

NELSIP
North East

Local Skills
Improvement
Plan



**Funded by
UK Government**

Advanced Manufacturing, including Electric Vehicles

Annex A: Detailed Information on Skills Needs Assessment



**North East
Mayoral**
Strategic Authority

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UK Government

Advanced Manufacturing including Electric Vehicles

National Picture

UK manufacturing is increasingly shifting toward high-value, advanced-intensive work, moving away from traditional low-skill assembly. The national strategy, as outlined in the Invest 2035 framework, identifies advanced manufacturing as one of eight core growth sectors essential for the UK's long-term economic resilience. The UK's biggest competitive advantage is high-value, advanced manufacturing, where strong R&D, skills and supply-chain resilience give the UK a competitive edge over low-cost mass manufacturing. The UK's modern industrial strategy is highly ambitious, aiming to nearly double yearly business investment in the sector from £21 billion to £39 billion by 2035.

To support this growth, the government is implementing competitiveness policies such as cutting electricity costs for heavy industrial users by up to 25% and speeding up the planning process for new infrastructure.

The sector's growth is threatened by a persistent recruitment and retention crisis. The number of apprenticeship starts in related technical fields has declined historically, mirroring systemic challenges in the domestic labour supply. To address this, the government is introducing the Growth and Skills Levy, designed to allow for shorter, more flexible training programmes and foundation apprenticeships that can rapidly upskill the workforce in response to technological change. This strategy aims to transform the sector from a perceived traditional trade into a recognised professional career path with clear progression and fair compensation, integrated with the technological demands of the transition to Net Zero.

The specific sector in the North East

The North East plays a leading role in the UK's transition to electric vehicles (EVs). The region's manufacturing output is now nearly 20% higher than it was in 2018. The sector contributes £5.5 billion in Gross Value Added (GVA) to the local economy annually, which accounts for 10.5% of total regional GVA. On a national scale, the North East accounts for 5.9% of England's advanced manufacturing GVA, with distinct strengths in Chemicals/Pharma (10.2% of national GVA) and Motor Vehicles (6.7%).

NELSIP 2026–2029 will focus on ensuring alignment between regional training and investment plans and these national goals and the Mayor's New Deal for North East Workers.

Nationally, demand for priority occupations in this sector is expected to grow by 15% by 2030, which is 1.6 times faster than for non-priority roles. In the North East, job roles in the sector are expected to grow by 4.5% annually, reaching 80,229 roles by 2030, up from 64,380 currently.

The regional sector landscape includes 2,384 employers. Of these, 54.5% are micro or small businesses with fewer than 10 employees, 20.1% are SMEs with fewer than 50 employees, 13.4% are medium-sized businesses employing between 50 and 249 people, and the remaining 11.7% are large organisations.

The demographic profile of the North East workforce shows that workforce inclusivity remains a significant challenge for the region. Only 26.1% of the manufacturing workforce are women, demonstrating that there is still a substantial gap to address if the sector is to become more inclusive and access a wider talent pool. In addition, women hold only 19% of director-level roles, indicating a need for targeted career progression support.

Sector Definition - Priority SIC Codes: Manufacture of chemicals and chemical products (20), manufacture of rubber and plastic products (22), manufacture of fabricated metal products, specifically metal forging (25), manufacture of computer, electronic and optical products (26), manufacture of electrical equipment (27), manufacture of batteries and accumulators (27.2), manufacture of machinery and equipment (28), manufacture of motor vehicles, trailers and semi-trailers (29), manufacture of other transport equipment (30), and activities of other holding companies not elsewhere classified (AESC) (64).

