

Marches LEP

Low Carbon Environmental Goods and Services Market Snapshot

Midlands Energy Hub
2017/18 to 2019/20

Final Report March 2021
kMatrix Data Services Ltd



Disclaimer

kMatrix

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Midlands Energy Hub

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Project Overview

The Low Carbon and Environmental Goods and Services sector study was commissioned by Nottingham City Council on behalf of the Midlands Energy Hub, sponsored by the Department of Business, Energy and Industrial Strategy (BEIS), and its stakeholders across the Midlands including the Local Enterprise Partnerships (LEPs) and Local Authorities.

The study was commissioned in November 2020 and awarded to kMatrix Data Services Ltd and Sustainability West Midlands, with the aim of understanding the current state of the sector, where support is needed to help grow the sector across the Midlands from a Local Authority level to a regional level and the role the sector can play to drive a low-carbon recovery from Covid-19.

The UK has a clear commitment to clean growth, where the economy continues to grow while reducing greenhouse gas emissions. The commitments are set out in the Industrial Strategy and the Clean Growth Strategy. The UK has a strong record of clean growth, cutting carbon emissions by 42% between 1990 and 2015, while experiencing a 67% increase in GDP during the same period, in contrast to the G7 emissions reduction of 3% and GDP increase of 61%¹. This has been achieved through a variety of strategies including improved energy efficiency, increased recycling of waste products and improved automobile engine technology, with the largest contribution in reduction of emissions from the decarbonisation of power. The UK now has the largest installed offshore wind capacity in the world².

Although the UK is arguably a world leader in clean growth, there is an ongoing need for further development across multiple sectors to deliver on the low carbon economy commitments both local and central government are pursuing. LEPs in the Midlands are fully cognizant of the need to support and further develop the green economy, as set out in their Energy Strategies and Local Industrial Strategies.

The study is grounded in evidenced data provided by the kMatrix big data analytical tool, which has been used to inform the nature of the sector across the Midlands region, in a number of sub-sectors. The data has been used alongside desk research, documentation review, stakeholder engagement and collaboration with partners and the awarding authority to produce a series of reports constituting an evidence base of both quantitative and qualitative evidence. This evidence not only informs policy recommendations as an integral part of the study, but also acts as a baseline from which progress can be measured post Covid-19 and into the future.

The study involved the production of a quantitative evidence base led by kMatrix and a qualitative evidence-base led by Sustainability West Midlands with findings from each workstream enriching the evidence of the other. By full collaboration between partners, the project steering group and stakeholders, the evidence base produced by the project delivers a comprehensive overview of the LCEGS market, with detailed information at the LEP and Local Authority levels. The wider relevance to the green recovery and national commitment to net zero by 2050 have been considered throughout the work and are integral to the policy recommendations and growth forecasts made during the study.

¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

² <https://gwec.net/global-figures/global-offshore/>

Report Introduction

This report is one of a series which quantify the LCEGS sector for the MEH as a region and from the perspective of the nine LEPs which comprise the MEH. The data in this report are produced using the kMatrix Big Data Analytical Tool, with full methodology paper delivered to the MEH.

The MEH Regional analysis of the LCEGS sector, at the Local Authority level is available in a separate report. The data in this report is specifically for the Marches Local Enterprise Partnership (LEP) and constituent Local Authorities. The reason for this delineation is the presence of some Local Authorities in more than one LEP, for example Hinckley and Bosworth is served by both Coventry and Warwick LEP and Leicester and Leicestershire LEP. Likewise, Bromsgrove, Redditch and Wyre Forest are all served by both Greater Birmingham and Solihull LEP and Worcestershire LEP. The purpose of the data at the LEP-level is to provide the individual LEPs with a snapshot of the LCEGS sector within the geographical area they serve, regardless of whether the Local Authorities within their boundaries are also served by other LEPs. To avoid the issue of double counting, the data at the Regional and LEP-level have been segregated, except for limited LEP-level data being available in the Regional report for growth rate comparison.

Alongside the data evidence-base is a qualitative evidence base including literature review and stakeholder engagement with 1-2-1 interviews and workshops. Both the data produced by kMatrix and the qualitative findings of Sustainability West Midlands have fed into the research and production of all reports.

The full list of reports available through this project include:

- Midlands Region Low Carbon Environmental Goods and Services Market Snapshot
- Black Country Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Coventry and Warwick Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- D2N2 Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Greater Birmingham and Solihull Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Greater Lincolnshire Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Leicester and Leicestershire Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Marches Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Stoke and Staffordshire Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Worcestershire Local Enterprise Partnership Low Carbon Environmental Goods and Services Market Snapshot
- Midlands Energy Hub Low Carbon Environmental Goods and Services Covid Impact Report
- Literature review & excel spreadsheet
- Stakeholder report
- Low Carbon Environmental Goods and Services Recommendations Report
- Midlands Energy Growth Forecast, Low Carbon Environmental Goods and Services Growth Forecast for Net Zero 2030 and 2050

Local Authorities within the Marches LEP

This report includes local authority-level data, to allow deep disaggregation within the LEP area. For clarity of data visualization, the names of many local authorities have been shortened. The formal names and shortened labels of the local authorities within the Marches LEP are listed below:

Formal name	Shortened label
Telford & Wrekin C	Telford & Wrekin
Shropshire C	Shropshire
Herefordshire County C	Herefordshire

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Executive Summary

Marches LEP's Low Carbon and Environmental Goods and Services (LCEGS) sector was worth £1.8bn to the Marches LEP's economy in 2019/20, as indicated by the value of sales in the sector. These sales were generated by over 700 businesses that employed over 12,500 people in the sector in 2019/20.

Sales and growth

The Low Carbon and Environmental Goods and Services sector in the Marches LEP grew year on year since 2017/18. In 2017/18 total sales in the sector were worth £1.6bn and have now reached £1.8bn in 2019/20.

The sector in the Marches LEP grew by 6.2% during the financial year 2017/18 to 2018/19 and 6.4% during 2018/19 to 2019/20. This rate of growth is stronger than the MEH average (5.2% and 5.9% respectively), but slower than the UK average for the same period (10.0% and 8.1% respectively), however, the fast rate of growth in London raises the UK average.

Employment

Employment in Marches LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was 12,792, up from 12,073 in 2017/18. Annual growth rate in employment was 3.2% between 2017/18 and 2018/19 and 3.7% between 2018/19 and 2019/20. This rate of growth is slower than both the MEH average (5.7% and 5.0% respectively) and the UK average for the same period (9.4% and 7.3% respectively) however, the fast rate of growth in London raises the UK average.

Companies

The number of companies in Marches LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was 733, up from 654 in 2017/18. Annual growth rate in the number of companies was 3.2% between 2017/18 and 2018/19 and 3.7% between 2018/19 and 2019/20. This rate of growth is slower than both the MEH average (3.7% and 6.9% respectively) and the UK average for the same period (9.3% and 10.3% respectively) however, the fast rate of growth in London raises the UK average.

Marches LEP's sub-sectors

In 2019/20 Marches LEP's Low Carbon and Environmental Goods and Services sector was made up by the following proportions: Renewable Energy 39%, Low Carbon 39% and Environmental 21%.

Marches LEP's sub-sector strengths

The four largest sub-sectors in the Low Carbon and Environmental Goods and Services sector by sales account for 57% of the Marches LEP's total sales and are made up of:

- Building Technologies (£286m) - this includes head office functions, building systems design and consultancy and building systems providers and installers.
- Wind (£286m) – this includes control systems development and manufacture, drive train development, manufacture and systems integration, consulting houses and companies providing power firming systems and services, maintenance services and grid integration services.
- Alternative Fuels (£260m) – this includes R&D functions, alternative fuel providers, designers and consultancy, process implementation, sales and accounting and application development specialists.
- Photovoltaic (£191m) - this includes head office functions, systems developers, providers and installers.

