

Low carbon and the demand for skills in C&W

David Brennan

Low carbon and the demand for skills in Cheshire and Warrington

The Report

- Policy Context
 - To understand the policy drivers for low carbon
- Carbon and the Cheshire and Warrington Economy
 - To understand the 'whole economy' issues for Net Zero
- Low carbon jobs in Cheshire and Warrington
 - To understand the specific issues associated with the Low Carbon and Renewable Energy Economy
- Recommendations

Low carbon and the demand for skills in Cheshire and Warrington

POLICY CONTEXT

Low carbon and the demand for skills in Cheshire and Warrington

POLICY CONTEXT

Global

- Paris agreement
- COP26

National

- Ten point plan
- Updated targets

Local

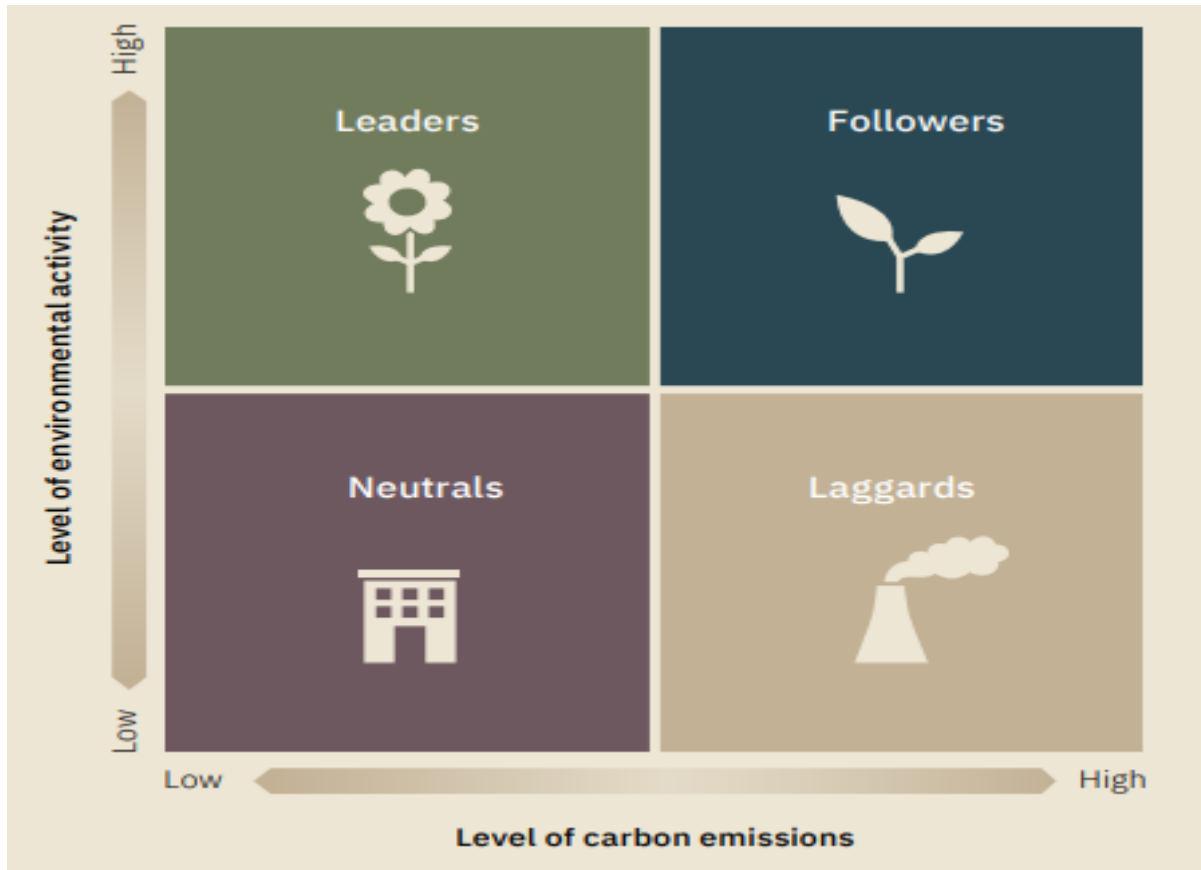
- Local authorities
- Net zero North West

Low carbon and the demand for skills in Cheshire and Warrington

CARBON AND THE CHESHIRE AND WARRINGTON ECONOMY

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Carbon and the Cheshire and Warrington Economy



Source: Nesta, 'Going Green'

Nesta's Eco-Transformation of Industries Matrix

Leaders - Industries in this category are the most eco-friendly, as they do not produce high levels of carbon emissions and are intensively involved in activities that directly protect the environment across the economy.

Neutrals - Industries in this category produce low levels of carbon emissions but are not involved in activities that directly protect the environment. They are part of the green sector but are not influenced by new climate-crisis policies.

Followers - Although they are producing high levels of emissions, followers are also intensively involved in activities that are intended to protect the environment and could thus create green jobs.

Laggards - Industries in this category produce high levels of carbon emissions and are not involved in activities aimed at protecting the environment.

Source: Nesta, 'Going Green'

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C&W has a higher proportion employed with ‘laggards’ and ‘followers’ than is the case for England. Almost 250,000 people are employed in sectors that will experience a low carbon transition.

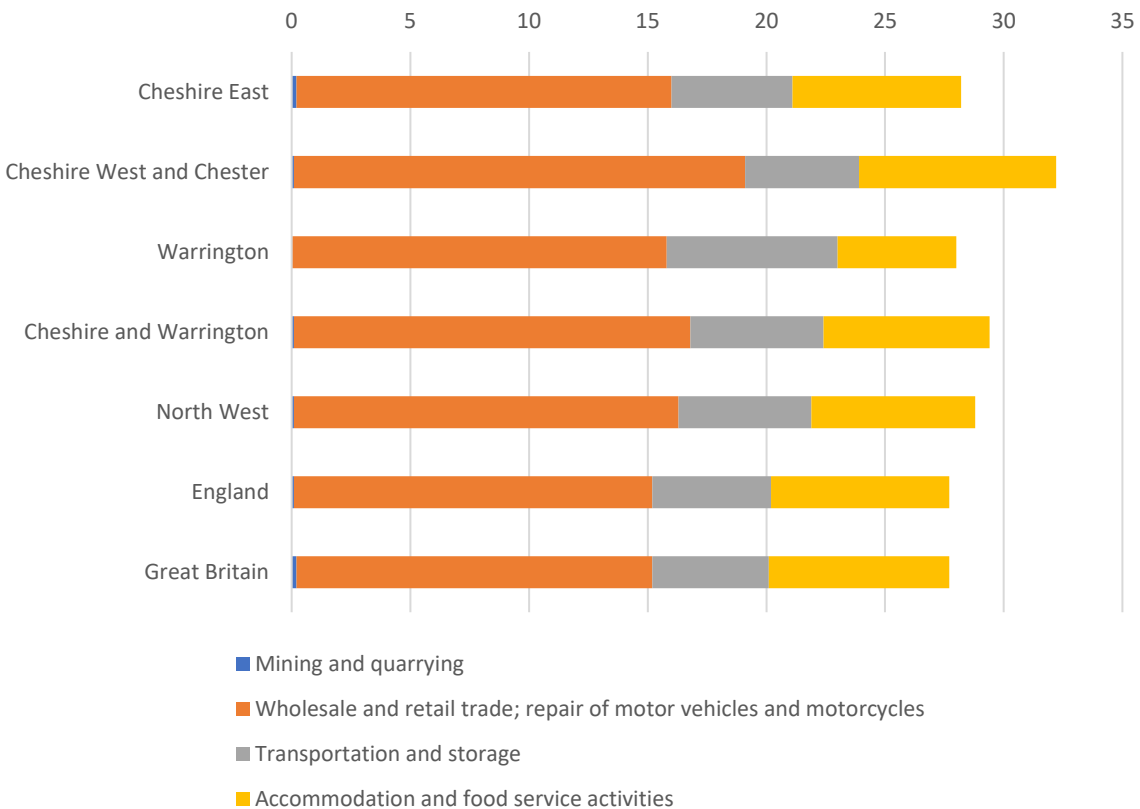
Proportion of jobs in each Nesta category by local authority, region and Great Britain				
	<i>Laggard</i>	<i>Follower</i>	<i>Neutral</i>	<i>Leader</i>
Cheshire East	28.2	20.2	30.6	21.9
Cheshire West	32.2	15.4	28.3	23.8
Warrington	28	14.2	29.8	26.9
LEP	29.4	17	29.6	23.9
North West	28.8	17.4	29.9	24
England	27.7	16.4	31.5	24.3
Great Britain	27.7	16.7	31.3	24.2
<i>Source: Brennan Wilson Ltd analysis of BRES using Nesta taxonomy</i>				

The table opposite presents the proportion of employment that falls into each of the Nesta categories in each of the local authorities, Cheshire and Warrington, the North West, England, and Great Britain.

