

APPENDIX G – JOBS & SKILLS APPENDICES

APPENDIX G-1 – TRANSITION LITERATURE REVIEW

As part of the literature review approximately 20 studies, policy documents and academic papers relating to net zero jobs & skills and the green economy have been reviewed. However, for the purposes of the Five Year Plan not all items that were reviewed are included as part of this appendix; only the material most relevant to the West Midlands Combined Authority Five Year Plan have been included.

SKILLS TRANSITION

Skills related to jobs in the renewable sector, construction and waste management are amongst those required for a low-carbon economy. “Green skills” were defined and listed by the government report for a Green Economy¹ as follows:

1. Resource efficiency,
2. The low-carbon industry,
3. Climate resilience; and
4. Skills to manage natural assets.

Current government policy hasn’t always matched demand for green skills with supply of green skills. A National Open College Network report highlighted the need to address skills across all sectors with a focus on:

- **Management skills** to enable identification of potential and confidence pushing forward performance improvements and digital changes,
- **Employability and generic skills**, particularly literacy, numeracy, digital and cognitive skills; and
- **Technical skills and knowledge**, to support the transition to an AI- and digital-based economy.

Meeting Net Zero targets will have a significant impact on the labour market, and it is vital that those in their early years of employments and those in the latter years of their working career are provided with the right education, training and re-training opportunities to meet future job needs. Increased investment in the green sector and increased demand for certain occupations may not affect skills needed in some occupations, for example demand for railway workers may increase due to greater investment in public transport².

Table 1 provides an overview of the levels of skill and occupational change involved in moving towards green jobs. It takes as its starting point the degree of skill change required on the labour market, matches this with corresponding occupational change and specifies the typical skills response required and gives examples for each level.

Table 1 - Changes in skills and occupations for green jobs

Skill change	Change	Examples	Skills response
Low	Changing established occupation	Welder for wind turbines production	On-the-job and short training courses

¹ Cutting Carbon, Growing Skills, TUC (2020)

² Skills for Green Jobs A Global View, International Labour Organisation, 2011

Medium	Changing of emerging occupation	Mechanic for EV/hydrogen vehicles	Training Courses
High	New and emerging	Smart energy systems	Longer training courses and university degrees

The level of occupational change depends on the degree of skills change: from none (for example railway worker) to high when new occupations emerge, (for example that of smart energy analyst or heat pump engineer). In the middle of this range are numerous established occupations whose content is altered with the adoption of new green technologies or of new green methods of production. These include engineers, managers or technicians who install and maintain new technologies or implement new energy efficiency standards.

Emissions-intensive manufacturing, in particular the automotive sector and related supply chains, is shifting focus to electric vehicles. Increased investment in green sector and increased demand for certain occupations may not affect skills need in some occupations, for example demand for railway worker may increase due to greater investment in public transport. To prepare well for the long term, education and training policies need to be aligned to meet the future new skill demands. STEM skills, as well as technical, managerial, and leadership skills will be important for the transition.

In 2008 a green skills checklist³ was developed by the Government on the skills implications of the transition to a low-carbon and resource-efficient economy. The list includes ten broad groups of skills (tier 1), relevant across sectors, which are broken down into general skills categories (tier 2) and more specific skills (tier 3).

Table 2 - Green skills checklist

Tier 1	Tier 2	Tier 3
Design skills	Eco-design	Design for disassembly, design for recyclability, design for the environment, design for effective energy use, legislation and regulatory compliance.
	Green manufacturing	Legislation and regulatory compliance, integration of process waste
	Materials specification	
	Life-cycle assessment/costing	
Waste skills	Waste quantification and monitoring	Waste production calculations, mass balance, waste audit
	Waste process studies	Material/substance flow analysis, resource utilization mapping life-cycle assessment
	Waste management systems	Objective setting, legislative and regulatory compliance, collection, segregation, waste cycle management, 3R implementation (reduce, reuse, recycle), hazardous waste management, landfill requirements, communications/implementation campaigns
	Waste minimisation	Industrial symbiosis, integration of process waste
	Waste technologies	Recycling, waste-to-energy
Energy skills	Energy minimization	Energy reduction programmes, heat recovery and re-use, energy efficient technologies, energy-efficient practices, communications/implementation campaigns, enhanced capital allowance technologies and schemes

³ Pro Enviro: Skills for a low-carbon and resource efficient economy (LCREE), Report for DEFRA (2008).

	Energy management systems	Objective setting, legislative and regulatory compliance, energy base loads and variable loads, energy audit, energy review, communications/implementation campaigns
	Energy quantification and monitoring	Monitoring targeting and reporting, use of half-hourly data, use of 3. Energy skills sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems
	Energy costs and trading	Energy markets and pricing, carbon trading schemes, climate change levy agreements, energy price trends, enhanced capital allowances, peak oil and impact on energy supplies and prices
	Renewable energy technologies	Solar, wind, biomass, combined heat and power, photovoltaic, ground source heat pump, air source heat pump, hydro, hydrogen, fuel cell, integration into energy supply
	Non-renewable technologies	Nuclear, incineration with energy recovery, clean fossil fuel technologies, carbon sequestration, waste-to-energy
Water skills	Water use minimisation and water re-use	Grey water, water harvesting, wastewater recovery, recycling, cascading, waste/water recovery, effluent treatment, sludge/slurry dewatering, leak detection
	Water management systems	Objective setting, legislative and regulatory compliance, water audit, water consumption review, communications/implementation campaigns
	Water quantification and monitoring	Sub-metering, data collection, water use calculations
Building skills	Building energy management	Monitoring targeting and reporting, use of half-hourly data, use of sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems, building energy assessment
	Integration of renewable energy	Photovoltaics, wind turbines, combined heat and power, fuel cell
	Energy-efficient construction	Insulation (cavity wall, loft, paperwork), regulatory compliance, passive heating, building regulations
	Facilities management	Building energy management systems, management and maintenance of water, waste management
	Calculating building energy efficiency and carbon ratings	U value calculations, building energy assessment, carbon rating
Transport skills	Transport impact minimisation technologies	Hybrid vehicles, biodiesel, electric vehicles, fuel-efficient vehicles
	Transport impact minimisation processes	Alternative transport strategies, communication/implementation campaigns, car-sharing schemes, public transport planning, public transport implementation, cycle network planning, cycle network implementation, transport modelling
	Transport management in business	Transport modelling, route planning and management, distribution and collection system
Material skills	Sourcing	Sources of low-energy materials, sources of low-mileage materials, recyclates (secondary materials), energy-efficient raw material extraction, industrial symbiosis, transport mileage
	Procurement and selection	Use and properties of low-energy materials and of recyclates, industrial symbiosis, low-carbon and resource-efficient

		procurement, cost impact of climate change on material procurement
	Material use and impact quantification	Material usage calculations, life-cycle assessment and costing
	Management systems	Material use planning, material flow process design and implementation, energy-efficient process design and implementation
	Impact and use minimisation	Life-cycle assessment and costing, energy-efficient process implementation, material flows analysis
Financial skills	Investment models	Carbon trading, EU Emissions Trading Scheme, UK Emissions Trading Scheme, enhanced capital allowances
	New/alternative financial models	Energy technologies investment models, carbon derivatives investment models, calculation of payback/return on investment
	Quantification of climate change impacts	Impact assessment of climate change on business finances, impact of climate change on materials availability and cost, carbon neutrality and associated cost/opportunities (costs of doing nothing), risk/opportunity assessment models for adaptation and mitigation, insurance risks/opportunities of a low-carbon economy
	Principles of low-carbon and resource-efficient	Polluter pays principle, externalities economies
	Tools of low-carbon and resource-efficient	Climate Change Levy agreements, enhanced capital allowances, cost – economies benefit analysis, low-carbon and resource-efficient procurement
Management skills	Impact assessment	Energy use calculations, water use calculations, waste production calculations, carbon foot-printing calculations, emissions measurement
	Business planning	RE planning, low-carbon planning, integration of RE and low carbon into business planning cycles, climate change risks, climate change adaptation and mitigation responses (as part of business risk management), understanding low-carbon and resource efficiency skills requirements and long-term planning
	Awareness raising	Communication/implementation campaigns skills
	Opportunities management	Identification of low-carbon and resource efficiency opportunities, cost–benefit analysis
	Risk management	Identification of low-carbon and resource scarcity risks, cost–benefit analysis
	Day to day management	Low-carbon and resource-efficient procurement, integration of low-carbon and resource efficiency skills, due diligence, management systems, low-carbon and resource efficiency skills requirements for recruitment
Policy and planning skills	Built environment master planning and implementation	Low-carbon spatial planning, zero waste planning, resource-efficient planning, low-carbon and resource-efficient urban design, building regulations, public transport planning and implementation, cycle network planning and implementation
	Strategy development	Impact assessment and modelling, principles of low-carbon and planning skills resource efficiency
	Strategy implementation	Understanding of skills needs for HR managers, low-carbon and resource-efficient material sourcing and procurement, awareness raising/communications skills

It is clear both from this checklist and from the definitions of green skills quoted above that the West Midlands needs a broad range of knowledge, technical, managerial and conceptual skills at its disposal. Many of these are specific new skills such as knowledge of sustainable materials, carbon footprinting skills or environmental impact assessment.