RTIC: 0065 Advanced Manufacturing (includes all AM industry codes), 0034 Advanced Materials, 0003 AgriTech, 0097 Battery Supply Chain, 0083 Biopharmaceuticals, 0047 Cleantech, 0096 Defence, 0067 Electronics Manufacturing, 0085 Engineering Biology Application, 0086 Engineering Biology Supply Chain, 0057 Foodtech, 001810 Immersive Technologies - Manufacturing & Engineering, 0078 Life Sciences, 008402 Marine & Maritime - Autonomy & Robotics, 008405 Marine Engineering and Naval Architecture, 008406 Naval Defence, 008408 Professional Services, 0058 MedTech, 0063 Modular Construction, 005501 Net Zero AgriTech, 005512 Net Zero Low Emission Vehicles, 0090 Neurotechnology, 0062 Pharma, 0027 Photonics, 0051 Quantum Economy - Components & Materials, 008703 Quantum Materials, 0091 Robotics and Autonomous Systems, 0099 Semiconductors, 0030 Sensors, 0098 Space Economy.

The definition extends beyond traditional production to include businesses providing essential services that keep manufacturing factories running, even if their SIC business code does not explicitly state "manufacturing." This inclusive approach has been considered the right way to forecast the regional demand from the Advanced Manufacturing sector, and it is estimated to bring in about £2.3 billion in annual turnover to the region that would otherwise be excluded from strategic planning.

| SOC20 unit code | SOC2020 – Priority Occupation unit label | 2021-25 monthly average actual job posting | monthly average job posting forecast by 2029 | Forecasted change by 2029 in monthly job postings | Forecasted % change by 2029 in average monthly job postings |
|-----------------|---|--|--|---|---|
| 2134 | Programmers and software development professionals | 177.7 | 240 | 3.8 | 35.06% |
| 2133 | IT business analysts, architects and systems designers | 145.7 | 204 | -3.3 | 40.01% |
| 2122 | Mechanical engineers | 56.2 | 73.1 | 1.7 | 30.07% |
| 1121 | Production managers and directors in manufacturing | 35.5 | 44.4 | 1.35 | 25.07% |
| 2124 | Electronics engineers | 12.9 | 16.8 | 14.2 | 30.23% |
| 5250 | Skilled metal, electrical and electronic trades supervisors | 12.1 | 8.8 | -0.43 | -27.27% |
| 2126 | Aerospace engineers n.e.c. | 7.6 | 11.4 | 3.9 | 50.00% |
| 5231 | Vehicle technicians, mechanics and electricians | 7.3 | 21.3 | 16.9 | 191.78% |
| 2129 | Engineering professionals n.e.c. | 7.3 | 9.5 | 2.2 | 30.14% |
| 5213 | Welding trades | 7.1 | 21.3 | 58.3 | 200.00% |
| 2127 | Engineering project managers and project engineers | 6.4 | 8.6 | 14 | 34.38% |
| 3112 | Electrical and electronics technicians n.e.c. | 5.6 | 7.3 | 2.2 | 30.36% |
| 5211 | Sheet metal workers | 2.13 | 7.1 | 62.3 | 233.33% |
| 5221 | Metal machining setters and setter-operators | 1.75 | 3.1 | 8.9 | 77.14% |
| 3116 | Planning, process and production technicians | 1.5 | 1.9 | 4.97 | 26.67% |
| 5234 | Aircraft maintenance and related trades | 1.05 | 0.62 | 0 | -40.95% |
| 5223 | Metal working production and maintenance fitters n.e.c. | 0 | 0 | 0 | 0.00% |
| 2123 | Electrical engineers | 63.9 | 89.5 | 25.6 | 40.06% |
| 2125 | Production and process engineers | 71.2 | 96.1 | 24.9 | 34.97% |
| 3113 | Engineering technicians | 36 | 46.8 | 10.8 | 30.00% |

The forecast 200% increase in welding trades and 191.78% increase in vehicle technicians underscores the substantial demand for skills related to electrification and high-integrity fabrication. Employer feedback suggests that high-integrity welding and niche electrical skills are among the most difficult to source, often requiring years of training to reach the necessary level of competence. Automotive employers anticipate stable market conditions in the short term, while subsea engineering and defence manufacturers expect continued growth driven by electrification, autonomy and high-integrity manufacturing requirements.