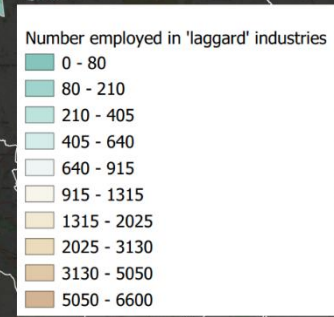
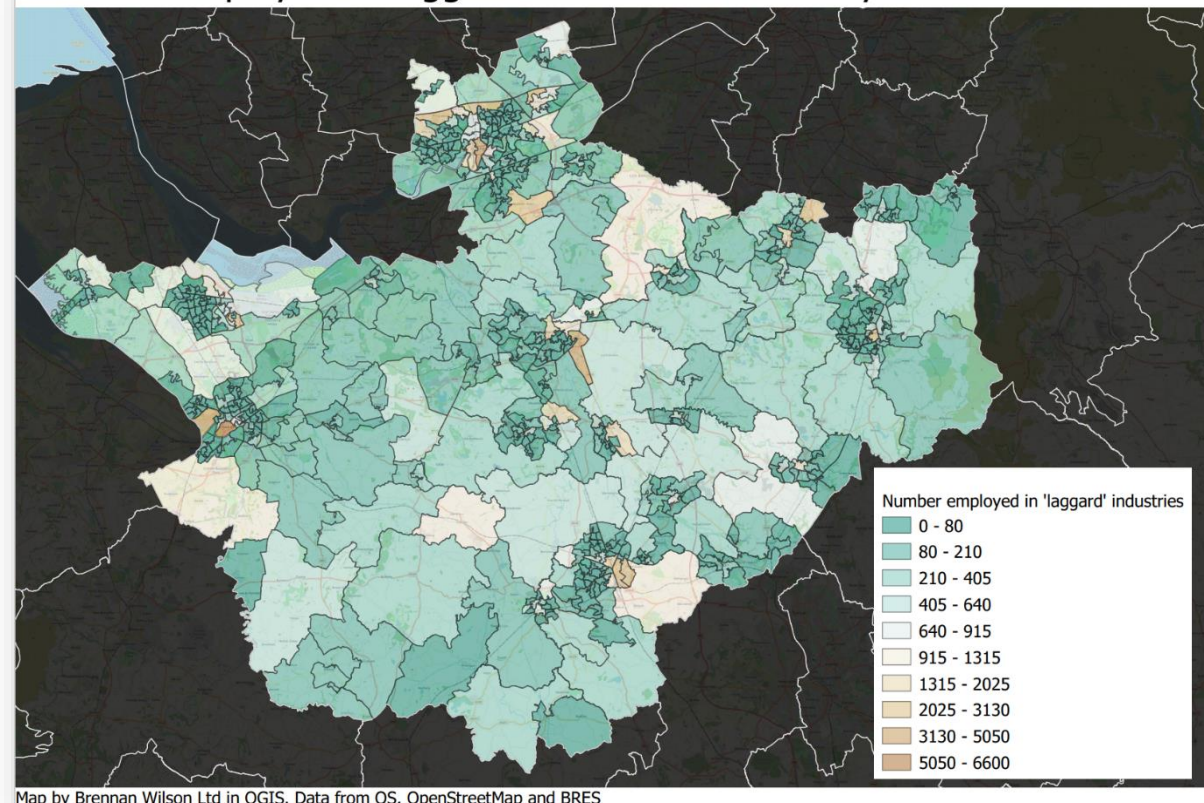
The proportion of employment in ‘laggard’ industries is higher in all three local authorities and for Cheshire and Warrington than is the case for England, with over 32% of employment being in such industries in Cheshire West compared with less than 28% for England. The proportion of employment in ‘follower’ industries is also higher for Cheshire and Warrington than is the case for England. However, this is because the proportion employed in Cheshire East is almost 4% higher than for England. Each of the other two authorities have a slightly lower proportion of employment in ‘follower’ industries than is the case for England.

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'Laggards' by industry type and place



Numbers employed in 'laggard' industries in C&W by LSOA

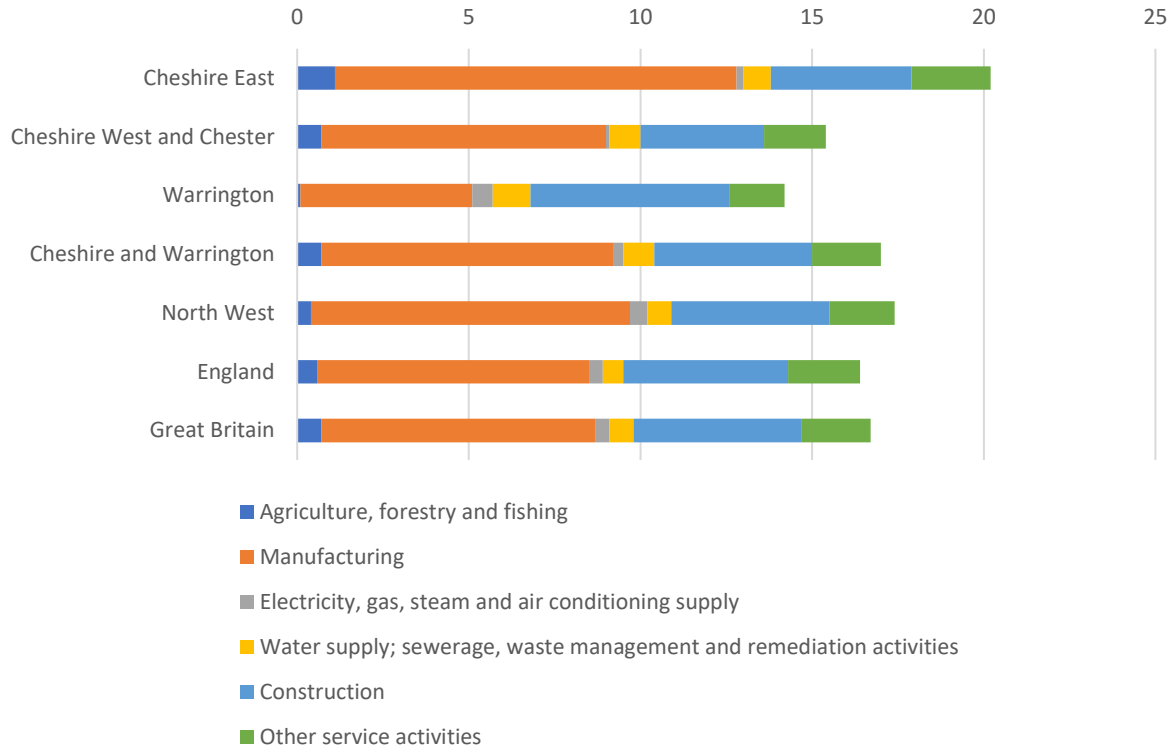


The chart above provides a disaggregated analysis of the 'laggards' category across the three local authorities compared to the regional and national position. The higher proportion of employment with 'laggard' industries in Cheshire and Warrington compared to England is driven, in particular, by a higher proportion of employment in Wholesale and Retail trade in Cheshire West and Chester, and a higher proportion of employment in Transportation and Storage in Warrington, than is the case for England. The map above shows the concentrations of employment in 'laggard' industries in Cheshire and Warrington by lower super output area (LSOA). The greener the shading, the fewer jobs there are in 'laggard' industries. Many of the brown-shaded areas are associated with shopping centres, or are adjacent to motorways – as might be expected from a classification that includes retail, transportation and storage.