It is also clear that some of these skills are not necessarily green or low carbon but are only as green as the context in which they are applied. For example, knowledge of building regulations only leads to more energy-efficient buildings if the right regulations are in place. Building skills may be green only when they are applied in the green building industry. However, this does not make building skills as such irrelevant for green jobs. The essential point is that skills are possessed by the workforce, who can apply them in different contexts.

Training policies are important to ensure a smooth transition of workers across sectors in the short term. These programmes will be particularly important to facilitate the transition of low-skilled workers from jobs in the declining sectors to jobs with similar skills in emerging sectors⁴.

- **Supply side policies** - Active labour market programmes and skill development systems to facilitate a smooth re-integration of jobseekers into employment.
- **Demand side policies** - Strong product market competition and moderate employment protection are important to facilitate the creation of new competitive green sectors.
- **Income support** - Unemployment insurance and in-work benefits can help to ensure that the transition is not achieved at the cost of excessive insecurity or inequality for workers.
- **Regional support policies** - Regions with a heavy reliance on fossil fuel and energy intensive industries might require specifically targeted policy measures to facilitate the transition.

Specifically, targeted labour market policies might be necessary in geographic regions with a high share of the labour force working in fossil fuel and energy-intensive sectors.

Jobs created

Across the UK there could be as many as 694,000 direct jobs employed in the low-carbon and renewable energy economy by 2030⁵.

- Nearly half (46%) of the total low-carbon jobs by 2030 will be in clean electricity generation and providing low-carbon heat for homes and businesses. These jobs will range from manufacturing wind turbines, deploying solar PV, constructing nuclear reactors, installing heat pumps and maintaining energy-system infrastructure.
- Over one-fifth (21%) of jobs by 2030 will be involved in installing energy efficiency products ranging from insulation, lighting and control systems.
- Around 19% of jobs in 2030 will be involved in providing low-carbon services (financial, legal and IT) and producing alternative fuels such as bioenergy and hydrogen.
- A further 14% of jobs will be directly involved in manufacturing low-emission vehicles and the associated infrastructure. These jobs will range from manufacturing electric vehicles and hydrogen vehicles, manufacturing EV batteries from the proliferation of giga factories and sustaining low-carbon mobility by installing electric vehicle charge-points and hydrogen refuelling stations.

The West Midlands is well-known for having a large and dynamic workforce engaged in the manufacturing and production of vehicles. Around half of automotive companies produce vehicle components in the West

⁴ Employment Implications of Green Growth: Linking jobs, growth, and green policies, OECD report for G7 Environmental ministers, June 2017

⁵ Local green jobs – accelerating a sustainable economic recovery, Ecuity, 2020

Midlands⁶. Increased demand for electric cars will increase jobs in West Midlands existing manufacturing capacity lies. This could be in the North West of England and West Midlands where automotive manufacturing supply chains are already well developed.

Across the West Midlands Combined Authority, there could be an estimated 72,000 jobs working in low-carbon sectors⁷. Most of these jobs would be focused on manufacturing low emission vehicles, battery packs and modules in factories situated near existing production sites. Additionally, jobs could be created installing low carbon heating technologies, energy efficiency products and solar panel installations. The skill requirements for these new jobs include:

- **Solar** - Solar technician skill requirements will be demand led. Level 3 Electrical Installations qualification are required to install grid connected solar. There is a relatively robust installer base due to previous boom in the sector, but this will have to increase.
- **Hydrogen fuel cells** - The primary skill demand is expected to be for highly skilled workers including engineers and scientists that can support innovation and research activities. There is a need for UK higher education institutions to deliver key skills such as engineering, physics and other core STEM subjects within the workforce.
- **Electric vehicles** - Job preservation of existing automotive services and growth in need for skills ranging from infrastructure installation, servicing and other high skilled jobs. This sub-sector could feasibly capitalise on existing expertise from automotive manufacturing workers in localities where current automotive operations are downsizing
- **Energy Efficient products** - Employment in key supply chain operations including in R&D, manufacturing and services is largely satisfied by the regional workforce in the operations' key localities. However, increasingly requiring highly skilled software engineering expertise has anecdotally required a change in a recruitment tactic to broaden recruitment to wider regions
- **Green stimulus** - involves 'retrofit' of millions of homes over the next two decades, involving multiple, integrated building fabric measures, new heating systems such as heat pumps and controls, and the widespread adoption of rooftop solar.
- **Professional services/ financial services and consultancy** - Skill and training requirements are broadly influenced by wider sustainability agenda and infrastructure projects.

There is a need to promote training and qualifications in these areas throughout the WMCA and the UK, otherwise there could be an under-capacity in workers especially in the short to medium term. For example, a recent Government research project⁸ into the heat pump manufacturing supply chain indicated that generally heat pump manufacturers are not concerned with skilling of the UK workforce as other industries (boiler, HVAC, and chiller manufacturers) have transferable skills. There is a potential shortfall in F-gas certified installation engineers that could have an impact on the type of heat pump deployed and the rate of deployment. There are currently around 50,000 of qualified engineers in the UK which could be a significant issue if heat pump growth takes place in the short term as expected. Refrigerant handling in the

⁶ Automotive Council Mapping UK Automotive. Accessed on 8th December 2020. Available from: <https://www.automotivecouncil.co.uk/mapping-ukautomotive/>

⁷ Local green jobs – accelerating a sustainable economic recovery, Ecuity, 2020

⁸ Heat Pump Manufacturing Supply Chain Research Project Report, Research carried out by Eunomia Research & Consulting Ltd on behalf of the Department for Business, Energy and Industrial Strategy, 2020.

<https://www.gov.uk/government/publications/heat-pump-manufacturing-supply-chain-research-project>

manufacturing process requires F-gas (Category 1) certification⁹. Without a promotion and increased levels of training, there could be a shortfall in F-gas certified installation engineers in the short to medium term.

A transition to Net Zero will also reduce demand for certain high-carbon services and technologies, such as fossil fuel extraction, processing and distribution, aviation, fossil fuel machinery and livestock and dairy. This could see jobs in some key sectors significantly affected, though in each area there will also be new employment opportunities:

- The oil and gas sector is likely to be heavily affected in by 2041 due to falling international demand for oil and gas. Opportunities in this sector could involve a shift towards offshore renewables, CCUS and hydrogen, with measures to manage the carbon footprint of imported fuels.
- Falling demand for fossil fuelled vehicles, resulting from a transition to electric vehicles, is likely to reduce the number of jobs available in manufacturing and servicing these vehicles. The West Midland’s already produces electric vehicles, and opportunities exist for the UK to have a large share of future electric vehicle, and potentially battery, production and electric vehicle maintenance.
- Jobs in UK aviation and aeronautics sectors could be impacted.
- Income to livestock and dairy farms could be affected if meat and dairy consumption falls by the 20-50% envisaged in our scenarios. The UK’s farms and their 450,000 workers will need to be engaged and supported in the transition to low-carbon farming practices.
- Demand for manufacturing of some products or materials would likely reduce within the more circular economy. This could lead to a shift of some manufacturing towards recycling-based manufacturing and re-use-based services. The transition will also require some industries, such as manufacturing, to change the technologies, fuels or processes they use to costlier ones, while they continue to provide the same type of products or services.

The Governments newly created Green Jobs Taskforce will be at the heart of the transition to net zero. The taskforce forms part of the Government’s 10 Point Plan to drive a green industrial revolution and it will set the direction for the job market as we transition to a high-skill, low carbon economy. Its key aim is to focus on the immediate and longer-term challenges of delivering skilled workers for the UK’s transition to net zero. The taskforce has already highlighted some of the key roles required to deliver net zero. These include gigaplant production operators, heat pump installers and tree planters which have already been identified in this literature review.

Table 3 **Error! Reference source not found.** Table 3 presents qualitative assessment of the expected impacts in four broad industry sectors that have been identified in this literature review. These sectors are considered which are vital to the West Midlands Combined Authority economy and the net zero transition.