The next seven largest sub-sectors by sales account for a further 39% of Marches LEP's total sales and are made up of:

- Biomass (£136m) - this includes systems development, supply, implementation and R&D
- Water & Waste Water Treatment (£134m) - development and implementation by utilities along with supply, consultancy and implementation by independent consulting engineers
- Waste Management (£113m) - this includes process development and new process implementation and consulting, public and private operations management and supply and installation of operational equipment.
- Recovery and Recycling (£98m) – this includes waste collection, glass stock processing and paper feedstock processing.
- Alternative Fuel Vehicle (£97m) - include selling agencies, alternative fuel development companies and consulting and applications development for vehicle conversion specialists.
- Geothermal (£76m) - this includes branch office functions, design, international consultancy, lateral geothermal systems providers and installers at the domestic and small commercial level and vertical control systems developers and suppliers.
- Energy Management (£37m) – this includes registered gas engineers, measurement and control systems and fitting and maintenance.

Sub-sector growth

Marches LEP's four largest sub-sectors by sales have all enjoyed high levels of growth in sales, number of employees and number of companies between 2017/18 and 2019/20:

- Building Technologies – sales have grown from £253m to £286m (13.0%), number of employees by 5.9% and number of companies by 11.5%
- Wind – sales have grown from £253m to £286m (13.0%), number of employees by 6.1% and number of companies by 2.3%
- Alternative Fuels – sales have grown from £230m to £260m (13.0% increase), number of employees by 5.8% and number of companies by 11.7%
- Photovoltaic – sales have grown from £169m to £191m (13.0% increase), number of employees by 5.8% and number of companies by 11.2%

Sub-sectors which saw stronger growth than the UK average between 2017/18 and 2019/20 include:

- Hydro with 13.3% (MEH 11.0%, UK 1.8%)
- Alternative Fuel Vehicle with 13.1% (MEH 11.4%, UK 5.7%)
- Energy Management with 13.1% (MEH 11.4%, UK 5.7%)
- Renewable Energy General Consultancy with 13.1% (MEH 11.3%, UK 10.8%)
- Environmental Monitoring with 13.0% (MEH 11.3%, UK 12.2%)
- Marine Pollution Control with 13.0% (MEH 11.4%, UK 12.7%)
- Air Pollution with 13.0% (MEH 11.4%, UK 5.8%)
- Waste Management with 13.0% (MEH 11.2%, UK 12.6%)
- Water & waste Water Treatment with 10.3% (MEH 11.3%, UK 12.7%)
- Contaminated Land Reclamation and Remediation with 8.8% (MEH 11.4%, UK 1.0%)

Sub-sectors which saw weaker growth than the UK average between 2017/18 and 2019/20 include:

- Environmental Consultancy with 13.0% (MEH 11.3%, UK 16.8%)
- Noise & Vibration Control with 13.1% (MEH 11.4%, UK 23.3%)
- Carbon Capture & Storage with 13.1% (MEH 11.3%, UK 19.0%)
- Biomass with 13.0% (MEH 11.3%, UK 28.2%)
- Geothermal with 13.0% (MEH 11.3%, UK 18.8%)
- Photovoltaic with 13.0% (MEH 11.3%, UK 24.3%)
- Wave & Tidal with 13.0% (MEH 11.2%, UK 24.9%)

- Wind with 13.0% (MEH 11.3%, UK 42.2%)

Investment in R&D

Investment in R&D within Marches LEP grew in two of three categories of investment between 2017/18 and 2019/20:

- Private Equity Investment in R&D grew -0.1% from £84m in 2017/18 to £84m in 2019/20
- Venture capital Investment in R&D grew 6.2% from £161m in 2017/18 to £171m in 2019/20
- Other Investment in R&D grew 10.3% from £240m in 2017/18 to £264m in 2019/20

Sub-sector Strengths and Weaknesses

Sub-sector strengths include:

- Renewable Energy General Consultancy has slightly stronger growth than the UK average and slightly larger than average market size
- Contaminated Land has a stronger growth than the UK average, but below average market size.
- Hydro has a stronger growth than the UK average, but below average market size.
- Energy Management has stronger growth than the UK average and slightly above average market size.
- Alternative Fuel Vehicle has a stronger growth than the UK average, but below average market size.
- Air Pollution has a stronger growth than the UK average, but below average market size.
- Waste Management has similar growth to the UK, but above average market size
- Photovoltaic has weaker growth than the UK, but significantly above average market size.
- Water & Waste Water Treatment has weaker growth than the UK, but slightly above average market size.
- Biomass has weaker growth than the UK, but slightly above average market size.

Sub-Sector weaknesses include:

- Geothermal has weaker growth than the UK and below average market size.
- Wave & Tidal has weaker growth than the UK and below average market size.

Scalability of sub-sectors

Scalability of the sub-sectors within the Marches LEP is variable and when combined with GVA, strengths include:

- Environmental Monitoring with small GVA but very high scalability (stronger position than the MEH average)
- Marine Pollution Control with small GVA but very high scalability (stronger position than the MEH average)
- Geothermal with good GVA and high Scalability (stronger position than the MEH average)
- Biomass with good GVA and medium Scalability (stronger position than the MEH average)
- Waste Management with good GVA and medium Scalability (stronger position than the MEH average)

Skills Shortages

The skills and employment estimates are based on the Standard Occupational Classification (SOC).

Sector shortages

The skills shortage for the LCEGS sector for the Marches LEP being 8.8% (MEH 8.7%).

Significant skills gaps are present within some SOC's with large numbers of employees:

- Production Engineers 39.0% (MEH 35.7%)
- Power Distribution Engineers 30.0% (MEH 29.8%)
- Technicians 23.3% (MEH 22.2%)

Insignificant skills gaps are present within some SOC's with large numbers of employees:

- General Semi-skilled Worker 2.1% (MEH 2.1%)
- Maintenance Engineer 6.3% (MEH 6.3%)
- Specialist or Consultant 3.2% (MEH 3.3%)
- Administrative Workers 2.2% (MEH 2.1%)

Level 1 shortages

Skills shortages within the Marches LEP at Level 1:

- Low Carbon 10.8% (MEH 10.5%)
- Renewable Energy 6.9% (MEH 7.0%)
- Environmental 10.5% (MEH 10.3%)

Skills gaps vary between SOC's for different Level 1 and Level 2 sub-sectors, for example:

Production Engineers:

- Low Carbon 55.9% (MEH 47.3%)
- Renewable Energy 28.1% (MEH 27.9%)
- Environmental 35.5% (MEH 34.9%)

Power Distribution Engineers:

- Low Carbon 34.0% (MEH 33.7%)
- Renewable Energy 27.2% (MEH 27.1%)
- Environmental 32.8% (MEH 32.6%)

Technicians:

- Low Carbon 31.1% (MEH 27.9%)
- Renewable Energy 16.9% (MEH 17.3%)
- Environmental 23.1% (22.9%)

Estimated Employment Requirements to Reach Net Zero by 2030 and 2050

Estimated growth in employees for the Marches LEP to reach zero by 2030:

- Worst-case scenario for the UK economy is 20.1% (MEH 20.3%)
- Best-case scenario for the UK economy is 57.5% (MEH 57.9%)

Estimated growth in employees for the Marches LEP to reach zero by 2050:

