicles are electric, only 39 per cent of the total railway network was electrified in 2024 (ORR 2024).

- **Electric infrastructure is a key economic condition for the electrification of transport.** IPPR has recently done work on how to foster the availability of charging infrastructure, recommending a more even distribution of charges, their greater affordability and the facilitation of access (Alvis et al 2025).

Equally important is the **cost of electricity**, which enters the equation in two different ways. First, companies wanting to invest in the UK face a condition of relatively higher industrial electricity prices – about 50 per cent higher than the International Energy Agency (IEA) median from 2014 to 2023 (DESNZ 2024). For businesses consuming a significant amount of electricity – such as electric battery manufacturers – this represents a major issue that affects their competitiveness and sometimes even their profitability. Second, lowering electricity costs can, all other things being equal, lead to an economic incentive to adopt an electric transport solution. This is particularly critical for passenger vehicles, whose higher upfront cost relative to traditional vehicles is only partially offset by the lower operating costs of electric charging versus petrol refuelling. Lower electricity prices are also vital for bus operating companies, helping them reduce operating costs and further incentivising their adoption of electric buses.

Interventions aimed at reducing the cost of electricity can be classified as **production policies** if they affect the cost of manufacturing production, while they represent **purchasing policies** if they impact on demand for transport products from the market.

- In recent work (Gasperin and Evans 2025), IPPR has suggested that the newly established Great British Energy could provide the electricity that it generates directly to end consumers through special power purchase agreements, targeting marginal offtakers and focussing on businesses in clean energy supply chains, including transport manufacturing.
- Reforming the electricity market so that it decouples itself from gas prices and benefits from the lower cost of renewables is the costless long-term solution to the problem of high electricity prices facing the consumer. In the meantime, a temporary reduction in charging prices – for instance by lowering the VAT rate on public charges from 20 per cent to 5 per cent, as IPPR has previously recommended – could enhance the operating costs appeal of buying an EV for consumers without home charging facilities (Alvis et al 2025).

Strengthening supply chains

As highlighted in chapter 2, **the UK maintains a strong specialisation in the assembly of transport equipment but exhibits comparative weaknesses in its supply chain**, particularly for road and rail equipment. This is not the case for aerospace, but the shifting preference for narrow-body aircraft and the absence of an institutional shareholding representation in Airbus[13] could prove challenging for an otherwise solid supply chain.

In many cases, the intermediate production of components represents the most valuable part of the finished product once assembled. Moreover, it is common for specialised suppliers to produce multiple components that enter into various industries – for instance, manufacturers of rolling stock components often supply both the automotive and aerospace sectors. Another area of cross-sectoral interest for the transport sector concerns materials, particularly steel. The production of transport equipment relies on primary steel, which in the UK is currently produced only at British Steel's Scunthorpe plant, following the closure of Port Talbot's two blast furnaces in September 2024.

An insufficient specialisation across the value chain of transport products not only means missing out on economic value but also presents a potential risk in an era of increasing trade tensions. **A comprehensive industrial strategy for green transport manufacturing should seek to increase the UK's specialisation and competitiveness in upstream supply chains, through growing existing players and attracting investments from new entrants.**

This could be addressed through **production policies** focussing on the provision of strategic long-term public financing:

- **The National Wealth Fund should become a key policy tool in attracting foreign investment**, particularly in these high-value, high-priority, upstream sectors, including through financing joint ventures with specialised manufacturing players, as IPPR has previously recommended (Gasperin and Dibb 2023).
- **The government should give greater financing power to the British Business Bank to expand its support towards existing smaller and fast-growing suppliers in transport manufacturing**, ensuring they have access to long-term financial backing. This is essential for them to scale up and become more competitive, seeking further growth through export markets. In aerospace, British Business Bank's British Patient Capital should be playing a more active role in financing risky manufacturing ventures in innovative aerospace materials and components related to zero emission flight.