Table 3 – Jobs and skills sector analysis

Sector	Jobs and skills
Transport	<ul style="list-style-type: none"> ▪ Transition to electric or hydrogen vehicles will create jobs in automotive manufacturing and the transition in the WM will have to be handled smoothly, given the significant size of the industry in the sub-region.

⁹ PPL Training (2020) F-Gas (Category 1) | City & Guilds 2079-11 (FCAT1), accessed July 2020, available at <https://www.ppltraining.co.uk/training-course/mechanical-and-electrical-technical/f-gas/f-gas-category-1-city-and-guilds-2079>

	<ul style="list-style-type: none"> ▪ Many of the existing jobs will have skills or aptitudes that are transferrable. ▪ Driving and process line jobs are likely to reduce and will need new skills. ▪ Development, deployment and maintenance of EV charging infrastructure and the electrical and engineering ▪ R&D related to electrification and hydrogen technologies will also potentially create new jobs across the WM HE and FE sectors in collaboration with national and international research agencies ▪ An overall modal shift towards public transport is also important, generating a need not only for technical engineering and transport planning skills, but also services around transport management and coordination, forecasting and finance/PPP/revenue management
Built Environment	<ul style="list-style-type: none"> ▪ Commercial and housing retrofit will provide a huge stimulus for new employment creation and skills upgrade ▪ The skills requirement for professional trades, particularly electrical and shifting to factory construction will be significant ▪ The national push for investment in major infrastructure will make considerable demands on the civil engineering sector ▪ Need for people with engineering and customer service skills for the retrofit market which includes being able to work with vulnerable customers
Energy	<ul style="list-style-type: none"> ▪ New jobs arising will cover the likes of energy efficiency retrofit, heat pump installation and retrofit, renewable energy design and installation, hydrogen specialists, energy systems balancing specialists and materials specialists ▪ Technical skills needed for Carbon Capture and Storage may be similar to existing industry skills in sectors such as power generation, chemicals or oil and gas
Heavy industry	<ul style="list-style-type: none"> ▪ Decarbonisation of the UK's important traditional heavy industrial base will be underpinned by decarbonising the power sector and by the introduction of new technologies ▪ New types of manufactured product, such as those taking plastic electronics and silicon electronics approaches ▪ Application of lean manufacturing methods ▪ Redesign of existing products with a focus on resource efficiency and a cradle to cradle approach, in which materials are continually recycled ▪ Minor reskilling for different treatment and processing of waste to energy ▪ Awareness and understanding of sustainable development issues ▪ and specialists such as energy managers for larger businesses ▪ IT specialists to design and operate systems applicable to logistics, smart operating systems, and environmental control

The findings from the literature review show some of the emerging roles that Net Zero will create need specific new skills and training and as such that there will need to train the WMCA labour force. It is also clear, however, that some of these new roles do not necessarily require dramatic increase in skill levels and can even make use of existing strengths in the West Midlands.

APPENDIX G-2 - JOBS & SKILLS POLICY LITERATURE REVIEW

WMCA

Table 4 presents a summary of relevant policies relating to jobs and skills and low carbon economy within the WMCA.

Table 4 – WMCA/LEP’s jobs and skills policy summary

Document	Conclusions
West Midlands Strategic Economic Plan	<p>The SEP sets out the vision for improving the quality of life of everyone who lives and works in the West Midlands with a focus on skills, innovation, transport and inward investment. Priority actions and SMART objectives are focused in the following areas</p> <ul style="list-style-type: none"> ▪ New manufacturing economy ▪ Creative and digital ▪ Environmental technologies ▪ Medical and life sciences ▪ Skills for growth and employment for all ▪ Housing ▪ HS2 growth ▪ Exploiting the economic geography. <p>There are four SMART objectives focused on employment and skills:</p> <ul style="list-style-type: none"> ▪ To improve the balance between the skills that businesses need and the skills of local people so that they have the skills and qualifications to access jobs ▪ Average earnings of working age population will be 13% above UK averages with the living wage as the foundation minimum wage ▪ Proportion of people qualified to NVQ4 or above will have increased to 36% to match the national average and the number with no qualifications will have fallen to 9% to match and then better exceed the national average ▪ Unemployment rate will be below the national average <p>The WMCA’s Productivity and Skills Commission supported net zero by ensuring the skills needs of businesses are met, with a particular focus on the needs of businesses in transformational sectors such as low carbon technologies and advanced manufacturing.</p>
West Midlands Local Industrial Strategy	<p>The West Midlands LIS sets out how the West Midlands will take advantage of the existing skills, infrastructure and innovation in the region to contribute towards the UK’s Grand Challenges. Construction and low carbon and future mobility technology are considered sector strengths in the WMCA.</p> <p>It specifically highlights that low carbon and environmental technology, skills and jobs are important as the sector is considered the most productive sector in the region based on GVA per employee, followed by digital and creative business, professional and financial services. Sets out the five strategic action areas:</p> <ul style="list-style-type: none"> ▪ Prepare young people for future life and work ▪ Create regional networks of specialist, technical education and training to help drive skills and productivity ▪ Accelerate the take up of good-quality apprenticeships across the region ▪ Deliver inclusive growth by giving more people the skills to get and sustain good jobs and careers ▪ Strengthen collaboration between partners to support achieving more collectively
West Midlands Regional Skills Plan	<p>The Skills Plan builds on the targets in the WMCA SEP; by 2030 the region’s productivity, salaries, skills attainment and labour market participation levels match or exceed the national average. The strategy outlines the plan to achieve this through inclusive growth, ensuring that everyone can gain the skills and support they need to access new opportunities and benefit from a stronger regional economy. Advanced manufacturing, building technologies, digital and business and professional services are considered to be transformative sectors where there is a desire to increase the number of skilled people and the level of their skills.</p>
WM2041 - Actions to meet the climate crisis	<p>The framework outlined in this paper summaries the reasons to address climate breakdown and to adapt to climate change the opportunity it provides to create a highly productive, low carbon economy in the West Midlands. It reflects on the potential actions needed and suggests who needs to take these forwards. It also highlights a £40bn investment</p>

<p>with inclusivity, prosperity and fairness</p>	<p>programme will be required over the 21 years (2020-2041) to deliver net zero. The high-level actions are as follows:</p> <ul style="list-style-type: none"> ▪ the West Midlands economy needs to shift to one which is zero carbon and abides by circular economy principles, while enabling the people of the region to build and enjoy their prosperity ▪ boost resilience to 'locked in' climate breakdown ▪ reconcile strong sectors like automotive without locking the region into congestion, polluted air and climate breakdown. ▪ build more places, and more connectivity between places in the West Midlands ▪ save energy and resources without reducing shared prosperity
<p>Black Country Local Enterprise Partnership - Strategic Economic Plan 2017-33</p>	<p>As part of the SEP the LEP have identified 3 overarching themes and 10 drivers of change to inform the plan. The themes are as follows;</p> <ul style="list-style-type: none"> ▪ People - Raising Employability, Education and Skills ▪ Place -Transforming the Black Country Infrastructure and Environment ▪ Business – Improving Black Country Business Competitiveness <p>As part of the aim to improve skills supply chain in the region there is a desire to extend the existing Black Country Skills Factory model beyond manufacturing to other growth sectors such as low carbon technologies. Expanding training programmes for emerging and changing roles as result of transition to lower carbon economy will be vital in ensuring there is suitable pool of workers in the region to deliver net zero by 2041.</p>
<p>Greater Birmingham and Solihull Local Enterprise Partnership - Strategic Economic Plan 2016-35</p>	<p>The overarching objective of the SEP is to create jobs and grow the economy of Greater Birmingham and in so doing raise the quality of life for its inhabitants. Successful delivery depends on:</p> <ul style="list-style-type: none"> ▪ Increasing business and workforce productivity and competitiveness – particularly by raising skills ▪ Stimulating demand led innovation ▪ Increasing private sector investment including overseas investment ▪ Increasing business survival and growth ▪ Increasing exports particularly amongst Small and Medium Sized Enterprises (SMEs) ▪ More inclusive growth that delivers benefits more widely and reduces unemployment, particularly in those parts of Birmingham and North Solihull with persistently high rates. <p>The plan highlights the importance of low carbon energy technologies clusters to achieving these objectives. The region is developing and commercialising new technologies which will be key to delivering smarter, more sustainable and more inclusive growth.</p> <p>The LEP wants local people to be inspired and skilled to fill employment opportunities that will come forward in future and continue to develop their skills. To do this the LEP have identified three key themes as part of their skills framework:</p> <ul style="list-style-type: none"> ▪ Ignite – igniting interest in jobs, raising awareness of career pathways, inspiring and influencing career choices. ▪ Accelerate – targeting those in work, to make skills and career progression, and drive increased productivity ▪ Retune – targeting unemployed people and those in employment whose skills no longer match labour market demand, ensuring they can gain skills or re-train to access the jobs created.
<p>Coventry and Warwickshire Local Enterprise Partnership – Skills strategy</p>	<p>The overall aim of the Skills strategy is to drive forward growth in the area, remove barriers to growth and to create more high value jobs. The skills strategy seeks to support this by developing a workforce with the right skills to meet employers' needs. Currently the proportion of the workforce within the LEP area that is employed in Manufacturing and in Energy and Water is above the national average. Within these sectors, the LEP has particular strengths in Advanced Manufacturing and Engineering and Low Carbon Technologies, and in associated R&D supplied by major internationally renowned companies, plus private and public sector research establishments. The two primary goals of the CWLEP Skills Strategy are to:</p> <ul style="list-style-type: none"> ▪ promote significant upskilling of the local population so that it can take advantage of the future job opportunities that are likely to arise ▪ improve the work-readiness of new entrants to the labour market, including those gaining employment in the many lower skills occupations that will still exist <p>The skills strategies outline how the CWLEP plan to achieve this through agreements with employers, local authority's and provider stakeholders to:</p> <ul style="list-style-type: none"> ▪ provide more apprenticeship places and work placements;