- Worst-case scenario for the UK economy is 85.7% (MEH 86.0%)
- Best-case scenario for the UK economy is 342.1% (MEH 342.4%)

Growth requirements for SOC's vary between Level 1 and Level 2 subsectors, for example the estimated growth requirement to reach net zero, best-case scenario for the UK economy:

Production Engineers:

- Low Carbon 9.3% (MEH 17.0%)
- Renewable Energy 34.9% (MEH 34.5%)
- Environmental 25.9% (MEH 27.0%)

Power Distribution Engineers:

- Low Carbon 28.6% (MEH 28.1%)
- Renewable Energy 35.3% (MEH 35.1%)
- Environmental 28.1% (MEH 29.3%)

Technicians:

- Low Carbon 29.2% (MEH 34.2%)
- Renewable Energy 46.5% (MEH 45.9%)
- Environmental 40.0% (MEH 39.6%)

Current Training Provision and Potential for Upskilling the Workforce

Strengths in the current training provision compared with the potential upskilling of the workforce in the Marches LEP include:

- Alternative Fuels with good training capacity and strong potential for upskilling
- Photovoltaic with good training capacity and strong potential for upskilling
- Hydro with good training capacity and strong potential for upskilling
- Water and Waste Water Treatment with average training capacity but good upskilling potential
- Marine Pollution Control with good training capacity and strong potential for upskilling

Weaknesses in the current training provision compared with the potential upskilling of the workforce in the Marches LEP include:

- Alternative Fuel Vehicle with below average training capacity but good potential for upskilling
- Geothermal with very low training capacity but average upskilling potential

Potential of Level 2 sub-sectors to impact on CO₂ reduction.

Sub-sectors with a high estimated CO₂ reduction impact include:

- Wind with large market and very high estimated potential impact
- Building Technologies with large market and very high estimated potential impact
- Alternative Fuels with large market and high estimated potential impact
- Photovoltaic with high estimated potential impact and smaller market

Sub-sectors with a low estimated CO₂ reduction impact include:

- Environmental Consultancy with low estimated potential impact and small market
- Additional Energy Sources with low estimated potential impact and small market

Marches LEP's Exports

The value of exports in Marches LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was £186m, an increase from £166m in 2017/18. This accounted for 6% of the MEH's LCEGS exports in 2019/20 and is in line with Marches LEP's 7% share of the overall MEH LCEGS market.

Marches LEP's LCEGS exports grew by 7.5% and 4.2% over the last three years which compared with MEH growth of 4.5% and 6.2% and UK growth of approximately 8.7% and 9.5% respectively.

Marches LEP's top Export sub-sectors which saw large export market and strong growth include:

- Building Technologies - £30m
- Recovery and Recycling - £10m
- Water & Waste Water Treatment – £14m
- Waste Management - £12m
- Biomass - £15m
- Photovoltaic - £21m
- Wind - £30m
- Alternative Fuels - £26m

Marches LEP's Imports

The value of imports in Marches LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was £176m, an increase from £155m in 2017/18. This accounted for 7% of the MEH's LCEGS imports in 2019/20 and is in line with the Marches LEP's 7% share of the overall MEH LCEGS market.

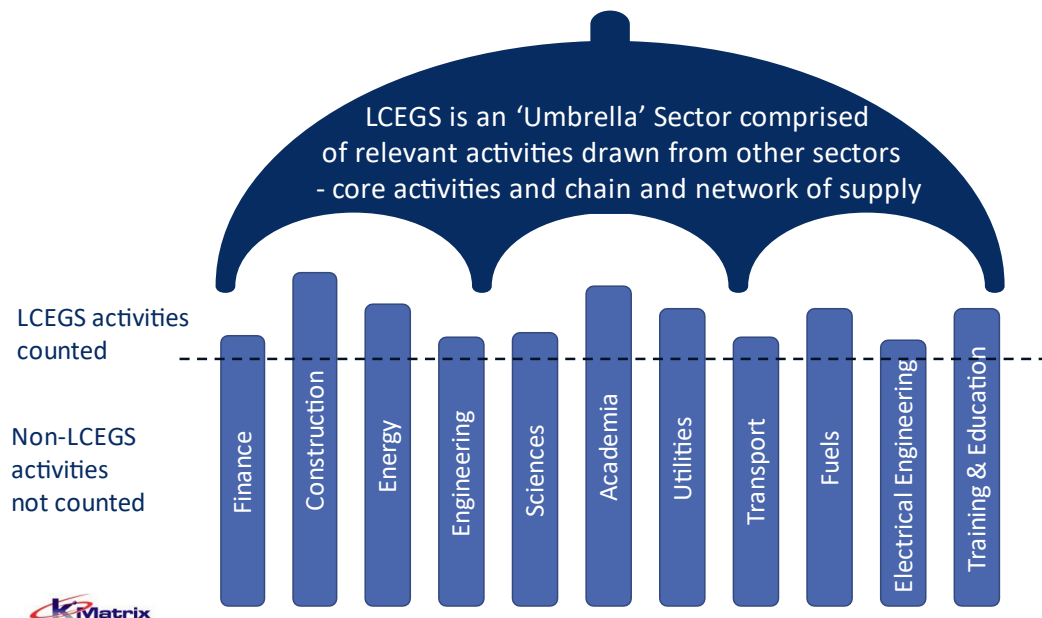
Marches LEP's LCEGS imports grew by 13.3% and 0.2% over the last three years which compared with MEH growth of 5.8% and 5.9% and UK growth of approximately 10.0% and 7.4% respectively.

Introduction to the Low Carbon and Environmental Goods and Services Sector

This section includes a summary definition of the Low Carbon Environmental Goods Services sector, followed by a detailed description of the dataset that sits behind the data analysis and detail regarding the types of activities measured.

Summary Sector Definition

The Low Carbon Environmental Goods and Services sector comprises products and services from across the economy, which actively enable a shift towards a green economy. The LCEGS sector is considered an 'umbrella' or horizontal sector, crossing many other traditional sectors, counting products and services from those sectors which can reduce carbon emissions and improve the environment:



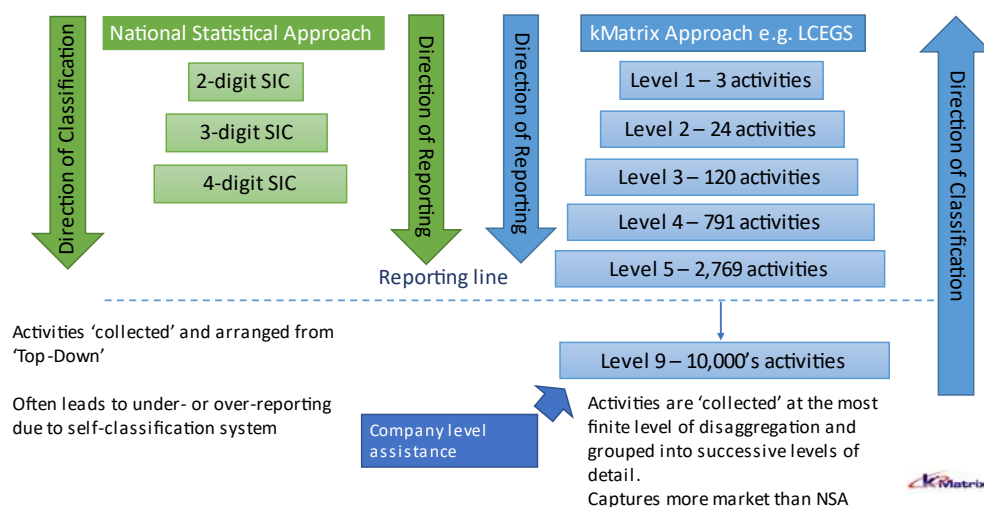
The sector is comprised of both core elements and those in the chain and network of supply, without whom the sector could not function.