High-volume automotive manufacturers typically have 60–80% of their workforce in entry-level operational roles, with skilled technicians and engineers representing 10–20%. In contrast, subsea engineering, life sciences, and defence manufacturing organisations are dominated by highly skilled engineering and technical roles. Employers also highlight declining interest in entry-level manufacturing roles, driven by shift patterns, perceived instability and changing expectations among young people.

Attrition varies significantly: automotive employers report turnover around 10%, while defence and specialist engineering firms report levels closer to 5%. Ageing workforces remain a concern, where the retirement of a small number of senior staff can represent the loss of decades of accumulated expertise.

Key challenges for the sector

The shift from the internal combustion engine (ICE) to electric vehicles (EVs) has brought significant challenges across the sector, including supply chain volatility and operational difficulties.

- The Zero-Emission Vehicle (ZEV) Mandate: The government required 28% of new car sales to be zero-emission in 2025, but actual sales were only 23.4%. To meet these rules and avoid fines, manufacturers are discounting EVs, resulting in an additional cost to the industry of over £5.5 billion in 2025 alone.

- **Global Competition:** Significant cost advantages for goods manufactured in Asia have had a lasting impact on the UK automotive sector. In addition, the transition from the internal combustion engine (ICE) to EVs has not been linear. To compete, manufacturers are investing in automation and digitalisation while mitigating cyber security risks through ever-increasing cyber security measures. The high cost of technology remains a significant constraint. Chinese brands like MG, BYD, and Chery nearly doubled their UK market share to 9.7% in 2025. Using cheaper Lithium Iron Phosphate (LiFePO) battery chemistry, they can sell cars for 20–30% less than western manufacturers, putting immense pressure on local supply chains to reduce costs and innovate.
- **The High Cost of Tech:** Modern cars are essentially high-performance computers on wheels. Integrating AI for features like autonomous navigation can cost up to £190,000 per project. Adding necessary sensors and hardware increases unit manufacturing costs by between £230 and £1,340 per car. AI projects in SMEs have a 43% hesitation rate due to costs and complexity.
- **Repair and Volatility:** Advanced tech is making repairs much more expensive; a simple scrape that used to cost £150 can now reach £900 because sensors need recalibrating. These factors, plus a global shortage of memory chips, have made production lines unstable and unpredictable.
- **Recruitment Pressure:** 36% of manufacturing vacancies are "hard-to-fill" due to skills shortages, notably higher than the 24% cross-industry average. Recruitment difficulties are widespread across subsectors. Automotive and subsea engineering employers report persistent shortages in maintenance technicians, electrical engineers, PLC specialists (Programmable Logic Controllers) and electrical technicians with niche wiring skills.
- **Ageing Workforce:** Replacement demand is high as 19.95% of the workforce is aged 55–64 and 8.25% are aged 65+. There is significant pressure to replace skilled engineering workers who are approaching retirement.

Skills needs, current provision and demand

Across all subsectors, employers report strong and growing demand for digital, automation and AI-related capability, including data literacy, digital workflows, embedded systems, robotics and AI-enabled manufacturing. Employers also highlight the need for stronger logical and mechanical reasoning skills. Soft skills gaps are widely observed, particularly in communication, teamwork, resilience and professional behaviours. Automotive employers emphasise reduced workplace readiness among younger recruits, particularly those whose education was disrupted during the pandemic. Leadership capability is increasingly important, with several employers embedding leadership development into apprenticeship pathways. Rapid technological change is driving continuous upskilling needs, especially in subsea engineering and defence manufacturing.

Education pathways: It is projected that 66% of future demand in priority roles will require a Level 4 qualification or above. The main pathways that have historically fed into priority sector occupations are:

- Engineering L2 – L6+
- Manufacturing technologies and maintenance at Levels 2–3 are a national priority.
- Transportation operations at Levels 2–3 are a national priority.
- Adult skills training and bootcamps are also key vehicles for developing the entry-level workforce required, particularly for shop-floor roles.
- Computing L6+
- National priority skills assessments mandate a shift toward level 6 and above training in engineering and computing to support frontier R&D.