	<ul style="list-style-type: none"> ▪ support SMEs by clarifying and better tailoring the training available to them, and providing a one-stop-shop for assistance; ▪ encourage local providers, including universities, to align their offer to LEP priorities, and in association with local employers to design tailored programmes linking qualifications to career progression in specific organisations; ▪ strengthen provision for the unemployed and for NEETs, including via involving voluntary agencies alongside mainstream providers; ▪ in conjunction with the National Careers Service and by other appropriate means, strengthen the publicity given to qualification and career paths available via locally based employers; ▪ coordinate as appropriate with emerging skills policies and action plans in adjoining LEPs and Authorities ▪ regular examination of the data relating to skills supply and demand so as to help reach informed judgements about the future directions of skills provision in the area.
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LOCAL AUTHORITIES

Table 5 presents a summary of relevant Local Authority policies relating to jobs and skills and low carbon economy within the WMCA.

Table 5 – WMCA Local Authority’s jobs and skills policy summary

Document	Conclusions
Birmingham Skills Investment Plan	<p>Ambition to get Birmingham residents in new jobs coming to the area from major employers and SME’s. Aims to create 70,000 new jobs by 2026 reduce employment rate and reduce people claiming welfare benefits. Skills and qualifications focus in the following areas:</p> <ul style="list-style-type: none"> ▪ Business and financial services ▪ STEM subjects (Advanced engineering and manufacturing) ▪ Information technology ▪ Health and social work ▪ HS2
Walsall Council: Employment and Skills Board	<p>Brings together key strategic private, public and voluntary sector agencies to address the issues within their agreed priority of ‘Ensuring People Possess the Skills to Work & Support Growth’. They work to ensure support for unemployed and local people possess skills to enter and progress in work.</p>
The Coventry Employment and Skills Plan: response to COVID-19	<p>The plan is a response to the COVID-19 pandemic and sets out the scale of the economic challenge and the local impact this has for the residents of Coventry. This includes:</p> <ul style="list-style-type: none"> ▪ Ensuring all education and training providers have clear progression pathways which are responsive and lead into the local labour market. ▪ Digital skills courses ▪ Increasing the skills courses offer across Coventry and sharing data and resources across FEs, ITPs, and Coventry City Council’s Adult Education Service.
City of Wolverhampton Strategic Economic Plan 2019 – 2024	<p>Wolverhampton’s Strategic Economic Plan will help to drive key priorities of Black Country Strategic Economic Plan</p> <ul style="list-style-type: none"> ▪ People through a working and inclusive city ▪ Business through an enterprising city ▪ Place through a vibrant and future city
Vision 2030 Sandwell	<p>Vision 2030’ sets out ambitions for the borough on ten key themes:</p> <ul style="list-style-type: none"> ▪ Raising aspirations and resilience ▪ Healthier for longer and safer ▪ Young people to have skills for the future ▪ Raising the quality of schools ▪ Lowering crime and antisocial behaviour ▪ Excellent public transport to the region and beyond ▪ Major new housing along transport routes and employment sites ▪ Create environments in the six towns where people choose to live ▪ Hosting industries of the future ▪ National reputation for getting things done



Solihull Council Plan 2020-2025	Delivering Sustainable Inclusive Growth based on: <ol style="list-style-type: none">1. Building a vibrant economy2. Promoting and delivering social value3. Enabling communities to thrive4. Actioning our climate change declaration5. Improving skills and access to good work As part of this plan Solihull plan to undertake education, skills and employment activities and responsive employment support, targeted at people from the most disadvantaged groups and communities in the area.
Dudley Council	Dudley Council declared a climate emergency and are discussing proposals to reduce their carbon footprint

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APPENDIX G-3 - JOBS & SKILLS BASELINE DATA

The core of economic strength of the WMCA is in advanced manufacturing and engineering but a number of growing sectors including creative, digital and life sciences are playing an increasingly significant role in the region's success. Table 6 provides a breakdown of key employment sectors in the WMCA.

Table 6 - Employment sectors in WMCA, 2019

Sector	Number of jobs
Agriculture, forestry and fishing	410
Mining and quarrying	295
Manufacturing	132,685
Electricity, gas, steam and air conditioning supply	5,500
Water supply; sewerage, waste management and remediation activities	10,800
Construction	58,590
Wholesale and retail trade; repair of motor vehicles and motorcycles	183,275
Transportation and storage	66,600
Accommodation and food service activities	80,975
Information and communication	30,060
Financial and insurance activities	42,110
Real estate activities	24,400
Professional, scientific and technical activities	84,675
Administrative and support service activities	135,145
Public administration and defence; compulsory social security	50,000
Education	126,750
Human health and social work activities	178,500
Arts, entertainment and recreation	23,250
Other service activities	24,800

Source: Office for National Statistics, Business Register and Employment Survey, 2020

This demonstrates the strengths in the automotive sector, alongside Logistics, Textiles and other specialised Manufacturing which have shaped the sub-regional economy, and all carry inherent transition challenges.

To understand which sectors are of greater or less importance to the WMCA economy, location quotients have been calculated. Location quotients (LQ) indicate which industries or occupations account for a higher share of employment in an area relative to a benchmark location – usually Great Britain. This provides an indication of the degree of specialisation across sectors within a local economy (compared to the national average). LQ is calculated by comparing an industry's share of employment against the national share. The general rule for analysing LQ calculated is as follows:

- Value > 1 – The industry is more important locally than it is nationally
- Value = 1 – The industry is equally important locally and nationally
- A value < 1 – The industry is less important locally than it is nationally

Table 7 - Location Quotient comparing WMCA against Great Britain

Sector	West Midlands: Great Britain
Agriculture, forestry and fishing	0.0
Mining and quarrying	0.1
Manufacturing	1.3
Electricity, gas, steam and air conditioning supply	1.0
Water supply; sewerage, waste management and remediation activities	1.3
Construction	0.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	1.0
Transportation and storage	1.1
Accommodation and food service activities	0.8
Information and communication	0.6
Financial and insurance activities	1.0
Real estate activities	1.1
Professional, scientific and technical activities	0.8
Administrative and support service activities	1.2
Public administration and defence; compulsory social security	0.9
Education	1.2
Human health and social work activities	1.1
Arts, entertainment and recreation	0.7
Other service activities	1.0

Source: Calculated based on the Office for National Statistics, Business Register and Employment Survey, 2020

This shows the importance of the manufacturing, automotive and logistics sectors in the West Midlands compared to Great Britain. It will be important throughout the transition to Net Zero to focus on these sectors and ensure that training and skills programmes for the 5-year plan.

SKILLS LEVELS AND QUALIFICATIONS

High-skilled jobs require more specialised skills to be developed and this is measured by the level of qualifications the person has. Qualifications are defined under the National Vocational Qualifications (NVQ) assessment. The following is a breakdown of NVQs and their associated qualifications:

No Qualifications

No formal qualifications held.

Other Qualifications

Includes foreign qualifications and some professional qualifications.

NVQ1 Equivalent

Fewer than five GCSEs at grades A-C, foundation GNVQ, NVQ 1, intermediate one national qualification (Scotland) or equivalent.