Brief Methodology

kMatrix uses a unique data triangulation methodology, developed with Professor R. Jaikumar of Harvard University over 35 years ago.

The process was originally developed to look at individual companies, providing evidenced data for development. As such, sectors are classified from the 'bottom up', collecting activities from the most finite level of granulation and grouping them into successive levels of detail.

Example of bottom-up approach to classification – LCEGS Taxonomy



This is quite different to the National Statistical Approach, which classifies from the 'top down', with a company choosing their 2-digit code, then successive codes down through the classification system. The SIC system is very good as a national accounting system, but it struggles with hard to measure sectors such as LCEGS. Here, the kMatrix system of data collection, which triangulates transactional data from many sources, up to 70,000 for this study, provides the flexibility of a definition tailored to the sector being studied. Although the sector is classified from the bottom up, the sector taxonomy is reported from the sector level down, through a series of levels of complexity.

This process has measured the LCEGS sector for the Greater London Authority and the UK for over a decade. kMatrix also collaborate with academic colleagues in several fields, co-authoring academic papers, which are peer-reviewed and published in academic journals including Nature, Climate Services and the Lancet.

Example sectors the process has been applied to, where evidence is available in the public domain via clients publishing reports or published peer-reviewed academic journals include:

- Cyber Security: https://www.eunity-project.eu/m/filer_public/4b/62/4b6262dc-3bca-4145-a84b-b514049156ce/1_lsec_japan_eunity_ecso_wg2_cima_seldeslachts_ulrich_20190124881.pdf
- Low carbon environmental goods and services sector: https://www.london.gov.uk/sites/default/files/london_low_carbon_market_snapshot_-_2019.pdf and https://www.enterprisem3.org.uk/sites/default/files/2020-02/Hampshire-LCEGS-Market-Report-2015-16-to-2017-18-2nd-Draft_0.pdf
- The green Economy: <https://rgs-ibg.onlinelibrary.wiley.com/doi/pdf/10.1002/geo2.36> and <https://www.nature.com/articles/s41599-019-0329-3>
- Adaptation economy: <https://www.nature.com/articles/nclimate2944>
- Carbon Finance: <https://www.nature.com/articles/nclimate1492?draft=marketing>
- Weather and Climate: <https://advances.sciencemag.org/content/3/5/e1602632.full>
- Climate Services: <https://www.sciencedirect.com/science/article/pii/S2405880719300494?via%3Dihub>

The LCEGS Dataset

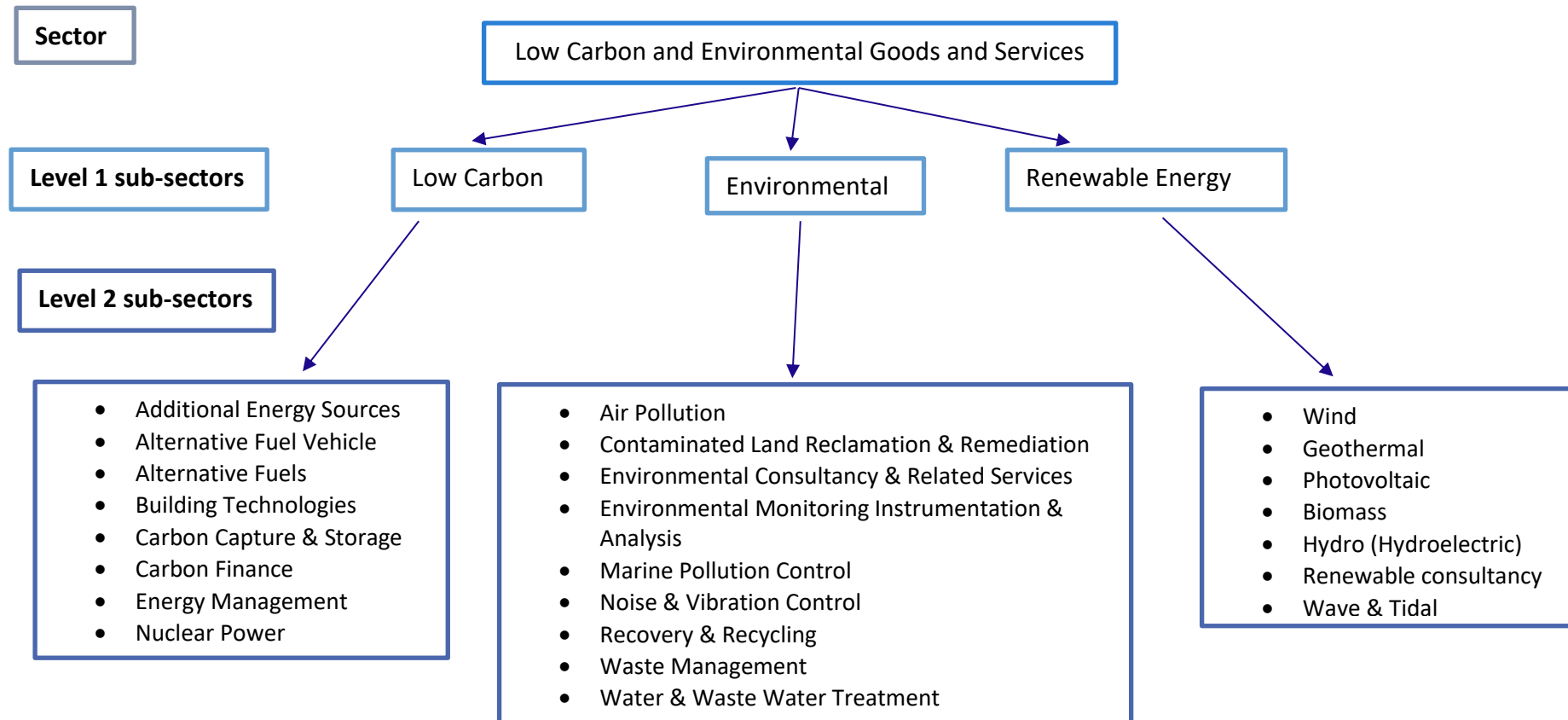
The data used in this report is based upon the work and methodology used by kMatrix to provide datasets on the UK's Low Carbon Environmental Goods and Services (LCEGS) sector for UK Government reported annually by the Department for Business, Innovation and Skills (BIS) from 2008/09 to 2011/12 and further reported every 3 years for the UK and London by the Greater London Authority to 2017/18, representing a continuous annual timeseries of the LCEGS sector for over a decade.

The LCEGS sector has been defined using 24 sub-sectors (or Level 2 markets) grouped into three broad categories (or Level 1 markets) - Environmental, Renewable Energy and Low Carbon. The addition of the Renewable Energy and Low Carbon groupings illustrates the evolution of the current LCEGS sector definition from its original Environmental roots and reflects developments in the market as sectors across the economy evolve to address the environmental challenges that they and the world is facing.

The dataset measures the core activities of the sector along with those in the supply chain, without whom the LCEGS sector could not operate. For example, the Wind sector includes those companies which develop the systems integration software enabling the power generated through turbines to be integrated into the National Grid, but it also includes those companies installing and maintaining the system integration software itself. Another example would be the collection of household waste, where the collection, processing and recycling of the waste is included, along with those companies who design, manufacture and supply the waste collection equipment itself.