13 In 2006, BAE Systems divested its 20 per cent stake in Airbus inherited from the formerly state-owned British Aerospace, leaving the French, German and Spanish governments as the main shareholders of the European aircraft manufacturer.

Purchasing policies could equally support the onshoring of intermediate supply chain productions:

- **Procurement contracts** by local transport authorities and operating companies for trains and buses could **incorporate non-price bonuses** for manufacturers supplying assembled products with a higher content of UK-manufactured components and materials.

Finally, our interviewed stakeholders repeatedly mentioned that the quality of the existing workforce hampers or enables investment in upstream supply chains. They also flagged difficulties in accessing material inputs. These are **economic conditions** that cut across the supply chain of all the transport modes, and must be addressed at the national level:

- **The national skills strategy should prioritise the development of technical skills.** This includes both university-based and vocational training, and support for businesses that are investing in their workforce through apprenticeships or training programmes. Advanced manufacturing requires strong skills in engineering, computing and data.
- **Access to critical resources should be expanded.** The critical minerals strategy is key to ensuring that the industry has access to the inputs it needs to maintain and grow its operations.

Addressing trade frictions head on

Uncertainty around trade policy has skyrocketed with the start of the second Trump administration, compounding longer-standing barriers related to Brexit. Different manufacturers are exposed to different countries and regions, but easier access to EU markets is vital for the transport manufacturing sector and its ability to source inputs and sell exports. While the EU–UK Trade and Cooperation Agreement means direct tariffs are avoided, it does impose costs through the administrative burden of compliance with things such as customs checks and regulatory barriers (Morris 2025). This will particularly benefit Nissan (the UK's biggest car producer by volume) and Toyota, whose UK factories primarily export to the EU.

The US is also a key link – it is a significant destination of UK automotive exports and a major part of the aerospace value chain. However, the Trump administration is putting up significant trade barriers that directly impact UK exporters, particularly in the automotive industry. Jaguar Land Rover (JLR) is the largest UK automotive exporter to the US – their factories are, therefore, particularly exposed to tariffs. The Agaratas gigafactory is also exposed through their links to JLR. Iconic British car brand Mini – currently owned by BMW and built in their factory in Oxford – are also exposed to the US market. A 25 per cent tariff on car imports into the US will have a substantial impact on these companies, and could leave 25,000 jobs at risk.[14] However, these companies export their cars around the world, including to Europe, so easier access to EU markets could offset some of the impact of US tariffs.

Trade rules and tariffs are part of the **economic conditions** under which manufacturers operate, and any industrial strategy must ensure that a trade strategy is aligned.

14 Jobs at risk is an estimate of direct manufacturing jobs that could be lost if all UK-based manufacturing at US-exposed companies is offshored to avoid tariffs. This is calculated based on employees at UK-based manufacturers that are particularly exposed to US exports, including Jaguar Land Rover, BMW's Plant Oxford, where Minis are produced, and the projected direct jobs for Agratas' gigafactory in Somerset, for which Jaguar Land Rover will be a major customer. For Jaguar Land Rover, we calculate UK manufacturing employment based on the share of manufacturing employees (47 per cent) from their latest financial accounts and apply this to their total UK-based workforce (reported to be 34,000 employees). We then add the total workforce of Plant Oxford – 4,500, and the projected workforce for the Agratas facility, 4,000. Whilst all of the jobs at these facilities are unlikely to disappear, suppliers who make components for the exported cars are also likely to be affected. This estimate is designed to show the potential scale of jobs at risk rather than a precise projection.

The UK should do the following:

- **Review the UK Global Tariff and identify targeted reductions of tariffs for imports** that are critical to the growth and resilience of priority sectors, including transport manufacturing.
- **Reduce non-tariff barriers with the EU as far as possible.** For example, a mutual recognition agreement with the EU would reduce administration costs related to both imports and exports.
- **Linking the UK and EU Emissions Trading Systems, and aligning the UK Carbon Border Adjustment Mechanism with the EU.** This would reduce frictions in trade in materials such as steel.
- **Secure a trade deal with the US, with proportionate domestic support measures if one is not forthcoming.** Support for US-exposed manufacturers who are investing in green production should be considered if a deal cannot be agreed.