NVQ2 Equivalent

Five or more GCSEs at grades A-C, intermediate GNVQ, NVQ 2, intermediate two national qualifications (Scotland) or equivalent.

NVQ3 Equivalent

Two or more A levels, advanced GNVQ, NVQ 3, two or more higher or advanced higher national qualifications (Scotland) or equivalent.

NVQ4 Equivalent and Above

Higher National Diploma, Degree and Higher Degree level qualifications or equivalent.

No Qualifications

The key areas to observe in terms of determining the skill level of a local labour market are by looking at levels of 'No qualifications', NVQ2 and 'NVQ4 and above'. Higher levels of qualifications generally correspond to higher employment rates with people with degree-level qualifications or above more likely to be working in 'professional' and 'technical' roles where the median gross weekly earnings are higher. According to the last census; fewer than half of those with "no qualifications" were in some sort of employment compared to roughly 80% of people who had at least one qualification.

The WMCA has a high rate of its working population with no qualifications. Solihull is the only authority which performs better than rest of the country. The percentage of the working population with No Qualifications has fallen over the previous 5 years from 16.3% to 13.4%, a decrease of 2.9 percentage points but is still above the Great Britain average of 7.7% respectively.

NVQ2

Having NVQ2 level qualifications is a minimum requirement for most jobs, corresponding to the standard five GCSE's at grades A-C (generally English and Mathematics are required subjects).

The percentage of the working population with NVQ 2 qualifications and above in WMCA is below the Great Britain average. The WMCA had a rate of 67.0% at the end of 2019 compared to 63.2% in 2015 but this is below the GB rate of 75.6%.

NVQ4

It will be bridging the gap between the number of people with NVQ 2 and those with NVQ3/4 which will help drive the transition to Net Zero.

Solihull has the highest share of people with NVQ4 or above in the WMCA with a rate of 44.9%. This is higher than the Great Britain average of 40.3% however the WMCA rate of 31% is below this. The WMCA has experienced a growth in NVQ4 rate since 2015. Bridging the gap between those obtaining NVQ2 and NVQ4 qualifications in WMCA should be the priority as this will help to address some of the existing skills gaps.

COVID-19

COVID-19 impacts on the labour market in the long-term are currently unclear and are still unfolding. To fully understand the impact on the labour market it will take months to see how this has been affected and could take years for some industries to recover fully. The impacts on the UK economy have been significant, however the government and the Bank of England are still trying to help stabilise the economy with a series of employment-related policies. Even with the support of these market interventions, it is estimated that Gross Domestic Product could decrease by up to 11% this year compared to last year.

The October 2020, Claimant Count data (the measure of number people claiming unemployment benefits) released in November 2020 shows the early impacts of COVID-19 on the UK labour market. To understand the full impact on the labour market, observing the monthly Claimant Count data in April and May 2021 will be important as this will show whether the extension of the Job Retention Scheme and the Self-Employment Income Support Scheme has delayed unemployment rather than stopped unemployment from occurring.

Table 8 shows a sharp increase in unemployment, locally, regionally and nationally comparing October 2020 against October 2019. Across WMCA, there has been an increase of 94,000 in the number of unemployed people.

Table 8 - Claimant Count in October 2020 vs October 2019,

Area	Claimant Count, October 2020	Claimant Count, October 2019	Difference
England	2,228,150	1,240,610	+987,540
WMCA	171,450	77,620	+93,830
Birmingham	81,815	34,495	+47,320
Coventry	16,695	9,455	+7,240
Dudley	14,285	6,030	+8,255
Sandwell	19,280	9,420	+9,860
Solihull	7,495	3,880	+3,615
Walsall	14,945	7,055	+7,890
Wolverhampton	16,940	7,290	+9,650

Source: Office for National Statistics, Labour Market Overview, November 2020

The above shows that Birmingham is the area with the largest increase in the number of Claimant Count claims followed by Sandwell. The increase in claims in Birmingham account for 50% of the total increase in claims in the WMCA. Table 9 shows the relative impact comparing the unemployment rate to the working population.

Table 9 - Percentage of population aged 16-64 unemployed,

Area	% unemployed, April 2020	% unemployed, April 2019
England	6.3	3.5
WMCA	9.3	4.2
Birmingham	11.2	4.7
Coventry	6.7	3.8
Dudley	7.4	3.1
Sandwell	9.4	4.6
Solihull	5.8	3.0
Walsall	8.6	4.1
Wolverhampton	10.4	4.5

Source: Office for National Statistics, Labour Market Overview, May 2020

Table 9 shows that Birmingham saw the biggest increase in unemployment rate from 4.7% in October 2019 to 11.2% in October 2020, a year-on-year increase of 6.5 percentage points. In relative terms, WMCA has seen larger increase than the rest of England. The unemployment rate in October 2019 was 4.2% in WMCA and 3.5% in England, and this increased to 9.3% and 6.3% respectively. Due to the extension of the job retention scheme it will not be until the monthly Claimant Count data is released in April and May of 2021 that the impact on unemployment will be confirmed and, therefore, the underlying trends in the data as the Government's two flagship schemes to support furloughed workers will end.

Job Retention and Self-Employment Schemes

On the 11th June, HMRC created two new monthly statistical bulletins showing the number of furloughed employees as part of the Coronavirus Job Retention Scheme (CJRS) and the number of claimants on the Self-Employment Income Support Scheme on a local authority level. The data is correct as of 31st July 2020.

Table 10 - Number of Furloughed Employees by Business Size

Employer size	Total number of employers furloughing	Total number of employments furloughed	Total value of claims made (£million)
1	181,800	182,500	922
2 to 4	286,200	538,700	2,963
5 to 9	132,800	479,000	3,108
10 to 19	79,800	487,300	3,364
20 to 49	61,700	686,500	5,089
50 to 99	19,400	426,700	3,194
100 to 249	11,400	483,500	3,651
250+	7,400	1,803,200	13,889
Unknown	600	6,500	32
Total	781,300	5,093,900	36,210

Source: HMRC, Coronavirus Job Retention Scheme statistics: October 2020

The table above shows the number employers and employees furloughed as of July 31st. At the peak of the crisis the number of people furloughed was higher than the above. In terms of business size, those with two to four employees have been most affected. Large businesses (more than 250+ employees) represented the greatest number of people furloughed.

The impact on sectors has varied greatly with some industries more able to adjust to changing circumstances than others. Many people working in the Professional Services may be able to work from home whilst other services are reliant on being on site or at a specific location.

Table 11 - Top five sectors by number of employees furloughed as of July 31st 2020

Sector	Total number of employments furloughed	Total value of claims made (£million)
Total	5,093,900	36,210
Accommodation & food services	1,028,700	5,730
Wholesale and retail; repair of motor vehicles	801,000	6,914
Business administration and support services	546,000	3,367
Manufacturing	444,400	4,452
Professional, scientific and technical	408,200	2,695

Source: HMRC, Coronavirus Job Retention Scheme statistics: October 2020

The total value of claims since March shows that Wholesale & Retail sector was the most impacted sector in the economy, resulting from the government decision to close non-essential shops making people unable to work and leading to firms putting employees on furlough. Accommodation & Food services and Manufacturing have also been significantly impacted by the Government's lockdown directives. The top five sectors make up 64% of all claims by value.

Geographic breakdowns of number of employees furloughed has been provided by HMRC for CJRS claims. The West Midlands was the fifth most affected region of the UK after London, South East North West and the East of England.

Table 12 - Number of employees furloughed by local authority as at 31st August 2020

Area	Number of people furloughed
United Kingdom	3,274,900
West Midlands	278,400
West Midlands Combined Authority	139,500
Birmingham	55,400



Coventry	16,600
Dudley	14,800
Sandwell	15,900
Solihull	12,600
Walsall	12,800
Wolverhampton	11,400

Source: HMRC, Coronavirus Job Retention Scheme statistics: October 2020

It will take time, effort and investment for the UK economy to recover from the global crisis triggered by the COVID-19 pandemic. Even amidst the current pandemic, there is still an urgent need to respond to the challenges of climate change and deliver Net Zero. Well-designed employment programmes can make distinct contributions to mitigating and adapting to the effects of climate change whilst also creating jobs. These should highlight the potential jobs that the green industrial revolution could bring to regions that have suffered industrial decline from the pandemic such as retail, hospitality and manufacturing. This will help create long-term and sustainable employment in the WMCA.

DRAFT

APPENDIX G-4 - GOALS JOBS ANALYSIS

JOBS CREATED

WSP have undertaken high-level analysis regarding the expected job impacts of the goals outlined in the main report. A qualitative assessment of the impacts regarding the Net Zero has been outlined in Table 13.