The time series provides 11 years of sales, companies and employment data and 10 years of growth rates for the LCEGS sector as a whole. The data is then broken down into three Level 1 sub-sectors (Low Carbon, Environmental and Renewable Energy) and then those three sub-sectors are split into further Level 2 sub-sectors to provide greater resolution and insights for analysing the data.

The kMatrix methodology is based around the production of a taxonomy, similar to that used for biological taxonomic ranking, with similar products and services being grouped together. As an illustration (provided below), the LCEGS sector is broken down into three Level 1 sub-sectors, one of which is Renewable Energy, which is in turn broken down into seven Level 2 sub-sectors, one of which is Wind that is then broken down into a further three Level 3 sub-sectors and so on:



Although the taxonomy is reported and organised ‘top down’ as it goes from the sector to Level 1, to Level 2 etc., the data is gathered and organised from the ‘bottom up’. The data is collected at the most finite disaggregation and then ‘rolled up’ to form the different levels. The current LCEGS sector definition, used in this report, includes 2,800 product and service activities at level 5 that are derived from sector supply chain activities (componentry & assemblies) and value chain activities (R&D, Supply & Training).

A glossary of economic activities included for each sub-sector of LCEGS is included as Appendix 1, a brief explanation of the LCEGS methodology as Appendix 2 and then a high-level comparison of data and methodologies between the Office of National Statistics (ONS) Environmental Goods and Services sector and LCEGS is presented in Appendix 3.

What is actually measured?

The dataset measures the core activities of the sector along with enabling activities in the supply chain, without whom the LCEGS sector could not operate. For example, the Wind sector includes those companies which develop the systems integration software enabling the power generated through turbines to be integrated into the National Grid, but it also includes those companies installing and maintaining the system integration software itself. Another example would be the collection of household waste, where the collection, processing and recycling of the waste is included, along with those companies who design, manufacture and supply the waste collection equipment itself.

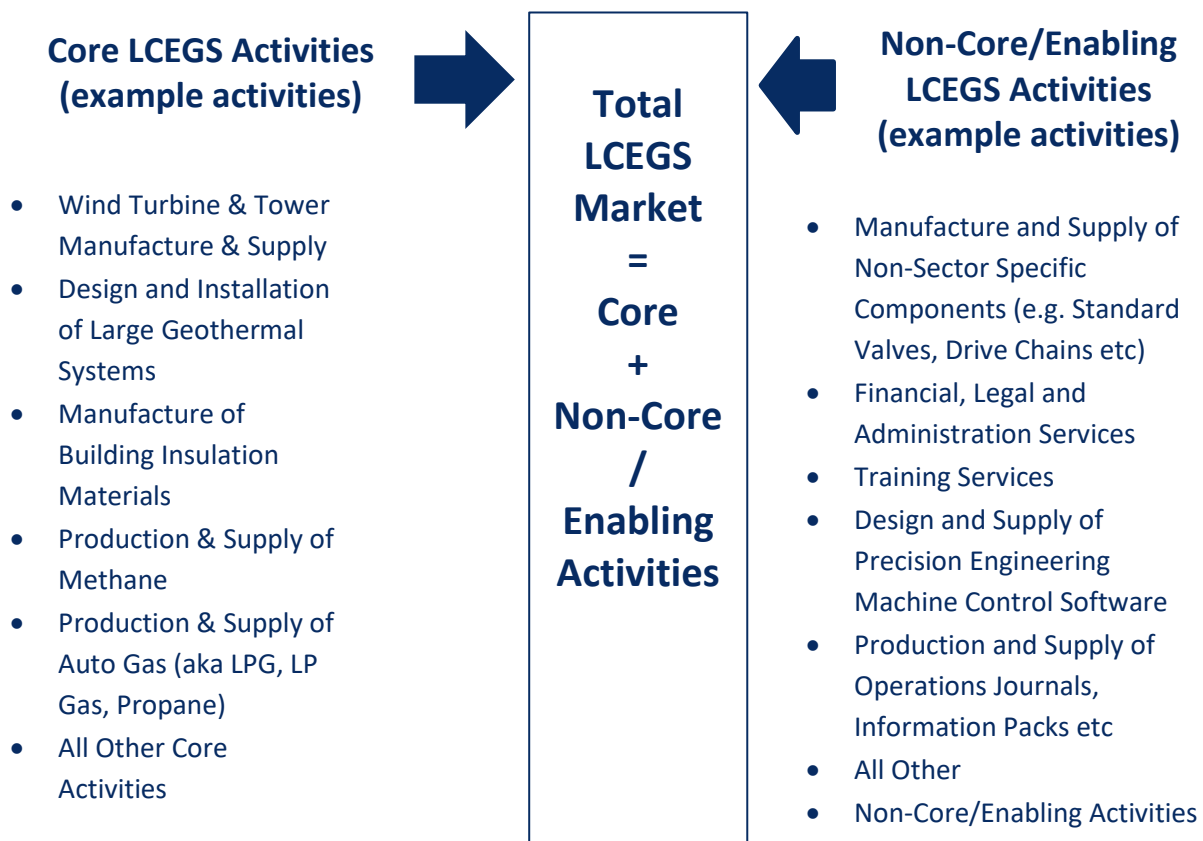
The purpose of the LCEGS dataset in its original form, is to provide a standardized measure of the complete LCEGS sector. The whole dataset includes those 'core' activities, which would immediately come to mind such as the manufacture of a wind turbine blade, but also the less obvious 'non-core' activities, such as the manufacture of the bearings for the turbine. Non-Core activities can be considered "enablers" for the Core sector and are often companies who have diversified from existing strengths into new sector activities. Non-core activities also include mid-stream activities, R&D, finance, training and other activities which cross multiple other sectors, but without which the LCEGS sector could not function.



The definition of a sector is almost always open to debate, in terms of what is, or is not, considered to be part of the sector in question. The kMatrix methodology includes all aspects that can realistically be considered part of the LCEGS sector. The taxonomy is built and interrogated by assembling activities and services which are then grouped together under different headings. From the example taxonomy in figure 1, seven level 2 activities are grouped together to form the Renewable Energy Level 1 heading. There are five levels in total, comprising approximately 2,800 activities.

The following picture illustrates the two distinctive sides of the LCEGS market, the smaller Core market and the much larger Non-Core market, provided by enablers within the LCEGS sector. Examples give a simplistic overview of the types and differences between activities, with the Core side including activities such as manufacture of wind turbines and building insulation materials. The enablers providing Non-Core activities are offering components that are non-sector specific, such as valves, gaskets, drive chains etc., alongside financial, legal and administration activities.

In essence, Core activities are those products and services which are generally LCEGS specific, whereas the Non-Core activities, provided by enablers are products and services which are not LCEGS specific and can generally be found in other sectors. Core activities are considered vertical in nature, being sector specific, whereas Non-Core activities are horizontal, crossing other sectors. Both sides of the market are required for the sector to function.



The economic values provided are Sales values, which are transactions made within the sector, which have an economic footprint that can be measured. For companies which service multiple sectors, for example in finance, the sales value is the value of sales that company has in the LCEGS market, it does not include finance sales into other sectors.

The complexity of determining the potential contribution to net zero

Understanding the potential contribution of each sub-sector to net zero targets (2030 & 2050) is important in identifying where priority markets lie for reaching those goals. Although the LCEGS sector entails low carbon and renewable energy technologies, they are not all equal in terms of their own carbon footprints or their ability to impact on net zero targets.