Current provision – apprenticeship starts by level and standard/framework: In the 2024/25 academic year, 2,080 apprenticeship starts were recorded in the Engineering and Manufacturing Technology area, which also supports the Defence and Space, Offshore Wind and Renewable Energy, and parts of the Life Sciences, Pharma and Process sectors. Of these starts, 69% were Advanced Apprenticeships at Level 3 (1,430), 22% were Intermediate Apprenticeships at Level 2 (460), and the remaining 9% were Higher Apprenticeships at Level 4+ (190). Overall, there were 1,060 achievements, representing an achievement rate of 50.5%; however, this rate relates to apprentices who started in earlier years and have since completed their programmes, so it should not be interpreted as directly corresponding to the 2024/25 starts figure.

The annual intake is dominated by Level 2 and Level 3 engineering, but only 120 learners are progressing to Level 4 apprenticeships. This represents a critical opportunity for upskilling, as 66% of future demand in priority roles will require a Level 4 qualification or above.

Employers report that lean operational resourcing and production pressures make it difficult to release staff for training, with apprenticeship levy utilisation varying widely and some firms using as little as 50% of available funds. While some automotive manufacturers deliver up to 15 training days per employee per year, many SMEs struggle to maintain this level of investment.

| Standard/framework | ST Code | Level | NE Starts 24/25 |
|---|---------|-------|-----------------|
| Lean Manufacturing Operative | ST0420 | 2 | 100 |
| Urban Driver | ST0926 | 2 | 100 |
| Autocare Technician | ST0499 | 2 | 70 |
| Passenger Transport Operative | ST0491 | 2 | 40 |
| Engineering Operative | ST0537 | 2 | 30 |
| Large Goods Vehicle (LGV) Driver C + E | ST0257 | 2 | 30 |
| Welder | ST0349 | 2 | 20 |
| Baker | ST0188 | 2 | 10 |
| Furniture Making Operative | ST0496 | 2 | 10 |
| Furniture Manufacturer | ST0497 | 2 | 10 |
| Port Operative | ST0233 | 2 | 10 |
| Science Manufacturing Process Operative | ST0422 | 2 | 10 |
| Surface Finisher | ST0460 | 2 | 10 |
| Wood Product Manufacturing Operative | ST0976 | 2 | 10 |
| Engineering Technician | ST0310 | 3 | 310 |
| Installation and Maintenance Electrician | ST0152 | 3 | 260 |
| Motor Vehicle Service & Maint. Tech (Light Vehicle) | ST0033 | 3 | 120 |
| Engineering Fitter | ST0090 | 3 | 90 |
| Machining Technician | ST1305 | 3 | 90 |
| Metal Fabricator | ST0607 | 3 | 80 |
| Plate Welder | ST0852 | 3 | 50 |
| Fire Emergency and Security Systems Technician | ST0189 | 3 | 40 |
| Heavy Vehicle Service and Maintenance Technician | ST0068 | 3 | 40 |
| Train Driver | ST0067 | 3 | 40 |
| Bus and Coach Engineering Technician | ST0030 | 3 | 30 |
| Engineering Design Technician | ST0041 | 3 | 30 |
| Gas Engineering Operative | ST0155 | 3 | 30 |
| Improvement Technician | ST0193 | 3 | 30 |
| Refrigeration Air Con & Heat Pump Engineering Tech | ST0150 | 3 | 30 |
| Vehicle Damage Paint Technician | ST0405 | 3 | 20 |
| Commercial Catering Equipment Technician | ST0575 | 3 | 10 |
| Engineering and Manufacturing Support Technician | ST0457 | 3 | 10 |
| Gas Network Craftsperson | ST0156 | 3 | 10 |
| Laboratory Technician | ST0248 | 3 | 10 |
| Lift and Escalator Engineering | ST0252 | 3 | 10 |
| Mechatronics Maintenance Technician | ST1326 | 3 | 10 |
| Non-Destructive Technologies Technician | ST0288 | 3 | 10 |
| Power Industry Overhead Linesperson | ST1330 | 3 | 10 |
| Rail Engineering Technician | ST0315 | 3 | 10 |
| Science Manufacturing Technician 2014 | ST0250 | 3 | 10 |
| Science Manufacturing Technician 2023 | ST1406 | 3 | 10 |
| Vehicle Damage Panel Technician | ST0406 | 3 | 10 |
| Water Industry Network Technician | ST0161 | 3 | 10 |
| Water Industry Treatment Process Technician | ST0162 | 3 | 10 |
| Improvement Practitioner | ST0192 | 4 | 50 |
| Engineering Manufacturing Technician | ST0841 | 4 | 40 |
| Electrical Power Networks Engineer | ST0475 | 4 | 20 |
| BEMS Controls Engineer | ST0636 | 4 | 10 |
| Electrical and Electronic Engineer (Degree) | ST0151 | 6 | 20 |
| Manufacturing Engineer (Degree) | ST0025 | 6 | 20 |
| Nuclear Scientist & Nuclear Engineer (Degree) | ST0289 | 6 | 10 |
| Product Design and Development Engineer (Degree) | ST0027 | 6 | 10 |
| Scientist | ST0590 | 6 | 10 |
| Total | | | 2,080 |