Table 13 – Goals and high-level jobs impacts

Sector	Goals	Jobs created	Jobs lost	Net Effect
Domestic	Energy Efficiency	Retrofit coordinators, installers and designers		Increase
	Fuel Switching	Heat pump installers	Gas boiler maintenance repairs	Increase
	Microgeneration	Solar PV installers		Increase
Commercial	Energy Efficiency	Retrofit coordinators, installers and designers		Increase
	Fuel Switching	Heat pump installers	Gas boiler maintenance repairs and gas transmission	Increase
	Microgeneration	Solar PV installers		Increase
Industry	Energy Efficiency and Fuel Switching	Retrofit coordinators, installers and designers Heat pump installers		Increase
	Microgeneration	Solar PV installers		Increase
Transport	Demand Reduction (WFH)	Opportunity to encourage digital skills IT and service sector jobs in more rural areas in local workspace hubs	Reduced demand for City Centre services such as food and beverage stores Vehicle manufacturers	Nil
	Fuel Switching (HGVs)	Hydrogen / Electric vehicle manufacturers	Petrol and diesel engine manufacturers	Increase
	Fuel Switching (Buses, Taxis)	Petrol and diesel engine manufacturers	Petrol and diesel engine manufacturers	Increase
	Demand Reduction (Trips)	Increase in LGV services and drivers from more deliveries	Vehicle manufacturers	Minimal Increase
	Mode Shift	Increased public transport operators	Vehicle manufacturers	Increase
	EV Uptake	EV vehicle manufacturing	Petrol and diesel vehicle manufacturing	Increase
Land Use	Renewables	Solar and wind infrastructure installers and maintenance		Increase
	Afforestation	Tree planters, ecologists		Increase



WSP has undertaken some high-level analysis to forecast the future number of jobs created by each intervention per sector for 2026 and 2041 based on the High carbon modelling scenario. The method adopted is based on research and additionality guidance set out in HCA's Additionality Guide¹⁰. Research has been paired with the inputs and outputs from the carbon modelling for most of the goals to estimate expected jobs created for the five-year plan period and until 2041. Where goals are not expected to have noticeable impact on jobs these have not been modelled.

WSP analysed the goals required to meet Net Zero by 2050. WSP used a mix of sources (more detail can be found in section 5 of the main report) to enable estimation of the uptake of goals by 2041 to meet Net Zero. To inform the pathway over the next two decades WSP developed a time series for the uptake of each goal. For example, the expected percentage of electric vehicles usage in 2026 and 2041 was used to estimate job creation in the EV sectors.

WSP then researched and estimated the employment requirements associated with each goal¹¹ and existing employment levels within the WMCA. While supporting evidence is limited at this stage this aimed to identify and quantify the number of workers required to either manufacture, install and operate and maintain for each goal and in associated supply chains. This included new low carbon technologies, natural capital and transport mode shift to more active and public transport modes. Combining the research and analysis in the carbon modelling with employments enabled an estimation of the number of new jobs required for each goal by 2026 and 2041.

The additionality calculations are based on the standard steps set out in the guidance. This covers:

- The level of 'leakage', (i.e. the proportion of new jobs that are expected to be created for residents outside of WMCA);
- The level of 'displacement', (i.e. the proportion of new employment generated that will simply be displaced from neighbouring areas);
- The level of 'substitution', (i.e. the proportion of new employment generated that will be substituted from one activity for a similar one); and
- The economic 'multiplier' impacts, (i.e. the additional jobs generated in supply chains, indirect employment, and through the expenditure of employees, induced employment).

To calculate the extent of additionality, the following assumptions were made and were applied to both the intervention and reference cases:

- Leakage: a Low impact of 10% was selected (based on Table 4.3 in the Additionality Guide: Fourth Edition);
- Displacement: a Low impact of 10% was selected (based on Table 4.8 in the Additionality Guide: Fourth Edition);
- Substitution: a Low impact of 25% was selected (based on Table 4.10 in the Additionality Guide: Fourth Edition); and
- Multiplier: a multiplier value has been chosen based on the Office for National Statistics industry multiplier rates published in 2019.

Using the MHCLG formula for the following additionality rate and multiplier rates have been calculated for each intervention. Additionality is the extent to which the jobs would be created that would not have

¹⁰ Homes and Communities Agency, Additionality Guide, Fourth Edition 2014
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf (note that several aspects of this additionality guidance are also contained in DCLG's Appraisal Guide of December 2016)

¹¹ Transport Demand (WFH and trips) and Land Use (Renewables) goals have not been modelled in the jobs analysis as there is expected to be limited impact.

occurred in the absence intervention such as the net zero goals. Economic multipliers refer to the increased economic activity (jobs, expenditure or income) associated with additional local income, local supplier purchases and longer term development effects from new jobs created as result of net zero goals.

Table 14 - Additionality and Multipliers

Sector	Goals	Additionality	Multiplier
Domestic	Energy Efficiency	0.51	1.97
	Fuel Switching	0.51	1.97
	Microgeneration	0.51	5.71
Commercial	Energy Efficiency	0.51	5.71
	Fuel Switching	0.51	5.71
	Microgeneration	0.51	5.71
Industry	Energy Efficiency and Fuel Switching	0.51	1.97
	Microgeneration	0.51	1.97
Transport	Fuel Switching (HGVs)	0.51	1.97
	Fuel Switching (Buses, Taxis)	0.51	1.47
	Demand Reduction (Trips)	0.51	1.47
	Mode Shift	0.51	1.47
	Electric Vehicles	0.51	3.05
Land Use	Renewables	0.51	5.71
	Afforestation	0.51	3.05

Domestic

- Energy Efficiency – 5,500 jobs created by 2026 and 18,800 jobs by 2041
- Fuel Switching (Heat pumps) - 6,900 jobs created by 2026 and 23,500 jobs by 2041
- Microgeneration - 1,800 jobs created by 2026 and 7,900 jobs by 2041

Commercial

- Energy Efficiency – 500 jobs created by 2026 and 2,200 jobs by 2041
- Fuel Switching (Heat pumps) - 500 jobs created by 2026 and 2,200 jobs by 2041
- Microgeneration - 100 jobs created by 2026 and 600 jobs by 2041

Industry

- Energy Efficiency – 10 jobs created by 2026 and 200 jobs by 2041
- Microgeneration - 10 jobs created by 2026 and 100 jobs by 2041

Transport

- Fuel Switching (HGVs) – no jobs created by 2026 and 400 jobs by 2041
- Fuel Switching (Buses, Taxis) - 500 jobs created by 2026 and 800 jobs by 2041
- Demand Reduction (Trips) – 40 jobs created by 2026 and 120 jobs by 2041
- Mode shift – 1,500 jobs created by 2026 and 1,500 jobs by 2041
- Electric Vehicles – 3,400 jobs created by 2026 and 32,800 jobs by 2041

Land use

- Renewables - 40 jobs created by 2026 and 600 jobs by 2041
- Afforestation – 200 jobs created by 2026 and 700 jobs by 2041

In total the proposed goals could create 21,000 jobs in the WMCA economy by 2026 and just over 92,000 jobs by 2041. However, if the WMCA does not develop a pool of potential workers with the skills needed for



the goals such as retrofit these jobs will not be created to this scale or timeframe. There is an opportunity for the WMCA to be at the forefront of Net Zero skills development and to create a competitive advantage over other regions.

Table 15 - Goals and high-level jobs impacts summary

Sector	Goals	New roles created	Jobs created by 2026	Jobs created by 2041
Domestic	Energy Efficiency	Retrofit coordinators, installers and designers	5,500	18,800
	Fuel Switching	Heat pump installers	6,900	23,500
	Microgeneration	Solar PV installers	1,800	7,900
Commercial	Energy Efficiency	Retrofit coordinators, installers and designers	500	2,200
	Fuel Switching	Heat pump installers	500	2,200
	Microgeneration	Solar PV installers	100	600
Industry	Energy Efficiency and Fuel Switching	Retrofit coordinators, installers and designers	10	200
	Microgeneration	Heat pump installers	10	100
Transport	Fuel Switching (HGVs)	Hydrogen and Electric vehicle manufacturers	0	400
	Fuel Switching (Buses, Taxis)	Petrol and diesel engine manufacturers	500	800
	Demand Reduction (Trips)	Increase in LGV services and drivers from more deliveries	40	120
	Mode Shift	Increased public transport operators	1,500	1,500
	Electric Vehicles	EV vehicle manufacturing	3,400	32,800
Land Use	Renewables	Solar and wind infrastructure installers and maintenance	40	600
	Afforestation	Tree planters, ecologists	200	700
Total			21,000	92,420

APPENDIX G-5 - SUPPLY SIDE REVIEW

COLLEGES

Colleges West Midlands is a formal strategic partnership of 20 colleges, including all colleges within the West Midlands Combined Authority. Further Education is vital in supporting skills development across the region and providing an infrastructure which offers technical and vocational education from levels 1 to 5. Colleges West Midlands aim to raise the technical skills of young people and adults in full-time education, upskilling in the workplace, undertaking an apprenticeship or pursuing a higher education programme either full or part-time. They drive collaboration across sectors and specialisms to create a network of clusters driving innovation and skills and Further Education providers that are driving multidisciplinary skills development to modernise industrial practice.