When assessing the potential for each Level 2 sub-sector to contribute to net-zero, there are a number of factors to consider, including:

- The embodied carbon of the product, is the carbon footprint to make the product, increasing throughout the supply chain and across geographies
- The carbon emissions during transportation, installation and commissioning of a product
- The emissions produced during operational lifetime of a product
- The emissions produced during decommissioning, dismantling and recovery of materials
- The localisation and format of the chain and network of supply

Academia varies with regards to estimating the carbon footprint of products, for example, photovoltaic systems produce almost zero carbon emissions when in operation, however carbon emissions are produced during the manufacturing process. Life cycle analysis of renewable energy systems, quantifying the carbon emissions of photovoltaic systems, report a wide range of carbon emissions factors. This is partly due to different methodologies and associated assumptions or design considerations³.

There are also variations in carbon emissions within industries, for example, the life cycle carbon emissions from both on- and off-shore wind are very low at 15 and 12 gCO₂eq/kWh⁴. The carbon emissions reduction of wind power cannot be solely estimated as being the value of carbon emissions displaced from coal- or gas-fired generation. Wind power is not carbon-zero, because greenhouse gases are emitted during installation, maintenance and decommissioning and wind power will not replace all forms of conventional generation equally and will depend on the operation of the whole grid. Variations in cost and carbon emissions estimates are affected by assumptions made in the calculation itself and the differences in wind turbine designs, manufacturing and installations locations, maintenance and disposal.

When the embodied emissions for each material involved in manufacture, transport to site and installation are quantified, higher rated turbines had greater embodied carbon emissions, with a 3 MW turbine incorporating 1046 tCO₂eq, compared with only 58 tCO₂eq for an 80-kW turbine. However, the greater electricity output from the larger turbines offset these emissions more quickly, with a recovery of 6 days for a 3.4 MW turbine, compared with 354 days for a 100kW one.⁵ Renewable energy generation is clean when compared with conventional energy generation methods, however the cost, payback time, size of power generation, construction time, resource capacity, characteristics of resource, external funding and other factors have affected how quickly different technologies have been adopted and the subsequent relative sizes of each market. The size of each market, corresponding to the carbon emissions displaced from conventional energy generation methods differs, as does the lifecycle carbon footprint of each renewable energy sub-sector.

Building Technologies are hugely important in terms of decarbonisation potential. An estimated 37% of UK emissions are attributable to heat⁶, so building technologies such as roof and wall insulation, insulative glazing and other technologies designed to prevent the loss of heat can indirectly lead to reduction in energy usage and carbon emissions. As for the renewable energy sub-sector, the reductions in carbon emissions through a decrease in energy consumption, must offset

³ Nian, V (2016) Impacts of changing design considerations on the life cycle carbon emissions of solar photovoltaic systems. J. Applied Energy 183 (2016) 1471-1487
<https://doi.org/10.1016/j.apenergy.2016.08.176>

⁴ https://www.climateexchange.org.uk/media/1459/life_cycle_wind_-_executive_summary_.pdf

⁵ Smoucha EA, Fitzpatrick K, Buckingham S, Knox OGG (2016) Life Cycle Analysis of the Embodied Carbon Emissions from 14 Wind Turbines with Rated Powers between 50 Kw and 3.4 Mw. J Fundam Renewable Energy Appl 6: 211. doi:10.4172/20904541.1000211

⁶ Clean Growth – Transforming Heating, Overview of Current Evidence, Department for Business, Energy and Industrial Strategy, December 2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766109/decarbonising-heating.pdf

any embodied carbon and those emissions associated with transportation, installation, those produced during usage, maintenance and 'end-of-life' recovery of materials.

In terms of sub-sectors within the Environmental Level 1 sub-sector, the carbon footprint of Water and Waste Water Treatment may be decreased dramatically by the usage of forward osmosis membrane-technology during the next generation of waste water treatment⁷.

Within Waste Management, the collection, re-use and recycling of the 2 Mt of waste electrical and electronic equipment (WEEE) produced in the UK each year has become a foremost environmental issue in the UK⁸, where efforts are undergoing to increase the levels and efficiency of recycling. Each sub-sector within the LCEGS sector has the potential to play their part in the move towards net zero, but as indicated above, the relative impact they may have varies both between sub-sectors and between academics attempting to quantify current levels.

For this study, the level 2 sub-sectors have been allocated a relative impact score of "Low", "Medium" and "High", based upon estimates including the activities present in the area being studied, the localization of chains and networks and supply and the technologies both being used and produced.

⁷ Environ. Sci.: Water Res. Technol., 2020, 6, 153

⁸ Clarke C, Williams I, Turner D, (2019) Evaluating the carbon footprint of WEE management in the UK. J Resources, Conservation & Recycling 141 (2019) 465-473

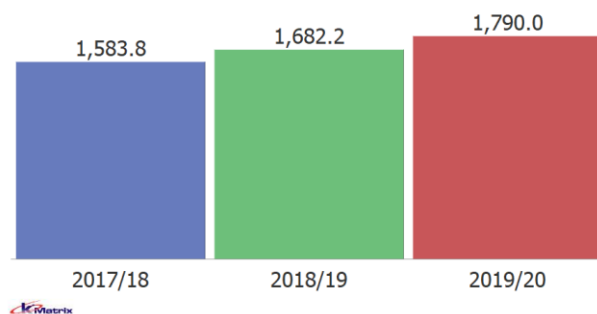
1. Marches LEP's Low Carbon and Environmental Goods and Services (LCEGS) Analysis

This section of the report analyses the Marches LEP's LCEGS at Level 1 and Level 2. It also provides information at Level 3 to show the type of activities included in these sub-sectors.

1.1 LCEGS Compared by Year

In this section of the report, the Marches LEP's LCEGS performance is compared for the last three years for the three key measures of Sales, Employment and Growth.

Figure 1: Sales 2017/18 to 2019/20 in £m

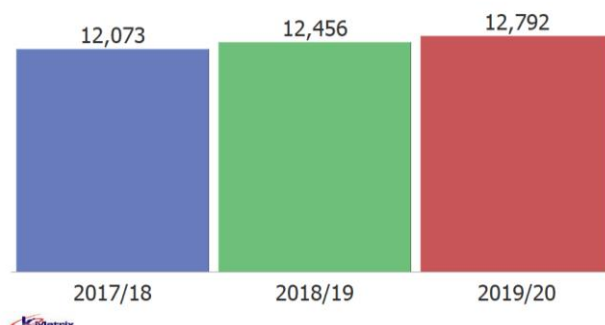


Marches LEP's LCEGS sales in 2019/20 were £1.8bn, up from £1.6bn in 2017/18.

Annual sales growth in the Marches LEP's LCEGS was 6.2% from 2017/18 to 2018/19 and 6.4% from 2018/19 to 2019/20.

In comparison MEH Regional sales growth in LCEGS was 5.2% and 5.9% respectively.

Figure 2: Employment 2017/18 to 2019/20

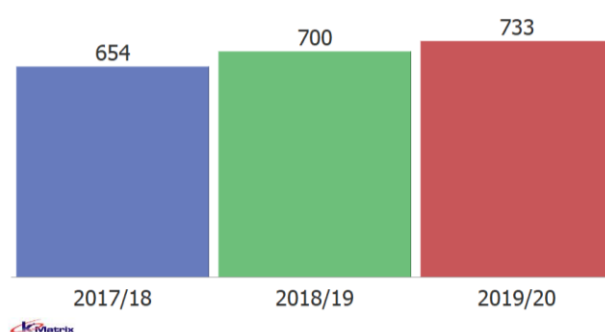


Marches LEP's LCEGS employment in 2019/20 was 12,792, up from 12,073 in 2017/18.

Annual employment growth in the Marches LEP's LCEGS was 3.2% from 2017/18 to 2018/19 and 3.7% from 2018/19 to 2019/20.