CHALLENGES, OPPORTUNITIES AND POLICY RECOMMENDATIONS FOR SPECIFIC GREEN TRANSPORT PRODUCTS

Road transport products

Decoupling the production and usage of passenger cars is not only possible but also already a reality, given that domestic car manufacturing meets just 9 per cent of the UK's total demand. In fact, as shown in figure 2.2, new passenger car registrations in the UK totalled 1,952,778 units in 2024 (SMMT 2025b), of which only 176,019 were manufactured in the UK (SMMT 2025a). There are at least three reasons why reducing car circulation in the UK is fully compatible with higher domestic production:

1. UK automotive manufacturers already export more than three-quarters of their output, meaning foreign demand can continue to drive production.
2. While domestic demand declines in volume, this can be progressively reoriented towards UK-made vehicles.
3. Domestic sales of EVs have been growing in recent years, but fully electric models (battery electric vehicles) accounted for only 19.6 per cent of total sales in 2024. With over 32 million non-EVs in circulation in the UK (DfT 2024e) – of a total of 34 million passenger cars[15] – UK-based manufacturers of EVs face the significant opportunity to capture a largely unsaturated domestic market.

The transition to manufacturing EVs depends on the ability to supply original equipment manufacturers with cost-competitive electric batteries, given that they are expected to account for about a third of a vehicle's total cost even in 2030 (BloombergNEF 2021), despite declining production costs. The UK is no exception to Europe's recent struggles in building the gigafactories needed for electrification (Chico 2025), as evidenced by the challenges that Northvolt faced at the end of 2024 (Tagliapietra and Trasi 2024). The proposed 60GWh Coventry gigafactory may never materialise due to a lack of investors (Nevett 2025), leaving only two confirmed sites: AESC's 15.8GWh gigafactory near Nissan's Sunderland plant and Tata Group's 40GWh facility in Somerset, which will supply batteries for EVs produced in the UK by its subsidiary JLR. **The presence of 'anchor' customers committed to purchasing large volumes of batteries for their EV assembly has made these projects possible.** The absence of such commitments was a key factor in the failures of Britishvolt and in the difficulties facing the Coventry initiative. Similarly, recent US support for domestic clean vehicle assembly has translated into significant investment in the domestic manufacturing of electric batteries – accounting for 78 per cent of total manufacturing investment under the Inflation Reduction Act 2022 in the first two years (Bermel et al 2024).

15 Figures refer to the second quarter of 2024.

Shifting mobility from individual car use to buses and coaches is a positive step in reducing congestion and emissions, even more so when collective transport can be electrified. The UK is already leading in the adoption of fully electric buses, accounting for over 20 per cent of total registered battery electric buses across Europe (European Commission 2025a). As highlighted in chapter 2, **the market for large passenger transport vehicles is far less open to trade, and demand comes primarily from a restricted number of private bus operating companies – local authorities have a significant influence on this demand through their contracts with operators**. New bus registrations have been on the rise since late 2022, and UK manufacturers have been able to capture a higher share of this growing domestic market. In 2024, British manufacturers Alexander Dennis and Wrightbus supplied nearly 50 per cent of new single-deck and double-deck vehicle registrations in the UK (SMMT 2025c).[16] A permanent and more stable increase in demand for new buses and coaches could drive domestic production growth at an even higher rate, with minimal import leakage.