Current courses, apprenticeships and qualifications at colleges in the West Midlands Combined Authority cover a number of key sectors:

- Construction (Levels 1 – 3, brick laying, carpentry)
- Plumbing and gas (Level 2 and 3 Diploma in Plumbing and Domestic heating)
- Electrical (Level 2 and 3 Diploma in Electrical Installation)
- Manufacturing engineering
- Mechanical engineering
- Vehicles maintenance and repair

These courses will need to be adapted for emerging roles in the net zero economy. For example, vehicle maintenance and repair courses will need to focus on EVs as there are differences with petrol cars. Currently oSouth & City College Birmingham offer a specific course for EV maintenance. Vehicle training programmes in all colleges will need to incorporate more qualifications relating to EVs. Colleges will also need to roll-out heat pump installation and maintenance training programme as gas boilers will need to be replaced by heat pumps, in both commercial and domestic buildings. Through the stakeholder engagement for the Five Year Plan it's been highlighted that EV and retrofit courses are being currently being developed for colleges in region and some courses in these study areas are now available. This demonstrates the education and training sector in the West Midlands Combined Authority ability to adapt and respond quickly to changing skills requirements. This needs to be matched with employer demand however our engagement indicates that many employers are not able specify their need for skills for net zero.

Two Institutes of Technology (IoT) have been developed to deliver higher technical education in the West Midlands. Dudley IoT has been redeveloped to provide teaching and research environment for higher level skills programmes in sectors where there are skills shortages and therefore employment opportunities including in advanced manufacturing, modern construction methodologies and medical engineering. The Greater Birmingham and Solihull IoT focuses on advanced manufacturing and industry through greater collaboration of further and higher education and creating pathways from level three to level six apprenticeships. Both IoTs form a key part of creating a world class technical education system in the West Midlands.

Workers are needed to deliver major infrastructure projects such as HS2 that will support net zero. The National College for Advanced Transport & Infrastructure in Birmingham provides training that will give learners skills and lead to careers in areas such as civil engineering, systems engineering and digital

design. It is vital that courses and qualifications have strong focus on infrastructure for sustainable and active transport whilst also educating people about new materials projects will be using in the future.

Colleges already have strong focus on areas in which the West Midlands Combined Authority already specialises such as manufacturing. Ensuring that their training is conducive to jobs with local employers in the net zero economy is vital. The Newcastle College Energy Academy is a recent example of a college implementing a strategy for improving the skills base for Low Carbon technology.

In 2018, Newcastle College's Energy Academy¹² launched a new strategy to deliver highly vocational, employer-led STEM education and training for the energy sector. A key cornerstone of this strategy is an innovative partnership with Port Training Services in Blyth, and the strategy is further underpinned by employer partnerships with a range of energy sector employers, including Royal IHC and the ORE Catapult. The Energy Academy opened in 2012 as a purpose-built centre of innovation and training for the Energy Sector, delivering qualifications from Level 2 to Level 6 in subsea engineering, renewable energy technologies and fabrication, including a range of apprenticeships.

In recent years, the academy had lost its connections with local industry, but since opening, more than 1,200 students have been trained, with many now working within the energy sector. The initial success of the college was brought about by strong ties with industry; this has not been maintained. West Midlands Combined Authority has demonstrated it has the ability to deliver responsive training through its providers however this needs to be paired with employer demand for these skills. As highlighted in engagement with employers as part of the development of the Five Year Plan are currently not able to indicate their need for certain jobs roles and skills in the net zero economy.

While investing in R&D for education institutions across the country is essential in tackling both regional and racial inequality and ensuring an adequate provision of skills in industrial clusters. However, to ensure the best and appropriate training to deliver net zero, West Midlands Combined Authority must build stronger connections between education providers and employers so that demand-led training programmes can be developed.

UNIVERSITIES

The region's research strengths across its universities are well established. The current sub-regional set up is able to support provision of new skills and aptitudes for net zero. The West Midlands' mix of universities, anchor companies, research and development facilities, knowledge networks and skilled workforce provides the foundations to support the transition to net zero. The universities in the West Midlands Combined Authority include:

- Aston University Birmingham
- University of Birmingham
- Birmingham City University
- University College Birmingham
- Coventry University
- Newman University Birmingham
- University of Wolverhampton
- University of Warwick

The West Midlands Combined Universities group brings together around 100,000 staff and students, offering research, innovation, skills development and technological opportunities. The three universities that

¹² <https://www.ncl-coll.ac.uk/world-class-facilities/energy-academy>

make up the group (Birmingham City University, Coventry University and the University of Wolverhampton) have a strong history of connecting organisations with students for jobs and work placements, as well as training and development opportunities for existing workers. With knowledge of the skills gaps currently facing the region, the institutions are ideally placed to provide tailored training to fulfil business needs and connect students and jobseekers with vacancies.

Aligning with the low carbon and net zero economy, the combined universities are developing a centre of excellence to support areas of need including sustainable construction methods and materials, low emission transport and fuels, and renewable energy generation¹³. This will address the huge opportunities for employment and economic growth identified in the low carbon sector through continued investment in enterprise, Research and Development (R&D), and knowledge transfer.

Business and university partnerships will embed digital and creative expertise in electric vehicle design and manufacturing and support the development of new supply chains. For example, Coventry University's National Transport Design Centre and the Advanced Manufacturing and Engineering Institute provide industry ready graduates and research in electric vehicle and powertrain technologies.

There are further opportunities to collaborate with the research capabilities of universities across the Combined Authority in areas of Low Carbon and sustainable developments including:

- **Low Impact Buildings Grand Challenge (Coventry University)** - covering a wide range of aspects from low carbon construction systems to intelligent monitoring and user experience of new building technologies.
- **European Bioenergy Research Institute (Aston University)** - centre of excellence for bioenergy and biofuels by pyrolysis and gasification. High level industrial research and industry test centre.
- **Institute of Enefty Research and Policy (University of Birmingham)** - the University is a world leading specialist in low carbon energy and are particularly strong in bio-fuels bio waste to energy, supercritical fluids and hydrogen fuel cell development, testing and storage.
- **Sustainable Environment Research Group (Aston University)** - SERG brings together experts from backgrounds including civil engineering, mechanical engineering, hydrology, ecology and computer modelling. The group aims to develop tools and technologies that conserve and rehabilitate ecosystems while enabling international development.
- **Bioenergy Research Group (Aston University)** - The objective of the BERG is to apply chemical-engineering science and technology to help provide the world with sufficient energy, fuels and chemicals from renewable and sustainable resources to meet tomorrow's needs. BERG is developing novel thermal processes whereby agricultural wastes, fast-growing wood, annual crops and biogenic wastes can be thermally converted in a biorefinery, using both fast pyrolysis and intermediate pyrolysis, into oils and gases which can, in turn, be used to generate electricity and produce transport fuels and chemicals.
- **Centre for Hydrogen and Fuel Cells Research (University of Birmingham)** - Collaborative research, R&D, testing of fuel cells, student placements, training in hydrogen fuel cell technology, hydrogen storage and hydrogen creation from waste materials.
- **Hydrogen Fuel Cell Vehicles (Coventry University)** - Coventry is at the head of developments in 'green' vehicle technologies. Researchers are also involved with the development of an automotive hybrid power flywheel system; including thermal modelling, vehicle system energy modelling, as well as control and sensor development work.
- **Thermofluid Engineering (Coventry University)** - Thermofluids Engineering group's work is focused on automotive aftertreatment applications. The group provides both technical expertise and dedicated

¹³ <http://www.wmcu.ac.uk/areas-of-expertise/>

test facilities. The research focuses on the development and validation of simulation techniques to predict the flow performance of after-treatment systems for spark ignition and diesel engines.