In comparison MEH Regional employment growth in LCEGS was 5.7% and 5.0% respectively.

Figure 3: Companies 2017/18 to 2019/20



Marches LEP's LCEGS company count in 2019/20 was 733, up from 654 in 2017/18.

Annual company growth in the Marches LEP's LCEGS was 7.1% from 2017/18 to 2018/19 and 4.6% from 2018/19 to 2019/20.

In comparison MEH Regional company growth in LCEGS was 3.7% and 6.9% respectively.

Growth in the Marches LEP's has been variable across each of the three parameters between 2017/18 and 2019/20 when compared with the MEH Region as a whole.

1.2 Marches LEP's LCEGS at Level 1

The analysis in this section of the report focuses on the Level 1 and Level 2 split of LCEGS in the Marches LEP for each of the last three years.

Figure 4: Sales 2017/18 to 2019/20 in £m (Level 1)

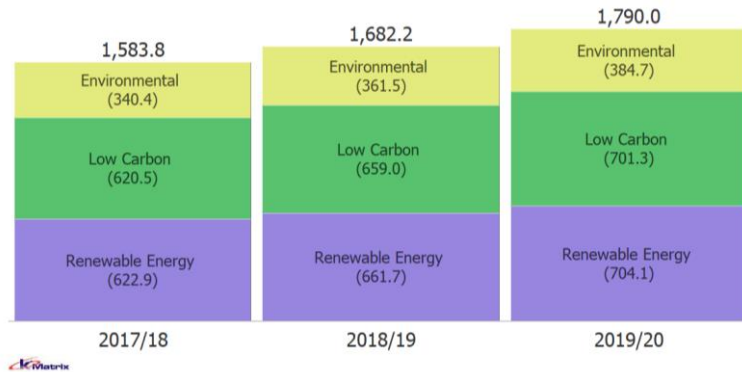


Figure 4 shows the three-year LCEGS sales split by Level 1.

In 2017/18 the split was 39% Renewable Energy, 39% Low Carbon and 21% Environmental. The split had not changed in 2019/20.

Figure 5: Employment 2017/18 to 2019/20 (Level 1)

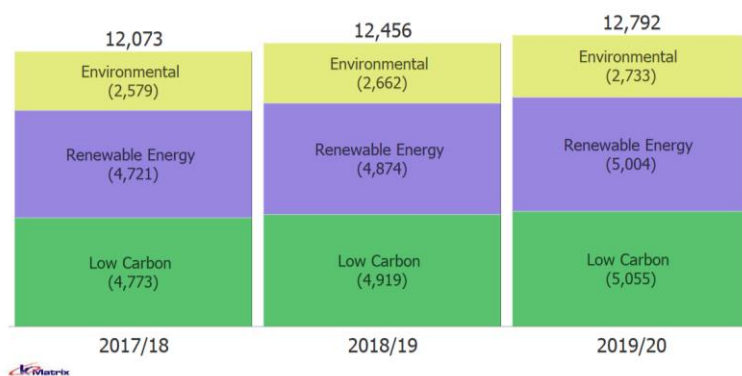


Figure 5 shows the three-year employment split by Level 1.

In 2017/18 the split was 39% Renewable Energy, 40% Low Carbon and 21% Environmental. The split had not changed in 2019/20.

Figure 6: Companies 2017/18 to 2019/20 (Level 1)

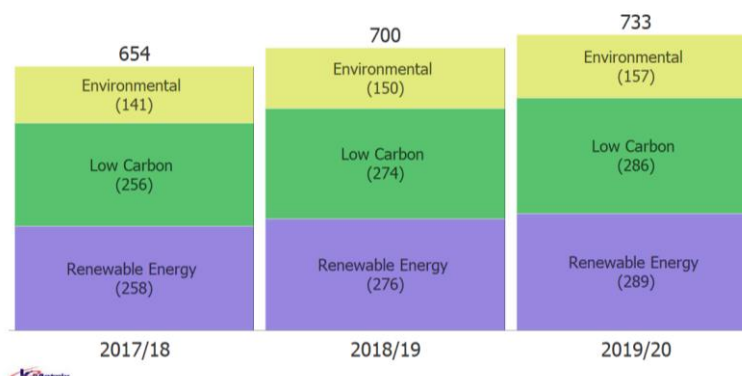


Figure 6 shows the three-year company split by Level 1.

In 2017/18 the split was 39% Renewable Energy, 39% Low Carbon and 22% Environmental. The split had changed to 30%, 39%, 21% in 2019/20.

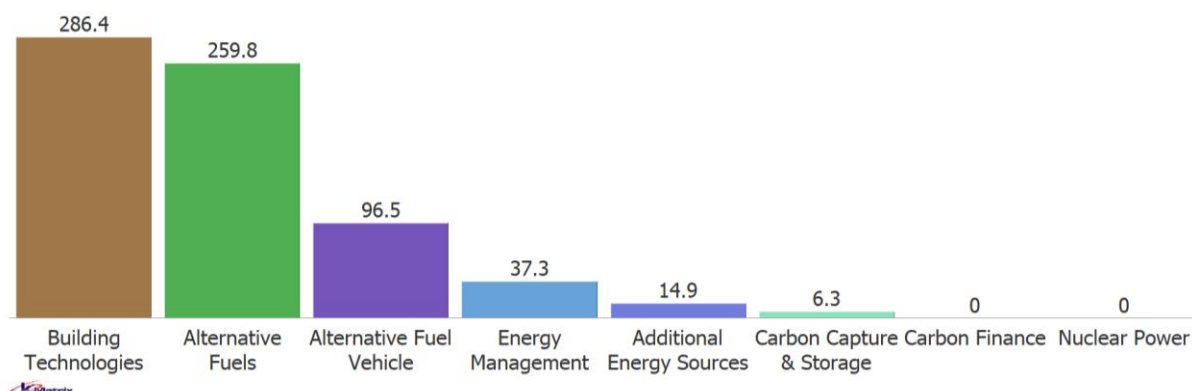
In 2019/20 MEH Regional LCEGS sales was split - Renewable Energy 39%, Low Carbon 39% and Environmental 22%.

1.3 Marches LEP's LCEGS Level 1 - Low Carbon Market

In this section we look at the Low Carbon market in greater detail. Initially we split the market into eight further sub-sectors (Level 2) and then look at the highest performing Level 2 sub-sectors in more detail by highlighting activity happening within them at Level 3.

1.3.1 Low Carbon Market (Level 2)

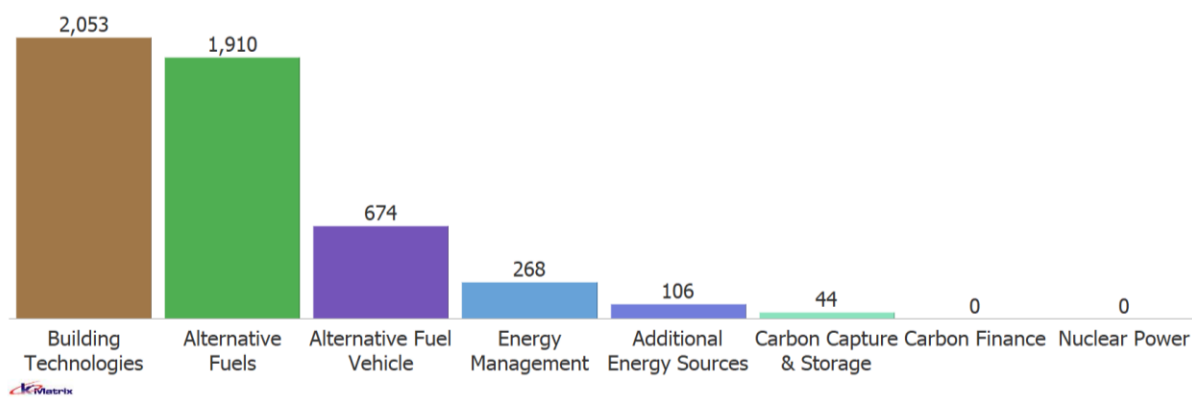
Figure 7: Sales 2019/20 in £m (Level 2)



Low Carbon is further sub-divided into eight sub-sectors, of which four account for 97% of sales (Figure 7). These four are made up of Building Technologies 41%, Alternative Fuels 37%, Alternative Fuel Vehicle 14% and Energy Management 5%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from £253.4m to £286.4m; Alternative Fuels from £230.0m to £259.8m; Alternative Fuel Vehicle from £85.3m to £96.5m and Energy Management from £33.0m to £37.3m.