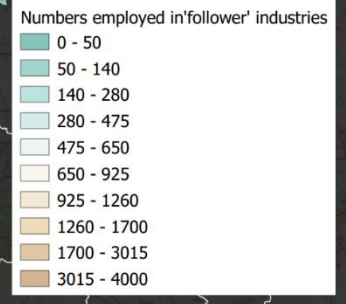
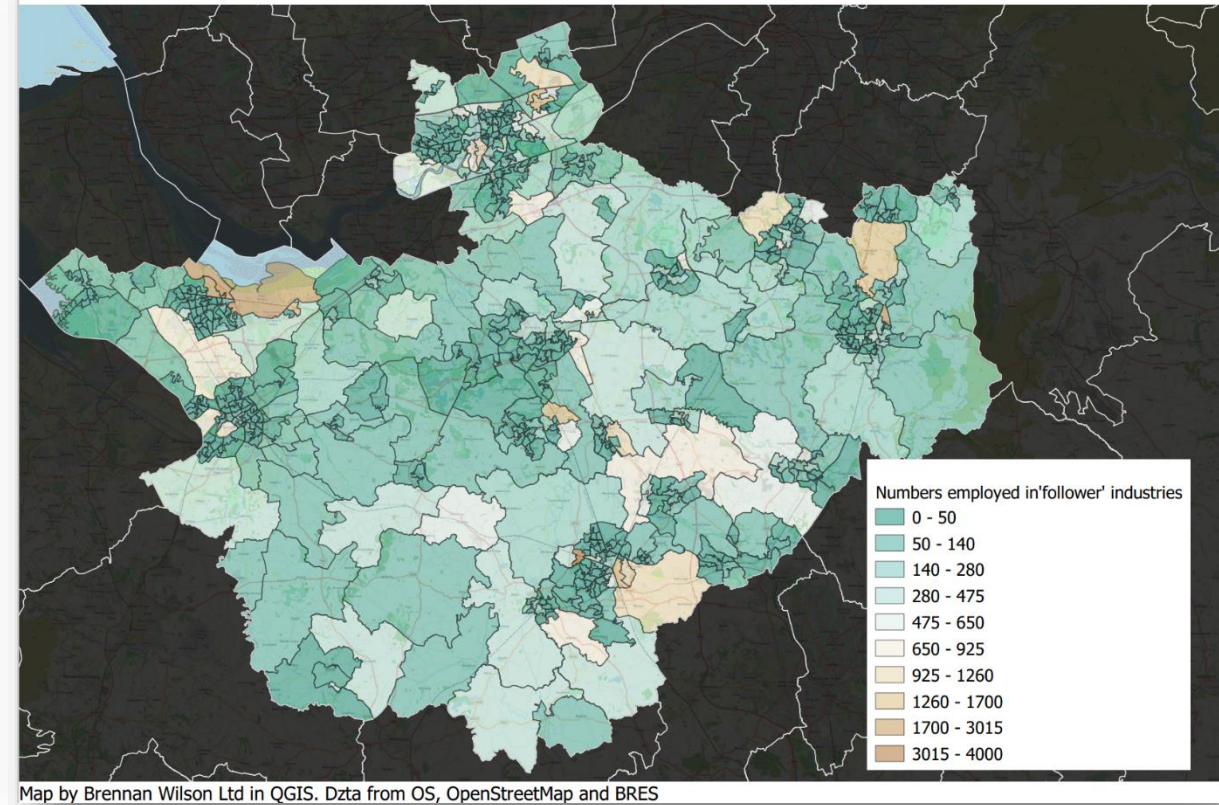
Source: Brennan Wilson Ltd analysis of BRES using the Nesta taxonomy

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'Followers' by industry type and place

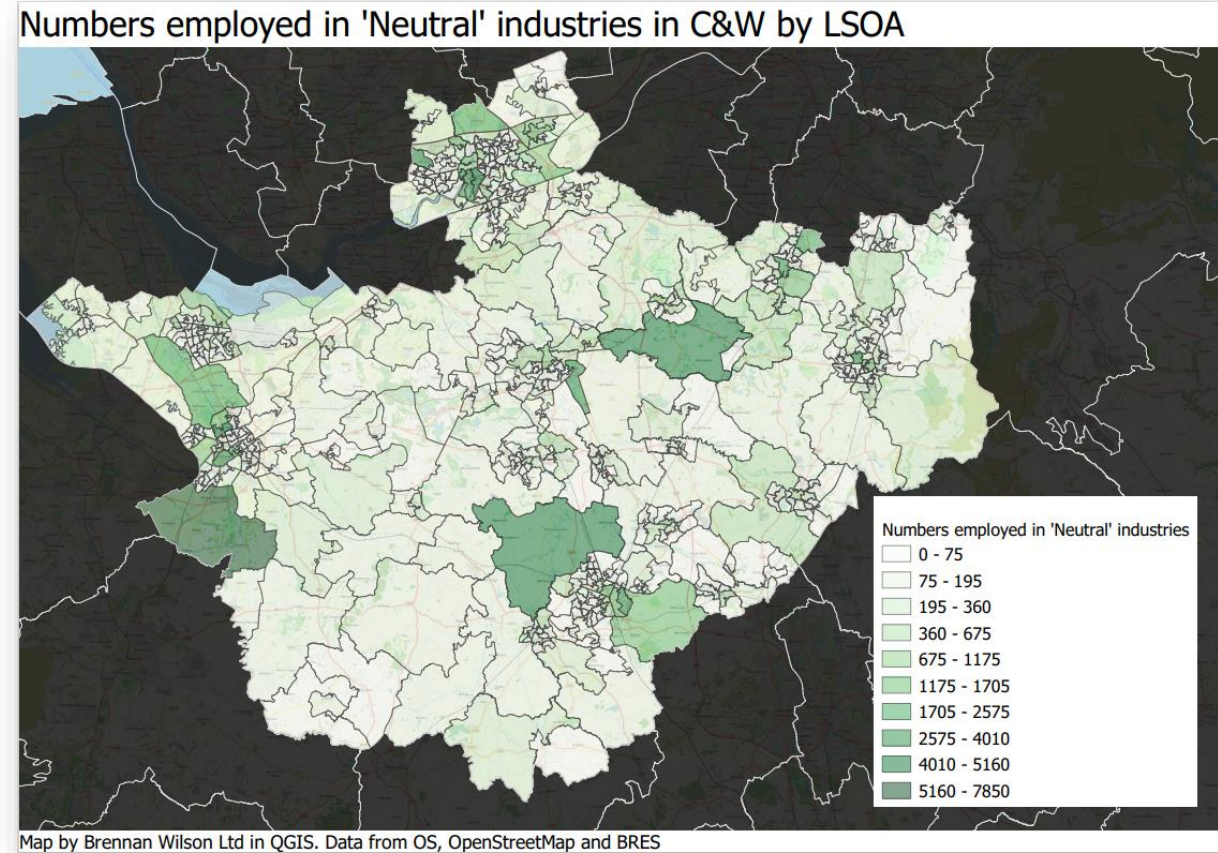
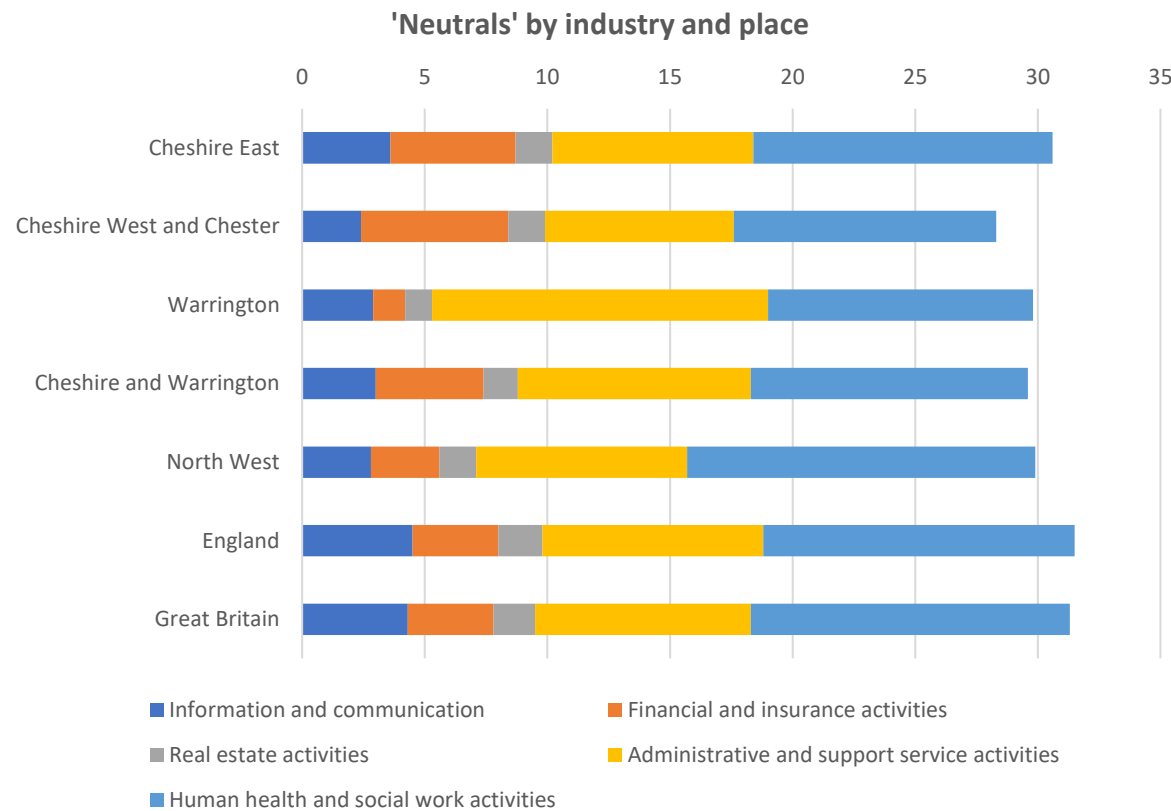