- **Warwick Manufacturing Group** - broad range of research including Low Carbon Vehicle Technology Project with industrial and HEI partners. The Vehicle Energy Facility tests hybrid powerplants, sustainable green materials, software integration, integrated power control, mechanical energy conversion. Advanced Manufacturing covers opportunities for research, development, prototyping and practical application in the areas of Advanced Materials, Innovation and Vehicles.
- **Polymer Research (Aston University)** - Polymer processing and performance including development of new materials and effects of accelerated ageing and weathering.
- **Premium Vehicle Lightweight Technologies** - advanced materials to lighten vehicles and cut down on CO₂ emissions. Includes advanced materials for exterior panels, different forms of lubrication, joining technologies, simulation.
- **Manufacturing Technology Centre (University of Birmingham, Lead Partner with Rolls Royce)** - collaborative research and practical applications, manufacturing development, problem solving and improving competitiveness.

In addition to the research centres the universities offer renowned undergraduate and postgraduate degrees that will support development of net zero skills base and strong talent pool in region. Degrees include:

- Civil engineering (BEng and MEng)
- Environmental science (BSc)
- Chemical engineering (BEng and MEng)
- Sustainable engineering (MSc)
- Automotive engineering (BEng)
- Construction project management (BSc)
- Gastronomy and food sustainability (MSc)

These degree will be at the forefront at developing a skills base for newly created roles in the net zero economy. In addition to those institutions in the West Midlands Combined Authority, there also universities in the surrounding areas with strong research facilities and networks in these same fields such as Keele University and Staffordshire University.

LOW CARBON

In 2018 Sustainability West Midlands Based undertook a review¹⁴ and analysis of the low carbon sector in the region to inform the development of the new West Midlands Local Industrial Strategy. Sustainability West Midlands suggests that the following areas should be highlighted to as particular strengths of the West Midlands Combined Authority upon which to build.

- **EIT Climate-KIC** - a European knowledge and innovation community, working towards a prosperous, inclusive, climate resilient society founded on a circular, zero-carbon economy.
- **Energy Innovation Zones** - framework for focused energy infrastructure investment meeting local community needs. They are mechanisms for risk-managed transition to an appropriate energy infrastructure for the future.
- **Energy Capital** - a smart energy innovation partnership for the West Midlands. The aim is to make the West Midlands one of the most attractive locations to build innovative clean energy technology companies in the world.

¹⁴ West Midlands Local Industrial Strategy, Low Carbon Evidence Base, Sustainability West Midlands, 2018

- **Energy Research Accelerator** - ERA is the UK's first cross-disciplinary energy research hub in the UK drawing on the expertise and world-class facilities of many of the Midlands Innovation group of universities, including Aston, Birmingham and Warwick.
- **Energy System Catapult** - Based in Birmingham, the Energy Systems Catapult supports innovators in unleashing opportunities from the transition to a clean, intelligent energy system.
- **CABLED successor activity** - The CABLED project ran from 2009 to June 2012 and showcased electric cars across Birmingham and Coventry, making ultralow-carbon vehicles available to real users and collected data on everyday use. Government could use this as an opportunity to invest in local trials that focus on innovative low carbon transport technologies, such as rapid charging points or alternative fuels such as hydrogen.
- **Autonomous vehicle development** - Early cluster in the West Midlands with activity and existing assets (such as JLR, HORIBA MIRA, Centre for Connected & Autonomous Automotive Research, Warwick Manufacturing Group etc.), there is an opportunity to make the West Midlands the UK's national centre for autonomous vehicle testing and development.

The West Midlands Combined Authority demonstrates particularly significant activity and expertise in research, development and projects pertaining to low emission vehicles, energy storage and systems, renewable energy and fuel cell and battery technologies. Therefore, further collaboration and investment between the private sector and education is needed to strengthen skills base in these areas.

CHAMBERS OF COMMERCE

The Greater Birmingham, Black Country, Coventry and Warwickshire Chambers of Commerce provide regional business support for firms based within or doing business across the West Midlands Combined Authority. The services and initiatives these agencies provide platforms and opportunities for businesses to grow, connect and become part of a thriving network. They are considered a leading provider of training and development, including apprenticeships for young people and adults as well as higher education and business to business courses. The Chambers of Commerce work with employers to design and develop courses which are up to date and relevant to industry and individual needs. At the moment no training courses are offered around sustainability and the green economy. There will be a need for training providers to offer programmes with a greater focus on sustainability and reducing carbon emissions for local businesses which then can be passed onto their employees. New courses will need to be accredited by the British Chambers of Commerce.

SKILLS HUBS AND PROGRAMMES

Throughout the West Midlands Combined Authority, there are a number of programmes in place to provide training and support for local businesses, especially for Small and Medium Enterprises (SME's). These have been developed with the aim of local businesses to be as successful as they can be by supporting the development of a skilled and talented workforce. A list of the current jobs and skills programmes and short description is provided below.

- **Adult skills for work (ASW)** – This is a programme which provides funded and part funded training which aims to help adults in employment within Birmingham, Coventry, Dudley and Sandwell to improve their skills and improve their future through progression in their work or by finding better paid employment. ASW is funded through the West Midlands Combined Authority Adult Education Budget. The following priority sectors for training have been identified to target in their area; Construction; Digital; Business and Professional Services; Engineering and Advanced Manufacturing.
- **Skills and Apprenticeship Hub** – this is part of the GBSLEP Growth Hub providing advice, guidance, and access to a provider network to support any workforce development needs employers across the



Greater Birmingham and Solihull area. Working with local, regional, and national providers and stakeholders in public and private sectors to deliver skills solutions.

- Coventry & Warwickshire Skills 4 Growth – This is a European Social Fund project managed by Coventry City Council, working in partnership with the Coventry and Warwickshire Local Enterprise Partnership and Growth Hub to deliver accredited training ranging from leadership and management through to technical and soft skills for SME's. The focus is on the skills needs and gap of a company, with customised packages developed to address business requirements and support growth.
- Greater Birmingham Supplier Skills Programme (SSP) - The SSP is a three-year programme Co-funded by the European Social Fund. Birmingham City Council has selected Skills Training UK as one of a small number of training partners for the employee upskilling programme in the GBSLEP region. The programme aims to improve management expertise, workforce capability and capacity, providing essential tools to help SME's sustain their performance and productivity.
- The Black Country Skills Factory – This is an employer-led education and training collaboration being coordinated by Black Country Consortium Ltd with funding via the Skills Funding Agency. The aim of the project is to address skills shortages in the five transformational sectors in the Black Country; Advance Manufacturing; Transport technologies; Construction; Environmental Technologies; and Business Services.
- The Elite Centre for Manufacturing Skills (ECMS) - This an employer-led training facility located in the Black Country, designed to support the UK industry in upskilling and multi-skilling the workforce, with particular focus on developing technical skills and knowledge in engineering, manufacturing, casting and metal forming sectors. ECMS is funded by The Black Country LEP and collaboration between, University of Wolverhampton, Dudley College, Cast Metals Federation, Confederation of British Metalforming and Institute of Cast Metals Engineers.
- Skills Support for the Workforce (SSW) - Programme developed to upskill employees within small and medium-sized businesses in the Black Country by providing recognised accredited qualifications and training courses. SSW is co-financed by the Education and Skills Funding Agency and the European Social Fund. SSW in the Black Country is managed by Serco in partnership with the BC LEP.

The majority of the training available in the West Midlands Combined Authority is commissioned through the Adult Education Budget. The skills and qualifications data in Appendix E shows that the proportion of people with qualifications above NVQ2 and NVQ4 in the combined authority has grown since the devolution of the Adult Education Budget. The numerous training programmes that have been put in place over the in recent years are supporting the main aims the Strategic Economic Plan, Local Industrial Strategy and Regional Skills Plan.

Across all of these programmes there is common aim to supply individuals with the appropriate skills and aspirations to meet current and future needs of a highly technical industry. Whilst these will address shortages of specific skillsets which support the region's strategic opportunities there is need to improve skills that will directly to support goals outlined in the Five Year Plan. The programmes highlighted above provide a foundation to support the transition to net zero, however more specific sustainability and lower skilled training programmes are needed especially those with lower skills levels.

These will be needed in these transformational sectors:

- Advance Manufacturing – e.g. working in a more automation and with new materials;
- Transport technologies – e.g. EV maintenance and repair.
- Construction – e.g. heat pump fitting and repair;
- Environmental Technologies - e.g. renewable energies;
- and Business Services – e.g. improving sustainability in services and products.

This will enable the region to take advantage of current growth opportunities in the transformational sectors and "future-proof" the skills base of a workforce whilst ensuring no one is left behind.

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