Finally, while bicycle manufacturers worldwide – particularly those making sports bicycles – are facing a severe overcapacity crisis following the boom years of 2021 and 2022 (Heller and Fehlau 2024), the UK's specialisation in urban transport products has partially shielded its bicycle manufacturing industry. However, major UK manufacturers have also faced financial struggles. Tariff regulations and lower margins are putting pressure on UK players, despite operating in a vibrant domestic market. The UK remains the third largest market in Europe, with 1.7 million bicycles sold in 2023 (Statista 2025). The broader European market for bicycles was valued at around £17 billion in 2023 (CONEBI 2024), representing a significant opportunity for UK exports. Moreover, the reconfiguration of urban mobility – through investments in cycling lanes, parking infrastructure and public transport integration – will further drive demand for bicycles both domestically and globally. This presents a **significant growth opportunity for existing and emerging UK manufacturers of bicycles, provided they continue to operate under the same trade and tariff conditions as their European counterparts when competing with China**.

The UK government should consider implementing a set of **purchasing policies** that will help leverage the UK market to drive domestic manufacturing production of EVs:

- **Maintain the zero emission vehicle (ZEV) mandate with a phase-out target by 2030, coupled with the introduction of a targeted and means-tested version of the plug-in grant, conditional on domestically manufactured content.** In an attempt to replicate the successful mechanism of the clean vehicle tax credits under the US Inflation Reduction Act 2022 (US Department of Energy 2023), the UK government should introduce capped, targeted and conditional fiscal incentives supporting new buyers of EVs. While limiting resources for such an incentive scheme to meet fiscal constraints, the government should recognise that a substantial proportion will be recovered through tax revenues generated by increased domestic production and sales, so the net cost of this policy in the long term might be low or even positive. The scheme should only be available for marginal lower-income buyers, to avoid subsidising those who can already afford an EV and to expand access to the EV market for a broader segment of the population. Finally, the incentive should be disbursed only if the vehicle and a significant portion of its components are assembled in the UK. This approach would give UK manufacturers greater investment certainty, which is necessary to comply with the ZEV mandate, as they can anticipate growing domestic demand for these products in the future. It is also crucial for driving investment in electric battery manufacturing and related supply chain (see the point below).

16 Figures relative to the first three quarters of 2024.

- **Expand public investment by local transport authorities to increase their bus network and services, reinforcing funding for the Zero Emission Bus Regional Areas (ZEBRA) programme.** Extra public capital funding for local transport authorities could be linked to preferential conditions for domestic content requirements, supporting UK bus manufacturers and suppliers. Beyond additional funding support, **a central coordinating mechanism for smoothing bus and coach procurement at the UK level** would provide manufacturers with the certainty needed to better plan production capacity and make new investments.

These measures should be complemented by **production policies** supporting EV supply chains, particularly focussing on battery manufacturing:

- **The government should provide financial support and infrastructure facilitation for specialised battery manufacturers investing in the UK.** Establishing gigafactories requires substantial capital investment, physical space and adequate infrastructure. While securing an anchor EV manufacturer's commitment to purchasing batteries is crucial, long-term government partnerships provide essential complementary support to attract investment. This could take the form of direct financial backing for investment projects in setting up manufacturing facilities, replicating the example that the UK Infrastructure Bank set with its £200 million loan to support the development of AESC's gigafactory (NWF 2024). Given the absence of a native UK battery manufacturer, attracting investment from specialised foreign players will be key – similar to recent developments in Hungary and Spain, where the world's leading battery manufacturer, China's CATL, has made significant investments (see box 4.1). The National Wealth Fund could be the instrument through which co-investments are made, through long-term equity financing for the new manufacturing initiatives, as IPPR has previously suggested (Gasperin and Dibb 2023). Furthermore, **the National Wealth Fund could provide low-interest loans or long-term equity financing to further develop a UK battery manufacturing supply chain,[17] to increase resilience within the sector and reduce production costs**. Other public financing entities in Europe play a similar supporting role. For instance, the European Investment Bank has provided €6 billion in financing over the past six years to support the wider battery value chain – covering raw materials, research, production, charging infrastructure and recycling (EIB 2024). Finally, reinforced support to the Automotive Transformation Fund will help nurture the EV innovation ecosystem, which is critical for larger-scale manufacturing investments.
- **The UK government should also actively facilitate partnerships between domestic EV assemblers and foreign specialised battery manufacturers, including through diplomatic initiatives**, as many leading companies – such as BYD, CATL, LG Energy and SK – are large players based in China and South Korea.