Numbers employed in 'follower' industries in C&W by LSOA



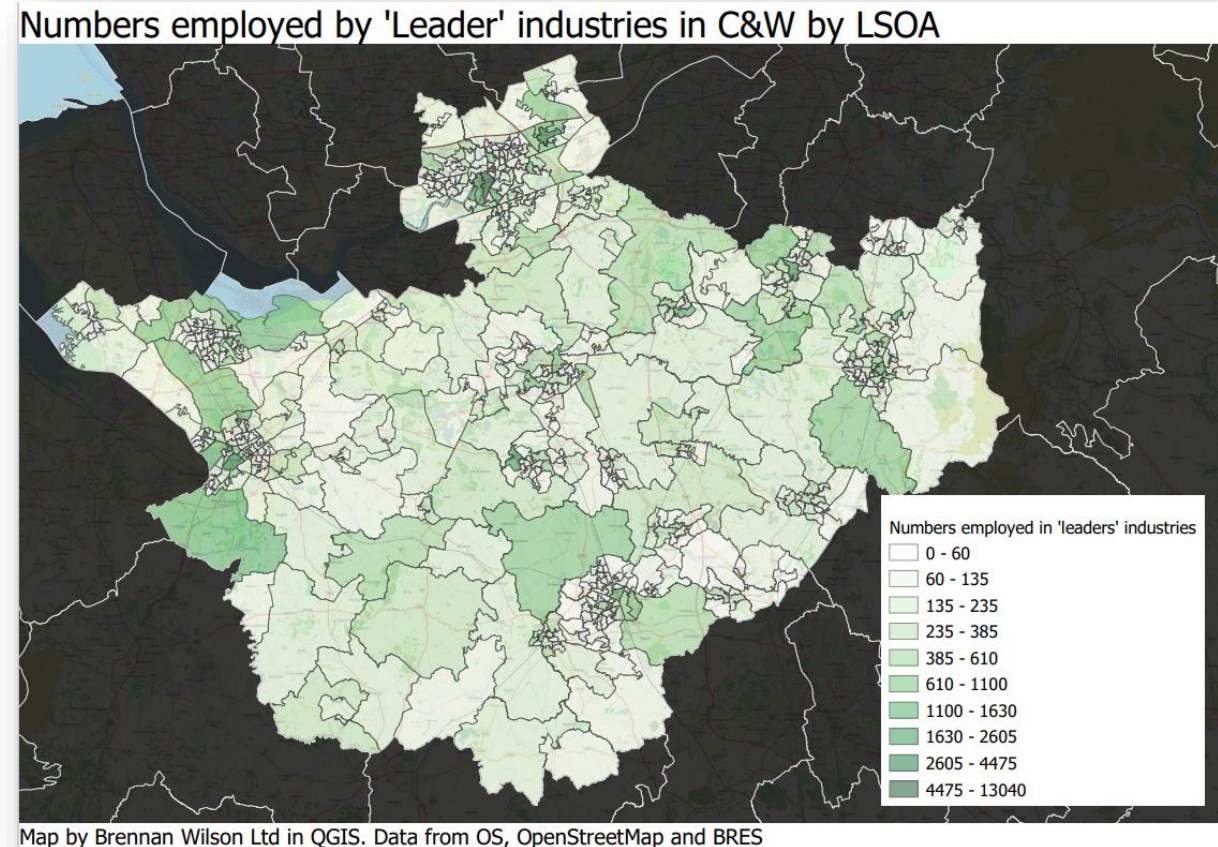
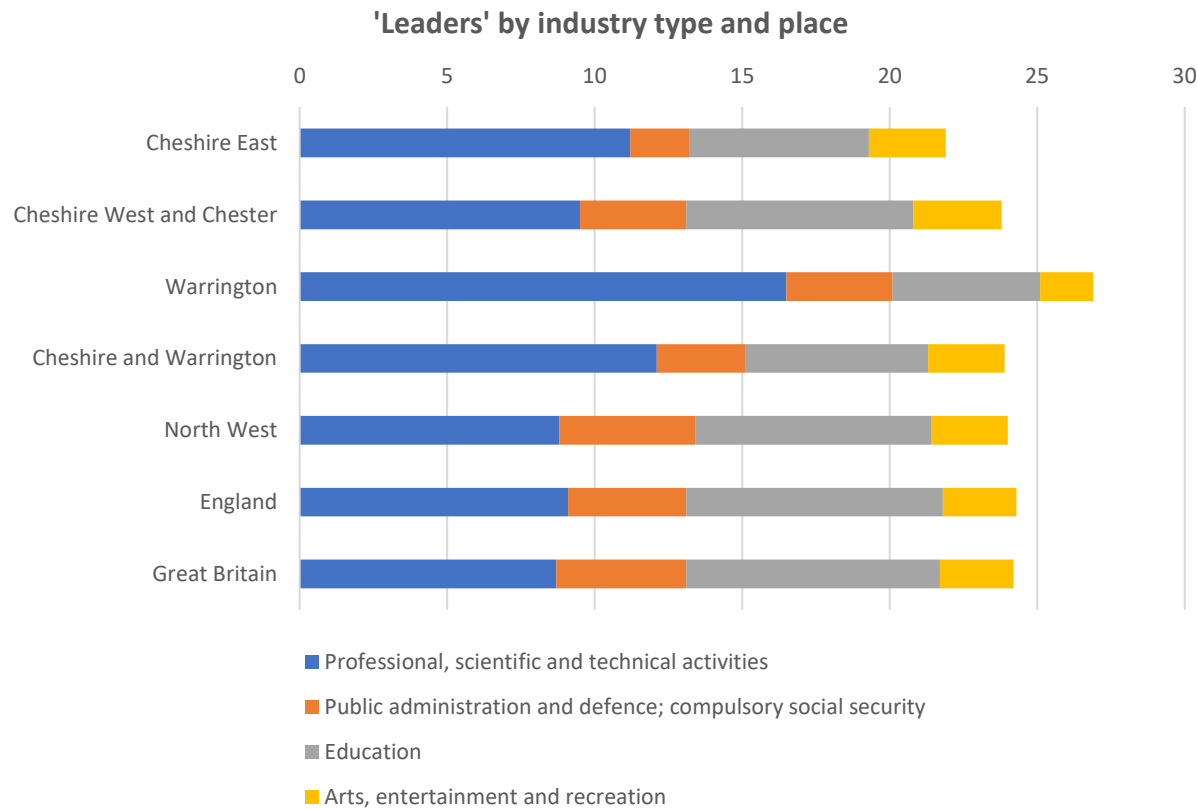
The chart above provides a disaggregated analysis of the 'followers' category across the three local authorities compared to the regional and national position. The higher proportion of employment with 'follower' industries in Cheshire and Warrington compared to England is driven by a higher proportion of employment in Manufacturing in Cheshire East, and to a lesser extent, a higher proportion of employment in Construction in Warrington, than is the case for England. The map above shows the concentrations of employment in 'follower' industries in Cheshire and Warrington by lower super output area (LSOA). The browner the shading, the higher are the concentrations of employment in these industries in those places. The areas with the highest concentrations of employment in this category include the Essar Stanlow refinery, Birchwood, central Warrington, Adlington Business Park and Industrial Estate/Poynton Industrial Estate, Bentley, and Crewe Industrial Estate.

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The chart above provides a disaggregated analysis of the 'neutrals' category across the three local authorities compared to the regional and national position. The lower proportion of employment with 'neutral' industries in Cheshire and Warrington compared to England applies in all three local authorities. This is partly explained by Cheshire and Warrington's relatively high job density which means that jobs in sectors such as health will account for a lower percentage of total employment. The map above shows the concentrations of employment in 'neutral' industries in Cheshire and Warrington by lower super output area (LSOA). The greener the shading, the more jobs there are in 'neutral' industries. The areas with the highest concentrations of employment in this category include the locations of hospitals, and concentrations of financial services/ICT companies such as Chester Business Park

Low carbon and the demand for skills in Cheshire and Warrington

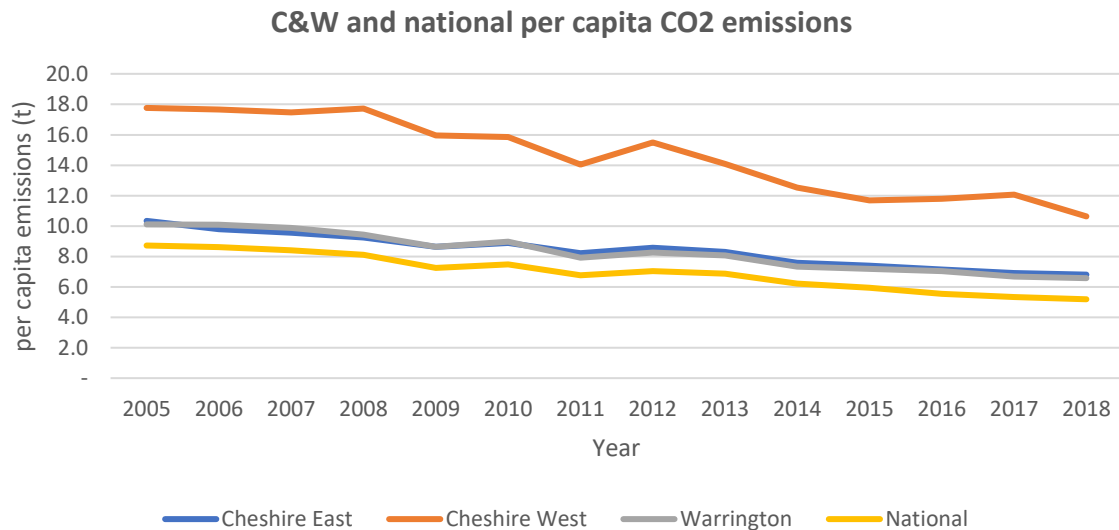


The chart above provides a disaggregated analysis of the Nesta 'leaders' category. The proportion of employment within 'leaders' industries in C&W compared to England is very similar. However, this disguises variance at local authority level. The proportion of employment in Education and the proportion employed in Public administration are both lower than England in all three local authorities. However, the proportion employed in Professional, scientific and technical activities is higher than for England in all three local authorities with Warrington having a particularly high 16.5% employed in this sector compared to 9.1% in England. The map above shows the concentrations of employment in 'leader' industries in C&W. The greener the shading the more jobs there are in 'leader' industries. The areas with the highest concentrations of employment in this category include the locations of police and local authority HQs, colleges and universities.