Medium term skills demand is expected to intensify across digitalisation, automation, electrification, mechatronics, net-zero technologies and advanced engineering. Technical maintenance, leadership, safety compliance and software-driven engineering roles will remain critical. Apprenticeships remain central across all the manufacturing subsectors, with some defence manufacturers reporting apprentices making up 10% or more of their workforce. Employers consistently call for clearer progression pathways and more coordinated regional activity.

Engagement with schools, FE, HE and independent training providers is extensive but often described as fragmented and difficult to navigate. Many employers advocate earlier intervention, particularly in Years 7–9, to influence perceptions of engineering and manufacturing careers. T Levels, work experience and apprenticeship pathways are widely supported, though operational constraints limit participation.

What's currently happening in the region

- Nissan Sunderland: Mass production has begun on the third-generation Nissan LEAF, a crossover model representing a £450 million investment. Nissan's direct investment of up to £1.12 billion in the North East England Investment Zone, with further supply chain and infrastructure investments, takes the overall investment in Sunderland's automotive cluster to £2 billion. EV36Zero will see three all-new electric vehicles manufactured and supported by the AESC Gigafactory, the UK's first large-scale battery facility. The MADE NE facility (£14.6 million) provides a world-class skills, training and industrial innovation centre for advanced manufacturing, EV and electrification technologies in the North East.
- AESC Gigafactory: A new 15.8 GWh gigafactory has launched production in Sunderland, creating the UK's largest operational battery facility and supporting over 1,000 jobs.
- MADE NE: The £14.6 million MADE NE facility is being established, with £9.6 million coming from the North East MSA. It will provide open-access training in EV and battery tech.
- School engagement activity: Many employers advocate earlier intervention, particularly in Years 7–9, to influence perceptions of engineering and manufacturing careers. The Nissan Skills Foundation is a strong regional example and recently celebrated 10 years of dedicated engagement, reaching more than 85,000 young people across the North East through programmes such as Nissan Blue Citizenship and F1 in Schools to build early STEM aspirations.
- The National Battery Skills and Training Academy: Led by New College Durham is a strategic collaboration with Newcastle University and regional partners to deliver technical qualifications and apprenticeships in battery production, electric vehicle technologies, and energy storage systems.
- The Institute of Electrification and Sustainable Advanced Manufacturing (IESAM): Bridges the gap between research and vocational delivery to drive the Clean Power 2030 Mission and the net-zero transition. This strategic partnership, led by Newcastle University and integrating regional universities, FE colleges, and the NEIoT, leverages academic expertise to deliver higher-level skills for the Power Electronics, Machines, and Drives (PEMD) supply chain.
- Training for Growth Pilot: A notable regional example during the 2024/25 period is the "Training for Growth" pilot, supported through the Sunderland City Council UK Shared Prosperity Fund. The initiative enabled 17 new Level 3 Engineering Technician apprenticeship starts across 10 local SMEs, directly addressing the barrier of training costs for smaller firms.
- Skills academy: Launched in 2023/24 through a partnership between Nissan and Sunderland College, this initiative aims to create a direct pipeline of skilled young talent into Nissan by bridging education and industry through early, hands-on engineering training and clear progression into apprenticeships and employment.
- New College Durham – AM-TEC: Lead provider for the regional Advanced Manufacturing Technical Excellence College (AM-TEC). Operating as a collaborative regional platform, AM-TEC utilises a hub-and-spoke model to coordinate delivery across partners, providing integrated pathways that support SME engagement and workforce upskilling.
- Inclusive Models: Projects like the IPAM (South Tyneside), which demonstrate successful social inclusion in high-tech sectors, supporting 60 economically inactive residents into high-tech automotive roles, converting social barriers into a production-ready talent pipeline.