17 This could be done by replicating and scaling up the UK Investment Bank's previous investment in the lithium mining company Cornish Lithium Plc (UKIB 2023).

BOX 4.1. POLICY RECIPE FOR INVESTMENTS IN GIGAFACTORIES

The recent case of Stellantis and CATL's joint venture (Stellantis 2024), which will build a 50GWh gigafactory in Zaragoza in Spain for Stellantis' plant, exemplifies the effectiveness of this approach. First, the battery plant will primarily produce for the Stellantis group, ensuring the gigafactory's commercial viability. Second, the investment was made possible in part by a €133 million grant from the Spanish government, which played a crucial role in mobilising a total investment of €4.1 billion.

The UK example of Agratas is equally illustrative. In addition to securing JLR's commitment to purchasing the batteries produced at the site, Agratas will benefit from establishing the battery plant at the Gravity Enterprise Zone in Somerset, a special area designated by government where companies can typically enjoy business rate discounts, enhanced capital allowances for machinery and equipment and simplified planning regulations (MHCLG 2024b). Furthermore, the UK government is providing direct funding support to the initiative (£500 million, covering 12.5 per cent of the overall capital investment), supplemented by a loan from Somerset council (£150 million).

In relation to the manufacturing of bicycles, we recommend the following **purchasing policies** and **economic conditions**:

- **Higher public investment in cycling infrastructure and elevating cycling as central to urban mobility**, in line with previous IPPR recommendations about cycling as a foundational asset for healthy lives (Thomas et al 2024). Public investment in cycling infrastructure in the UK is among the lowest in Europe on a per-capita basis, with a disproportionate distribution between London and other major cities. A greater availability of cycling lanes in the largest UK cities outside London, together with their prioritisation in the hierarchy of transport infrastructures, will encourage cycling mobility and boost domestic demand for bicycles, which UK manufacturers can intercept under fair competitiveness standards (see below).
- **Adapting to European standards of tariff protections and supports against Chinese imports of electric bikes, in order to compete on the same level playing field.** The recent government decision to revoke anti-dumping and countervailing measures on imports of Chinese non-folding electric bicycles (e-bikes), while modestly affecting the UK's specialisation in folding bikes, could halt the expansion of the wider domestic manufacturing industry, especially in light of the EU extending the validity of import duties (European Commission 2025b). Bicycle manufacturers in the EU, beyond receiving direct government support in certain cases, will be competing on a different level playing field from the UK within the European market. Aligning with EU duty rates for another five years, coupled with financial support for e-bike purchasers to offset the higher costs of UK–EU production, would ensure the compatibility of three key objectives: maintaining safety standards, promoting the widespread adoption of cycling and revitalising British bicycle manufacturing.

Rail transport products

The preservation and expansion of train manufacturing in the UK ultimately depend on public investment to increase domestic rail transport capacity, while in other leading train manufacturing nations, rolling stock is produced for both the domestic and export markets. For instance, Switzerland's Stadler, Germany's Siemens and Spain's CAF all operate production units outside their home countries to supply rolling stock where needed. However, these companies also export fully assembled trains from their existing facilities located near destination markets.

This is not the case for the UK, which no longer has a native rolling stock manufacturer and whose rolling stock production units are operated by foreign multinational groups. Therefore, rolling stock assembly in the UK has little scope for expanding through external demand growth: trains for France's state-owned train operator SNCF will be made by Alstom in its French plants, rather than by Alstom UK in Derby. This was not always the case. Alstom's Derby Litchurch Lane Works were once manufacturing rolling stock and components for the export markets, including Taiwan's EMU100 rail cars, supplied by British Rail Engineering Limited – the owner of the Derby plant – in 1978. Today, the UK does not feature among the top 15 exporting nations of rolling stock and signalling equipment, while it is the second largest importer (OECD 2023).