Low carbon and the demand for skills in Cheshire and Warrington

Source of CO ₂ Emissions by Local Authority, 2018							
Name	Industry and Commercial Total	Domestic Total	Transport Total	LULUCF Net Emissions	Grand Total	Per Capita Emissions (t)	Emissions per km ² (kt)
Cheshire East	749.5	667.0	1,178.7	-6.4	2,588.8	6.8	2.2
Cheshire West and Chester	2,147.4	530.0	950.1	-7.1	3,620.4	10.6	3.8
Warrington	389.8	300.4	677.0	12.0	1,379.3	6.6	7.6

Source: Local Authority territorial CO₂ emissions estimates 2005-2018 (kt CO₂) - Full dataset



The industry source of CO₂ varies significantly by local authority. In Cheshire East, ‘Transport’ is the largest emitter and accounts for 46% of all emissions (1,179kt in 2018). In Cheshire West and Chester, ‘Industry and Commercial’ is the largest emitter and accounts for 59% of all emissions (2,147kt in 2018). In Warrington ‘Transport’ is the largest emitter accounting for 49% of all emissions (677kt in 2018). In 2018, at 3,620kt, Cheshire West and Chester had the highest level of emissions for a (non-metropolitan) unitary local authority in England. Per capita emissions of CO₂ in all three Cheshire and Warrington local authorities were higher than the English level of 5t per capita in 2018. The levels of (per capita) emissions in Cheshire West and Chester in 2018 were more than double that for England.

The rate of decline of per capita emissions in all three local authorities has tracked the national rate, with around a 40% reduction on the 2005 baseline.

Source: Local Authority territorial CO₂ emissions estimates 2005-2018

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CO2 'by source' emissions in Cheshire and Warrington, 2018			
	Operator	Site	CO2 emissions (kt)
Cheshire East	3C Waste Ltd	Gawsworth	13
	3C Waste Ltd	Maw Green Landfill	26
	British Salt Ltd	Middlewich	63
	Dalkia Utilities Services Plc	Macclesfield	69
	Disley Tissue Ltd	Waterside	12
	E.ON UK Cogeneration Ltd	Sandbach	24
Cheshire West and Chester	3C Waste Ltd	Gowy	36
	Associated Octel Co Ltd	Ellesmere Port	12
	Brunner Mond (UK) Ltd	Lostock	78
	Cleanaway Ltd	Ellesmere Port	70
	Essar Oil UK Ltd	Stanlow Manufacturing Complex	1885
	Growhow UK Ltd	Ince	565
	Veolia Energy & Utility Services UK	Alderley Park Energy Centre	11
	Winnington CHP Ltd	Winnington Sodium Carbonate Manufacturing Site	352
Warrington	3C Waste Ltd	Arpley Landfill	135
	Alcan Primary Metal Europe	Latchford	46
	Biffa Waste Services Ltd	Risley	87
	Collier Industrial Waste Ltd	Rixton	15
	Keadby Generations Ltd	Fiddlers Ferry	1339
	PQ Silicas UK Ltd	Bank Quay	59
	Solvay Interlox Ltd	Stretford	52
	United Utilities Water Plc	Warrington North	18

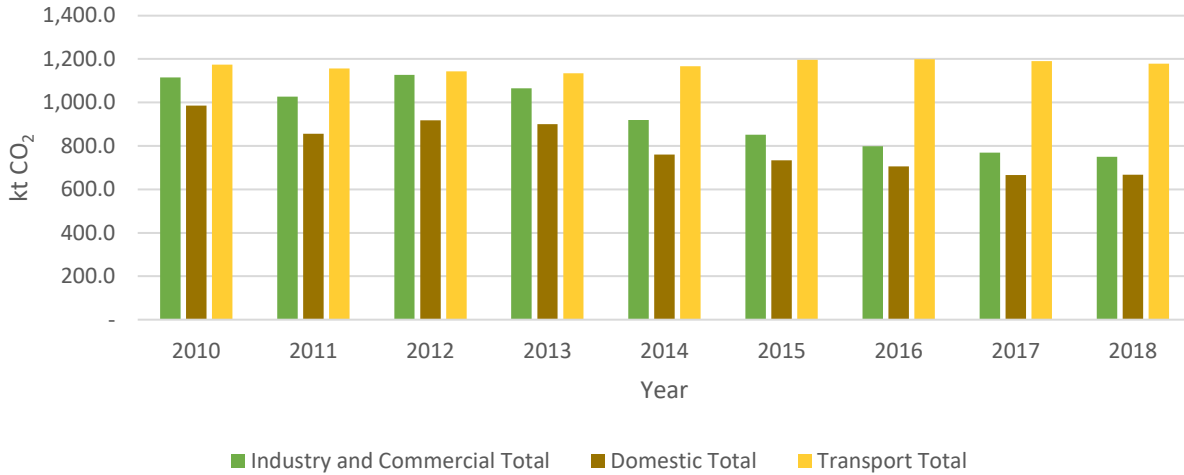
Source: UK local authority and regional carbon dioxide emissions national statistics: 2005-2018

The table opposite provides data on CO₂ emissions in Cheshire and Warrington from the Environment Agency Pollution Inventory for 2018. The highest CO₂ emitters in Cheshire and Warrington in 2018 were:

- The Manufacturing Complex at Stanlow, run by Essar Oil (UK) Ltd (1885kt of CO₂ in 2018)
- Fiddlers Ferry power station (1339kt of CO₂ in 2018). The power station closed in 2020 and the site has been designated as an employment site, although demolition of the existing facility is expected to take up to 7 years.
- Growhow UK Ltd (now known as CF Fertilisers) is, reportedly, the UK's largest fertiliser manufacturer (565kt of CO₂ in 2018)
- Winnington CHP Ltd (352kt of CO₂ in 2018) which provides energy in the form of intermediate pressure steam and power to Tata Chemicals Europe's manufacturing sites as well as other manufacturers located within Northwich's industrial clusters.
- 3C Waste Limited (210kt of CO₂ across 4 sites in Cheshire and Warrington in 2018) is involved in the handling, recycling, and disposal of waste materials. The Company provides these services for local authority and private commercial customers.

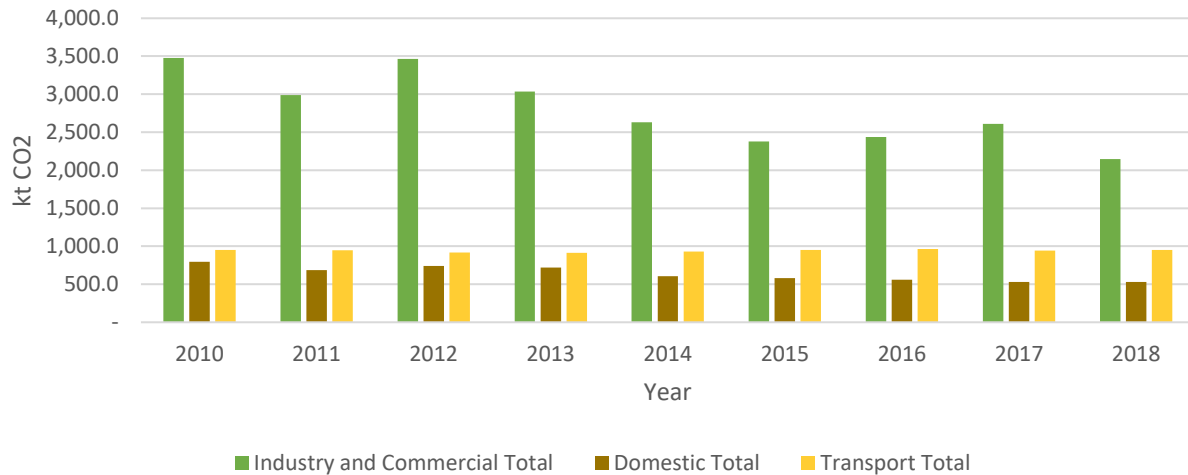
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CO₂ Emissions in Cheshire East 2010-2018