What needs to be retained

- Technician Training: Ongoing investment in engineering technician training is essential to address the scarcity of skilled labour.
- Education Pathways: The commitment across FE and HE to strengthen progression from Level 3 into higher-level and degree apprenticeships must be maintained to help close the region's Level 4+ attainment gap, particularly in priority areas such as battery technology and applied digital.
- Entry-level support: Successful adult short courses and Level 2 programmes that focus on functional skills and attitudes and behaviours, such as the Ford Engineering Academy, should be retained because they provide an important foundation for the workforce.

What changes are needed

- AI and digital embedded in all qualifications at every level: AI and digital skills must be included in all engineering and manufacturing courses at any level, along with upskilling for existing workers to handle Industry 4.0 technologies.
- Collaborations – Cluster approach – Regional Technician Plan: A unified regional Advanced Manufacturing and Engineering Training Plan is needed to coordinate provision and meet overall demand in the region.
- Gender Balance: The sector must address the gender gap; women represent only 26.1% of the manufacturing workforce compared to 54% in pharmaceuticals. Targeted recruitment and cultural change initiatives are necessary.

- Youth engagement: There is a need to narrow the youth participation gap, as only 79.8% of 16–17-year-olds in the region participate in full-time education, compared with the national average of 85.7%.
- SME Engagement: Reversing the 50% decline in SME apprenticeships since 2016 requires specific financial and administrative support mechanisms.
- Wage Competitiveness: The sector must address the wage barrier where learners can often earn more in low-skilled work than in technical apprenticeships, potentially through supplemented apprenticeship wages.
- Augmented Reality (AR) and Digital Twin - Industry 4.0 Integration: Embed these technology skills into engineering apprenticeships to support the regional shift toward high-value, automated assembly lines.
- AI readiness to support SMEs: SMEs should be supported to build resilience and move beyond pilot projects into full-scale automated production, thereby de-risking adoption and addressing the current 43% hesitation rate.

Potential benefits

Successfully implementing these changes will strengthen the region's talent pipeline, reinforce industrial resilience, and enhance the North East's attractiveness for future investment. By reinforcing the region's leadership in advanced manufacturing and Industry 4.0, the initiative will improve supply chain resilience, particularly for SMEs, while driving productivity gains through AI, data analysis and other digitally enabled technologies. It will also position the North East at the forefront of green technology and the transition to a digitally enabled net-zero economy. At the same time, it will create high-wage vocational pathways that support economic inclusion, widen participation, and help reduce economic inactivity across the region. In doing so, it will also raise aspirations among young people and strengthen the long-term workforce pipeline needed to sustain growth in the sector.