Expanding the UK's capacity in the intermediate supply chain will bolster the country's rolling stock manufacturing industry, as outlined earlier in this chapter in the section 'Strengthening supply chains'. This requires attracting investment from leading global specialised suppliers, while enhancing the competitiveness and growth of domestic producers of components. However, this will only be possible with sustained investment and production commitments from the UK's key original equipment manufacturers. This can be achieved with a combination of **purchasing policies**:

- **Planned expansion of UK railways through direct public coordination and investment by Great British Railways**. Increasing rail transport availability will drive higher demand for rolling stock, stimulating domestic manufacturing. However, beyond simply increasing order volumes, it is crucial to mitigate the cyclical nature of procurement, which results in inefficient 'stop and go' production – an issue that affects bus manufacturers as well. Periodic halts in production force manufacturers to bear fixed costs without revenue, while sudden demand spikes lead to higher-than-necessary variable costs due to short-term capacity constraints.
- A potential solution is to **centralise rolling stock procurement from a single, publicly owned entity**, rather than relying on fragmented privately owned rolling stock leasing companies (Dennis 2022). The newly established **Great British Railways** – a public corporation under the Department for Transport tasked with consolidating most UK train operating companies – should take on that role as the national purchaser of future rolling stock on behalf of its train operating companies. These would only own the newly procured trains while continuing to lease existing ones from the rolling stock leasing companies (ROSCOs). In the longer term, as ageing fleets are replaced, this process would gradually phase out the role of ROSCOs. In terms of its effect on domestic rolling stock manufacturing, this approach could yield two major benefits. First, a single large-scale buyer would have the monopsony power to negotiate lower unit prices for rolling stock. Second, manufacturers would benefit from a stable and predictable order pipeline, allowing for better production planning and lower average costs. This model aligns with long-established European practices – state-owned railway groups in France and Italy purchase and own the trains they operate, ensuring more efficient procurement and stable production levels.

Air transport products

Manufacturing of aircraft faces a very different set of circumstances from other areas due to the **UK's existing competitiveness across the entire supply chain**. Most domestic production is sold abroad, making the aerospace industry more responsive to global demand trends rather than domestic ones. The Covid-19 pandemic created huge challenges for commercial aircraft manufacturing – order books shrank substantially due to travel restrictions and lockdowns. However, demand has been surging in recent years and manufacturers are now actively seeking to capture higher shares of a growing market.

Another challenge, linked to future growth opportunities, is the ambition to achieve **zero emission aviation**. In 2020, Airbus launched three concepts for zero emission commercial aircraft powered by hydrogen that could be delivered by 2035 (Airbus 2020), but delays of more than five years are on the horizon due to technological issues and the unavailability of adequate hydrogen infrastructures. Smaller electric-powered prototypes are also being explored as an alternative for short-haul travel.

A coordinated effort between manufacturers, governments, infrastructure developers and airlines is needed to achieve commercially viable zero emission flight. In the interim, manufacturers are working on research & development (R&D) projects to improve fuel efficiency, for example with more efficient turbojets or better-designed components. Sustainable aviation fuel is compatible with existing models of aircraft, although the sustainability of this fuel is often questionable (Gabbatiss 2024) and significant infrastructure and supply chain development is needed to scale up its availability. Realising the longer-term vision for clean hydrogen-powered flight would prove an enormous, future-facing opportunity for the UK economy that builds on deeply held strengths.