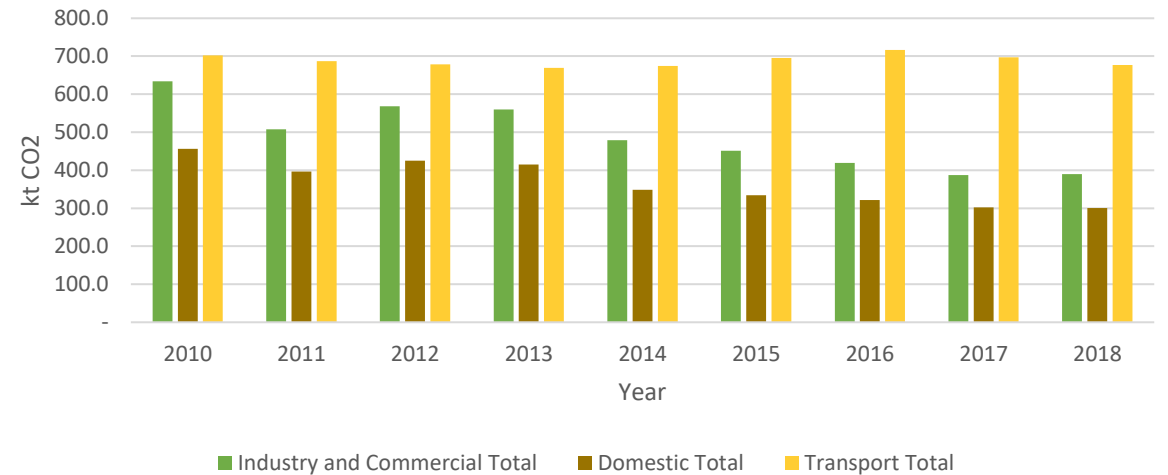


Considered over time (2010-2018) emissions in from ‘Industry and Commercial’ sources have declined by 35% (CE), 38% (CWAC and Warrington); emissions from ‘Domestic’ sources have declined by 32% (CE) and 34% (CWAC and Warrington); and emissions from ‘Transport’ have remained a broadly the same level over this time period in all three local authorities.

CO₂ Emissions in Cheshire West and Chester 2010-2018



CO₂ Emissions in Warrington 2010-2018



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LOW CARBON JOBS IN CHESHIRE AND WARRINGTON

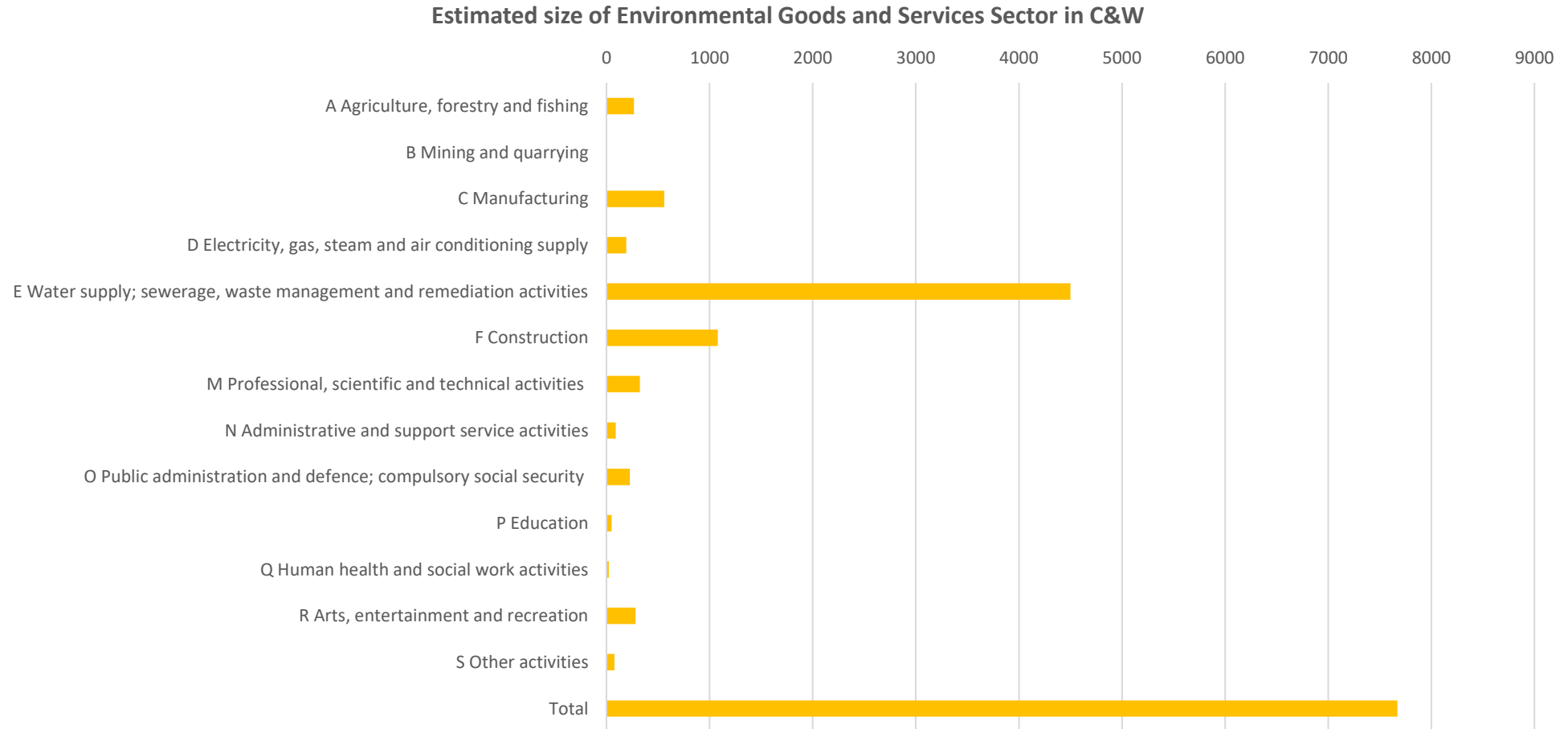
Low carbon and the demand for skills in Cheshire and Warrington

LCREE groups and description of activity	
Group	Description
Low- carbon electricity	Offshore wind, onshore wind, solar photovoltaic, hydropower, other renewable electricity, nuclear power, carbon capture and storage
Low- carbon heat	Renewable heat, renewable combined heat and power
Energy from waste and biomass	Bioenergy, alternative fuels
Energy-efficient products	Energy-efficient products, energy-efficient lighting, energy monitoring, saving or control systems
Low-carbon services	Low-carbon financial and advisory services
Low-emission vehicles and infrastructure	Low-emission vehicles and infrastructure, fuel cells and energy storage systems
<i>Source: ONS</i>	

Low Carbon and Renewable Energy Economy (LCREE) estimates, employment by industry, Cheshire and Warrington, 2018	
Sector	Jobs
A : Agriculture, forestry and fishing	24
B : Mining and quarrying	2
C : Manufacturing	1562
D : Electricity, gas, steam and air conditioning supply	205
E : Water supply; sewerage, waste management and remediation activities	83
F : Construction	1345
G : Wholesale and retail trade; repair of motor vehicles and motorcycles	66
H : Transportation and storage	5
J : Information and communication	13
L : Real estate activities	4
M : Professional, scientific and technical activities	562
N : Administrative and support service activities	122
P : Education	4
S : Other service activities	13
Total	4012
<i>Source: Brennan Wilson Ltd analysis of Low Carbon and Renewable Energy Economy (LCREE) survey estimates, UK, 2014 to 2018, (ONS) and BRES</i>	

Disaggregation of ONS data suggests that the LCREE in Cheshire and Warrington might currently employ in the region of 4,000 people. This is slightly lower than previous estimates of employment in these activities by K-Matrix which estimated 5,800 people employed in 2015. 4,000 is less than 1% of all those employed in Cheshire and Warrington, 5,800 is slightly more than 1%. ONS data suggests that most of the LCREE jobs in Cheshire and Warrington are likely to be in manufacturing, construction and professional, scientific and technical activities; with (very) small numbers employed in other sectors.

Low carbon and the demand for skills in Cheshire and Warrington



Source: Brennan Wilson Ltd analysis of BRES and ONS EGSS Estimates

Low carbon and the demand for skills in Cheshire and Warrington

Many of the immediate jobs associated with the LCREE will be linked to infrastructure:

- For **housing energy efficiency**, the installation of loft insulation; solid wall insulation; cavity wall insulation; floor insulation; and high efficiency glazing.
- For **solar photovoltaics**, Level 3 Electrical Installations qualifications will be required to install grid connected solar.
- For **nuclear**, there will be demand for construction workers that have non-nuclear specific skills (including highly skilled roles in, for example, welding), as well as civil contractors and mechanical engineers.
- For **anaerobic digestion (AD)** there will be a requirement for specialist grid-connection engineers and operators who ensure grid connections are safe.
- For low carbon **heat pumps**, the current challenge is primarily one of training and upskilling the 133,000 existing Gas Safe engineers in the country.
- For **carbon capture, utilisation and storage (CCUS)** and hydrogen, there will be a requirement for the construction and operation of scale pilot projects for hydrogen production (eg Hynet) and the construction and operation of CCUS infrastructure in high emitting industrial clusters.
- For **Electric Vehicles (EV)**, the construction and operation of EV charging infrastructure and the transition in manufacturing.
- For **active travel equipment and infrastructure**, the construction and operation of: walking schemes and networks; cycling infrastructure schemes and networks; and traffic calming schemes.
- For **natural capital**, creating, maintaining or restoring non-woodland ecosystems (e.g. wetlands); woodland ecosystems; saltmarshes and peatlands for carbon sequestration; and parks and urban green space.

Low carbon and the demand for skills in Cheshire and Warrington

There are a number of renewable energy projects in the planning pipeline

Renewable Energy Projects in Cheshire and Warrington (Operator, Technology and Development Status) as of Feb 2021			
J H Willis & Son Ltd	Holme Farm	Anaerobic Digestion	Awaiting Construction
SEP Elton	Land at Elton Farm	Solar Photovoltaics	Application Submitted
SEP Puddington	Land West of Vicarage Lane	Solar Photovoltaics	Application Submitted
This is Protos (Peel Environmental)	Plot 8 Protos/Ince Marshes (resubmission)	EfW Incineration	Under Construction
Engie	CF Fertilizer site	Anaerobic Digestion	Awaiting Construction
Barnstone Estate	Crewe Hill Farm	Anaerobic Digestion	Awaiting Construction
UK Power Reserve	Oil Sites Road	Battery	Awaiting Construction
Peel Environmental / Waste2tricity	Protos Plastics to Hydrogen Facility (Ince)	Advanced Conversion Technologies	Awaiting Construction
Green Switch Solutions - Liquidated	Hatherton Lodge	Solar Photovoltaics	Awaiting Construction
TGC Renewables/NESF	Land at Moss Farm (South)	Solar Photovoltaics	Awaiting Construction
TGC Renewables/NESF	Land at Moss Farm (North)	Solar Photovoltaics	Awaiting Construction
Energy Demand and Response	Leighton Hall Farm	Battery	Awaiting Construction
Intelligent Alternatives	Drury Lane	Solar Photovoltaics	Awaiting Construction
SBC Renewables	Johnson's Lane (resubmission) - Warrington	Solar Photovoltaics	Awaiting Construction
Amazon UK Services / Push Energy	Amazon Omega Business Park	Solar Photovoltaics	Awaiting Construction
Source: Renewable energy planning database			

Low carbon and the demand for skills in Cheshire and Warrington

An LQ of 0.85 for Construction in C&W disguises areas of competitive advantage

Demand for skills: Construction sub-sectors in Cheshire and Warrington				
Sub-sector	2021 Jobs	Avg. Wages Per Job	2021 LQ	2020 Establishments
Construction of Utility Projects for Electricity and Telecommunications	597	49192	2.32	13
Test Drilling and Boring	111	33788	1.95	2
Construction of Roads and Motorways	1270	40307	1.57	84
Construction of Railways and Underground Railways	374	43584	1.41	61
Construction of Other Civil Engineering Projects n.e.c.	2456	38998	1.27	220
Other Specialised Construction Activities n.e.c.	2024	32474	1.14	333
Floor and Wall Covering	338	32749	1.09	109
Construction of Residential and Non-residential Buildings	6407	38338	0.99	976
Other Construction Installation	627	31508	0.83	128
Construction of Water Projects	28	32528	0.79	4
Roofing Activities	388	31191	0.78	106
Demolition	113	29913	0.78	12
Electrical Installation	2652	32892	0.70	615
Painting and Glazing	450	27248	0.69	163
Site Preparation	213	37142	0.66	39
Development of Building Projects	878	33844	0.58	736
Joinery Installation	472	27224	0.43	329
Plumbing, Heat and Air-conditioning Installation	1165	30620	0.40	434
Other Building Completion and Finishing	386	27123	0.39	231
Construction of Utility Projects for Fluids	31	30228	0.35	10
Plastering	47	32084	0.26	59
Construction of Bridges and Tunnels	0	0	0.00	0

Source: EMSI Analyst

The construction industry in C&W employs 21,000 people in 4,665 establishments, with a current location quotient of 0.85. In other words, if the Construction sector in C&W had the same share of employment as it has nationally, the sector would employ a further 3,700 people in the sub-region.

The sub-sector with the highest LQ in Cheshire and Warrington is “Construction of Utility Projects for Electricity and Telecommunications” with an LQ of 2.32. This sector class includes the construction of distribution lines for electricity and telecommunications and related buildings and structures that are an integral part of these systems. It seems highly probable that many renewable energy projects in Cheshire and Warrington and beyond will involve this type of construction company.

Similarly, Cheshire and Warrington has a competitive advantage in “Construction of Other Civil Engineering Projects n.e.c.” (LQ of 1.27) which includes construction of industrial facilities (except buildings) such as refineries and chemical plants. It is likely that hydrogen/CCUS projects, for example, will involve this type of construction company.

Conversely, Cheshire and Warrington has relatively low location quotients for “Electrical Installation” (LQ of 0.7) and “Plumbing, Heat and Air-conditioning Installation” (LQ of 0.4) and so may be less well positioned for construction activities related to, for example, heat pumps and photovoltaic.

Low carbon and the demand for skills in Cheshire and Warrington

The level of construction apprenticeships is slightly higher in C&W than for England

Apprenticeship starts in building and construction by C&W residents, 2019/20, by level		
Intermediate Apprenticeship	Advanced Apprenticeship	Higher Apprenticeship
168	142	60
<i>Source: DfE</i>		

Supply of skills: building and construction starts on apprenticeship frameworks and standards (>10 starts) in Cheshire and Warrington, all ages, 2019/20	
Framework/Standard	Starts
Advanced Carpentry and Joinery	14
Bricklayer	26
Carpentry and Joinery	59
Chartered Surveyor (Degree)	26
Civil Engineer (Degree)	12
Construction Management	12
Construction Skills	107
Maintenance and Operations Engineering Technician	34
Science Industry Maintenance Technician	31
All starts	370
<i>Source: DfE</i>	

AEB funded learning aim enrolments (>12) in building and construction in C&W 2019/20		
Learning Aim Title	Level 2	Level 3
Diploma in Electrical Installations (Buildings and Structures)	42	30
Diploma in Plumbing Studies	28	14
All starts	135	70
<i>Source: DfE</i>		

There were 21,582 apprenticeship starts in Building and Construction in England in 2019/20. This equated to 9.2 starts per 10,000 employees. The equivalent figures for Cheshire and Warrington were 370 starts equivalent to 9.3 starts per 10,000 employees.

The table opposite provides data on the level of Construction Apprenticeship starts in 2019/20 in Cheshire and Warrington. 45% were at Level 2, 38% were at Level 3 and 16% were at Level 4 and above.

All apprenticeship frameworks/standards in building and construction with more than 10 starts by Cheshire and Warrington residents in 2018/19 are set out in the table opposite.

In 2019/20, there were 207 AEB-funded learning aim enrolments in building and construction at levels 2-7 by residents of Cheshire and Warrington who were aged 19 and over. There were only four learning aims with more than 12 enrolments. These are set out in the table below. The L3 electrical installations qualification, if achieved alongside other qualifications (eg wiring regulations, inspection and testing), does provide entry to work as an electrician. The L2 doesn't. L3 is the minimum prior achievement requirement for training in the NICEIC qualification for PV installation. Similarly, fully qualified plumbers need to achieve L3, although the minimum prior achievement requirement for taking the NICEIC heat pump qualification is at L2

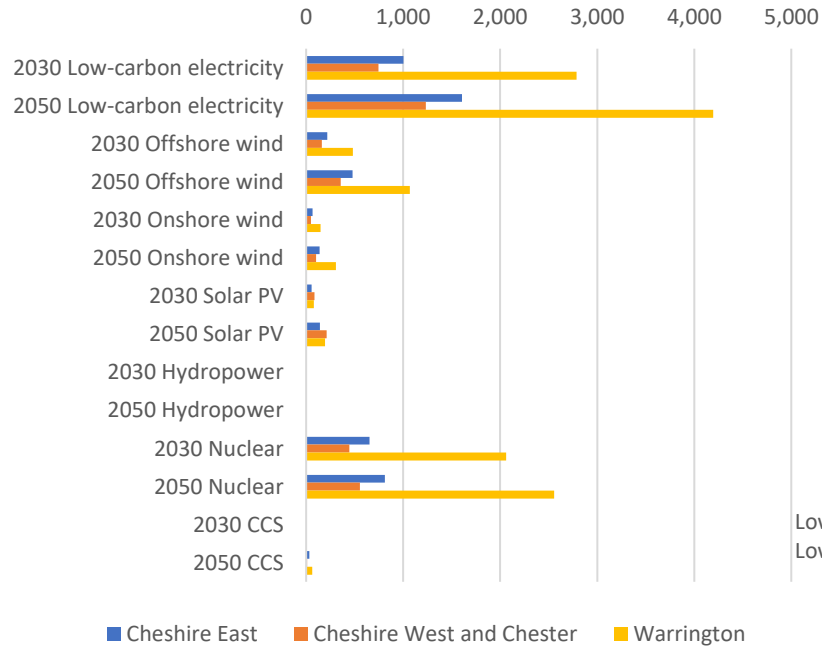
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National CITB Modelling suggests:

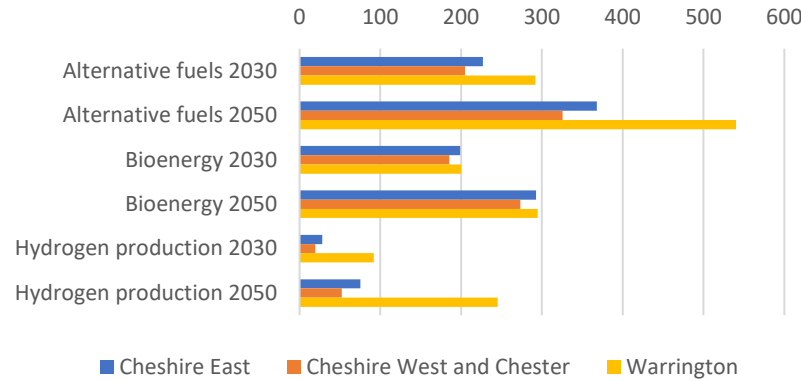
- **Hydrogen** - can be accommodated within the existing workforce for installation
- **Fabric first/retrofit** – national training requirement of at least 12,000 pa over the next four years, increasing thereafter but then sharply dropping off.
- **Heat pumps** – a national training requirement of between 7,500 and 15,000 pa
- **Heat networks** – sharp increase in training required to 9.5k pa
- **On-site energy** – limited additional training required

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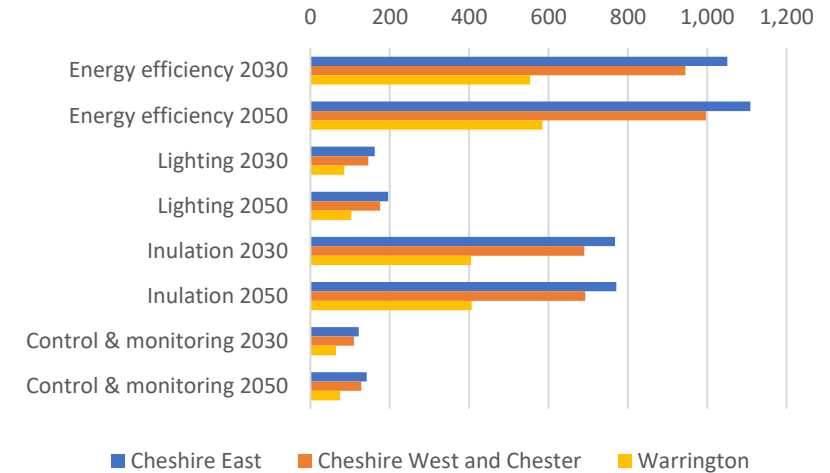
Local authority job forecasts - Low Carbon Electricity



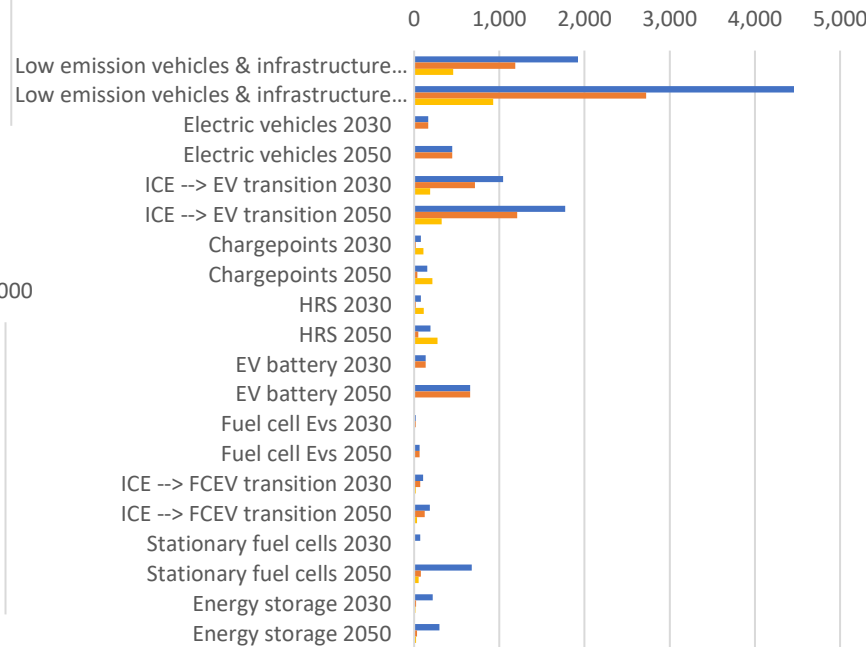
Local authority job forecasts - Alternative Fuels



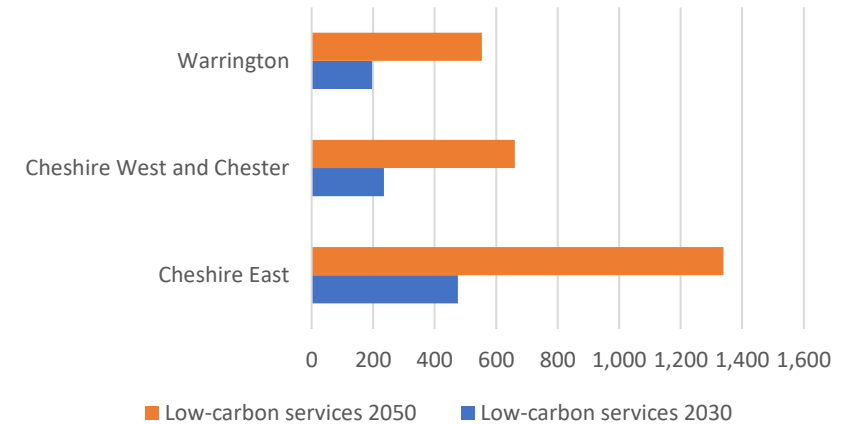
Local authority job forecasts - Energy Efficiency



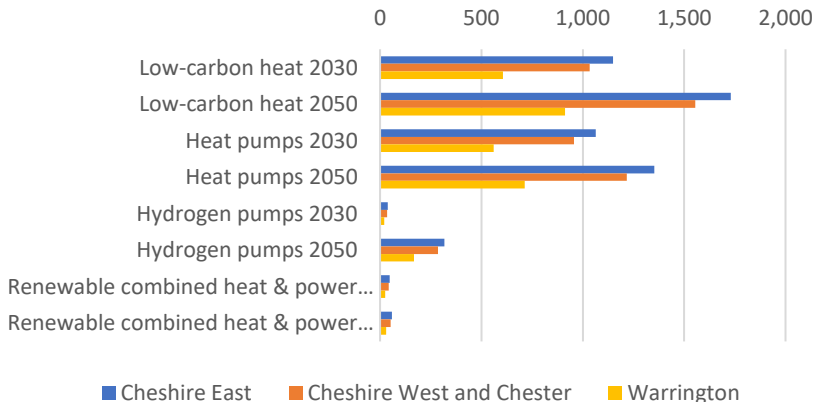
Local authority job forecasts - low-emission vehicles and infrastructure



Local authority job forecasts - Low-carbon services



Local authority job forecasts - Low Carbon Heat



Low carbon and the demand for skills in Cheshire and Warrington

Draft Recommendations

1. There should be support for short courses designed to facilitate the entry of already skilled workers to the LCREE. For example, supporting the training for trades people (electricians, plumbers etc) required to become MCS certified.
2. There should be support for employers that are introducing new process in response to the low carbon agenda to ensure that their workforce have the skills needed for implementation.
3. Partners should work with large-scale projects to ensure that there will be apprenticeship opportunities in both the construction phase (working with specialist construction companies) and the delivery phase.
4. Providers should review their curriculum (particularly for construction) to ensure that the learning aims offered have the content required for work in a low carbon future.
5. Providers should review and adapt their infrastructure to ensure that learning environments (workshops etc) are equipped appropriately and meet industry standards.
6. Providers should review their capacity to scale up delivery if Government takes the advice of CITB that low-carbon related construction skills training should be forecast-led rather than demand-led.
7. The Pledge partners should review and update resources on careers to ensure that the changing nature of some roles is reflected, and the best estimate of demand volumes is understood.