Aerospace manufacturers should be supported in delivering greener growth for the aviation sector through **production policies** and setting the right **economic conditions**, both for the short term and the long term:

- **Ensuring long-term certainty of R&D funding and increasing the technological competitiveness of the broader aerospace innovation ecosystem are essential for turning the UK into an incubator for the design and manufacturing of future zero emissions commercial aircraft.** The Aerospace Technology Institute is a world-leading institution that could be strengthened via longer-term funding cycles, for example by extending funding pipelines from five- to 10-year allocations. The High Value Manufacturing Catapult and the Connected Places Catapult could be encouraged to collaborate further on a zero emission flight supply chain, bringing together expertise on hydrogen infrastructure development and advanced manufacturing. Funding could also be made at higher levels of technological development – currently technologies of technology readiness level (TRL) 6 or below are eligible whereas more commercially viable products are not. The public funding framework could be adapted so that funding is available for commercialisation, not just technology development.
- **International collaborations on airport infrastructure, and aligning standards and regulations, are essential for the commercialisation of zero emission flights.** This could begin with agreements to establish the world's first 'green flight paths', which would provide an initial route into market for large zero emission aeroplanes.

Maritime transport products

The UK's existing specialisation in military shipbuilding and its marginal presence in civil shipbuilding limit green growth opportunities in maritime transport. The UK has long 'missed the boat' on large commercial ships and cruise liners. It lacks the physical shipyard capacity existing in East Asia, no domestic industry player can justify the huge capital investment required to enter those segments, and global competition within the sector is both intense and strongly cyclical.

For all those reasons, **we would not recommend including maritime transport as part of an overall industrial strategy for green transport manufacturing**.

Nevertheless, the UK government should consider implementing individual measures that would favour the reorientation of existing production facilities towards building specialised niche vessels such as dredgers, fishing vessels, short-sea shipping, offshore support vessels, small-scale ferries and inland navigation vessels (SEA Europe 2024). These vessels can be produced competitively in the UK and Europe since they are tailored to customer needs, and because high transport

costs for importing them from East Asia create a 'natural' protective barrier for domestic production. Crucially, electric versions of these vessels are already being manufactured at a commercial scale, enabling the greening of these smaller shipbuilding products.

TABLE 4.1

IPPR's industrial strategy for green transport manufacturing

		Transport mode	Products	Suggested interventions	Challenges addressed	Responsible department or organisation
Industrial strategy	**Governance**	All	All	An industrial strategy approach that brings together green transport imperatives and manufacturing growth opportunities	Apparent trade-off between reducing transport emissions and the need for more transport products	Interministerial committee and taskforce
	Planning	All	All	Establishing a cross-sectoral planning process through an interdepartmental collaboration of various responsible entities	Limitation in focussing on specific sectoral challenges of different transport modes	Interministerial committee and taskforce
Economic conditions	**Infrastructure**	Road	EVs (cars and buses)	Investment in public charging infrastructure	Inadequacy of available charging stations	MHCLG
		Road	Bicycles	Higher public investment in cycling infrastructure and elevating cycling as central to urban mobility	Inadequacy of cycling infrastructure in major UK cities outside London	Local authorities
		Air	Zero emission aircraft	International collaboration on airport infrastructure, aligning standards and regulations	Lack of adequate infrastructure for zero emission aviation (through green hydrogen)	DfT
	Education	Air	Aircraft components	Extra support for school and university curricula, focussing on aerospace and energy engineering	Tough competition and uncertainty around research and engineering in zero emission aviation	DfE
	Skills	Road, rail and air	Components for EVs, buses, trains and aircraft	Public support for national training programmes for transport manufacturing	Expansion of investment in supply chains limited by the scarcity of skilled jobs	DfE
	R&D	Air	Engines and aircraft wings	Ensuring long-term certainty around R&D funding and the broader aerospace innovation ecosystem	Difficulty in reducing jet fuel consumption and uncertainty around technical and commercial viability of zero emission aircraft	DSIT
Purchasing	**Cost**	Road	EVs (cars and buses)	Temporary reduction in charging prices (lowering VAT on public charges to 5%)	High electricity prices reducing the incentive for buying EVs and saving on operating costs	DESNZ
		Road	EVs (cars)	A targeted and capped grant scheme available to lower-income buyers of EVs, conditional on domestic EV production and manufacturing content	1. Higher cost of EVs relative to ICE vehicles still not affordable for a significant share of the population 2. Domestic car manufacturers facing uncertainty and lower volumes to convert into EV production	DBT
		Road	EVs (buses) and trains	Increasing the funding capacity of local and national public transport authorities to expand public transport	Limited domestic market for collective transport products	DfT and local authorities

Purchasing	Rules	Road	EVs (cars and buses)	Market reform to reduce electricity prices	Electricity prices not competitive enough to bridge the difference in upfront costs between EVs and ICE vehicles	DESNZ
		All	Components for buses and trains	Procurement contracts for trains and buses with non-price bonuses for manufacturers supplying assembled products with a higher content of UK-manufactured components and materials	1. Leakage of economic value through higher imports 2. Resilience problems with rising trade tensions 3. Lack of patient finance to support long-term investments through cycles of demand	DfT, local transport authorities
		Road	EVs (cars)	Continuing support for the ZEV mandate	Limited development of a domestic EV market	DfT
		Road	EVs (cars and buses)	Reforming the electricity market to decouple it from gas prices, benefitting from the lower cost of electricity from renewables	High electricity prices reducing the incentive for buying EVs and saving on operating costs	DESNZ
		Road	Bicycles	Alignment with the EU by extending anti-dumping and countervailing duties on imports of electric bicycles (e-bikes) from China for another five years	Absence of a level playing field with EU competitors in manufacturing e-bikes	DBT
		Road	Buses and trains	Creating a central coordinating and purchasing mechanism responsible for smoothing procurement (GBR should assume that role in the case of rolling stock procurement)	Stop-and-go demand for buses and trains affecting manufacturers' ability to plan production capacity	DfT, GBR
Production	Cost	Road	Electric batteries	Financing support of the NWF through loans and equity instruments to attract foreign investment (also through joint ventures with leading East Asian companies)	High capital costs and uncertainty implicit in committing to gigafactory investment	DBT, NWF
	Cost	All	All	GBE's operating model could focus on providing clean and cheaper electricity to transport manufacturing businesses via special PPAs	High industrial electricity prices impacting negatively on the cost competitiveness of UK transport manufacturers	DESZN
	Cost	All	Components for EVs, trains and aircraft	1. Financing support of the NWF through loans and equity instruments to attract foreign investment (also through joint ventures) 2. Financing support of the BBB to grow existing domestic businesses	1. Leakage of economic value through higher imports 2. Resilience problems with rising trade tensions 3. Lack of patient finance to support long-term investments through cycles of demand	DBT, NWF, BBB
	Rules	Road	Electric batteries	Targeting EV incentives at specific domestic content and facilitating partnerships with foreign specialised players in battery manufacturing	Need for EV assemblers as 'anchor' buyers of electric batteries	DBT

Source: IPPR analysis
Notes: BBB = British Business Bank, DBT = Department for Business and Trade, DESNZ = Department for Energy Security and Net Zero, DfT = Department for Transport, DSIT = Department for Science, Innovation and Technology, EU = European Union, EV = electric vehicle, GBR = Great British Railways, ICE = internal combustion engine, MHCLG = Ministry of Housing, Communities and Local Government, NWF = National Wealth Fund, PPA = power purchase agreement, R&D = research and development, VAT = value added tax and ZEV = zero emission vehicle.

5. CONCLUSIONS

The UK's transport manufacturing sector has the potential to drive green growth, creating jobs and prosperity in a cleaner and fairer economy. But the race is on, and global competition is fierce. To stay ahead, UK businesses must harness the disruption, shifting from fossil fuel based products to cutting-edge green technologies.

The UK government must act now with a bold industrial strategy for green transport manufacturing – investing in infrastructure, supply chains and energy costs, while providing targeted support for road, rail and civil aerospace. With the right approach, the UK can turn this challenge into an opportunity and lead the world in green transport manufacturing.

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