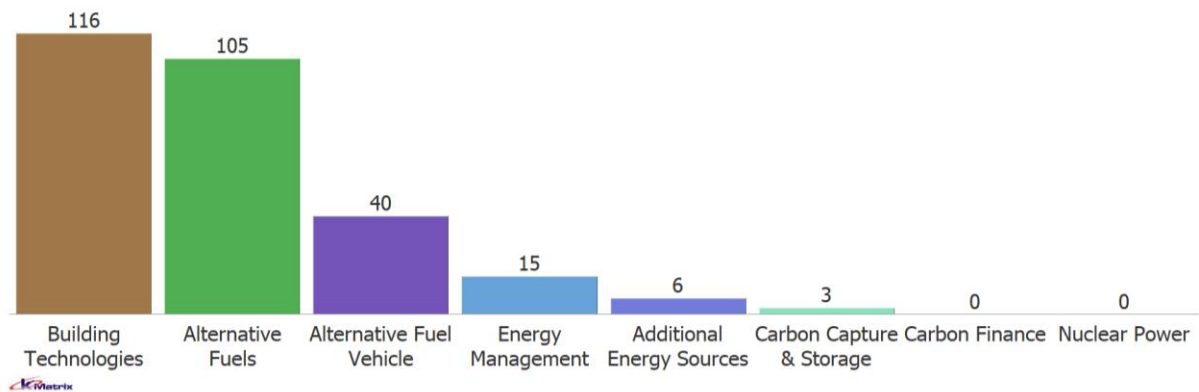
Figure 8: Employment 2019/20 (Level 2)



The same four sub-sectors account for 97% of employment (Figure 8). They are Building Technologies 41%, Alternative Fuels 38%, Alternative Fuel Vehicle 13% and Energy Management 5%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from 1,938 to 2,053; Alternative Fuels from 1,806 to 1,910; Alternative Fuel Vehicle from 634 to 674 and Energy Management from 253 to 268.

Figure 9: Companies 2019/20 (Level 2)

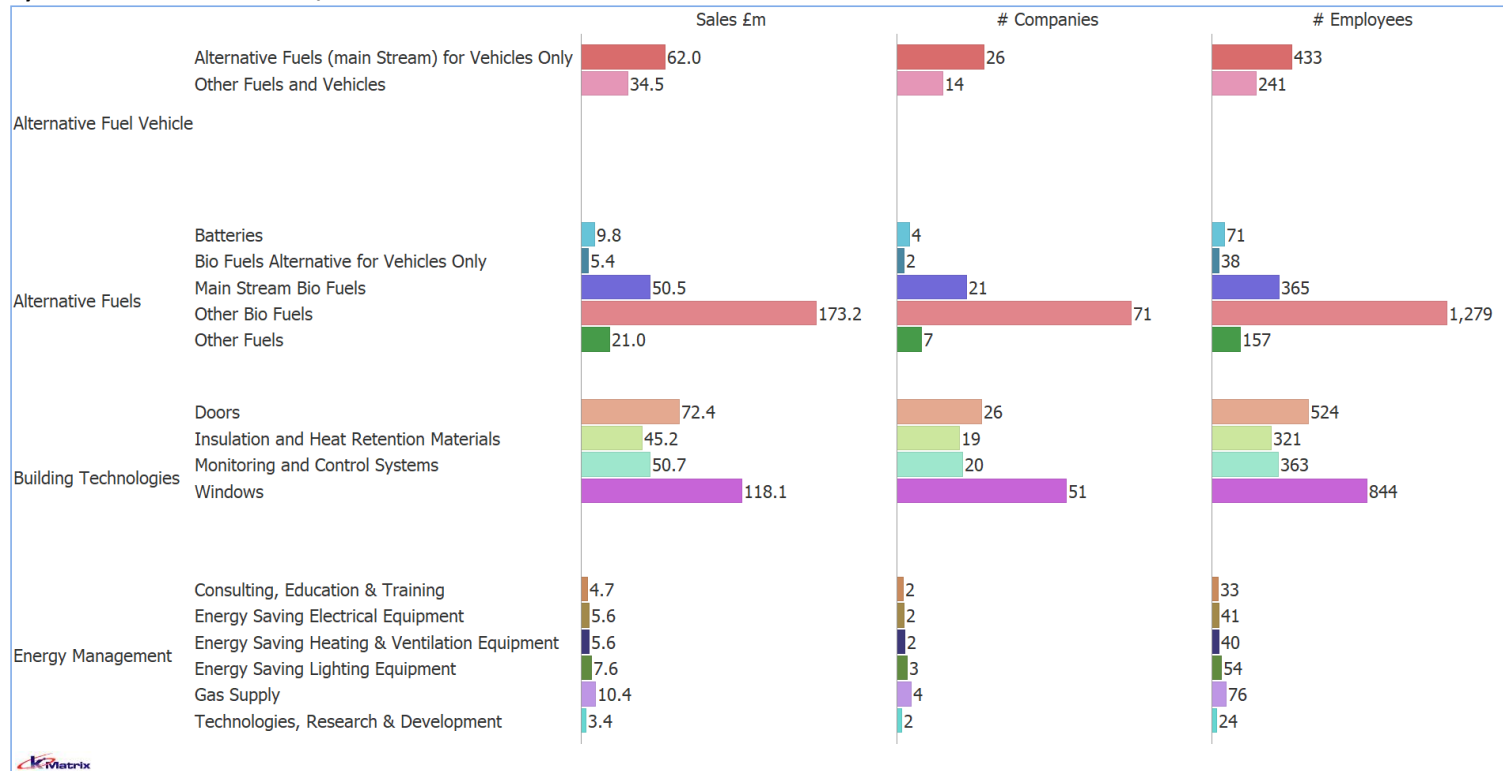


The same four sub-sectors again account for 97% of companies (Figure 9). They are Building Technologies 41%, Alternative Fuels 37%, Alternative Fuel Vehicle 14% and Energy Management 5%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from 104 to 116; Alternative Fuels from 94 to 105; Alternative Fuel Vehicle from 36 to 40 and Energy Management from 14 to 15.

1.3.2 Low Carbon Market at Level 3

Figure 10: Summary of selected metrics for 2019/20 for selected Low Carbon Level 2 sub-sectors at Level 3



The top four Level 2 sub-sectors for Low Carbon are Alternative Fuel Vehicle, Alternative Fuels, Building Technologies and Energy Management, making up 97% of the Low Carbon market in the Marches LEP. Figure 10 shows a summary of the Sales, Companies and Employees for these Level 2 sub-sectors, broken out into their Level 3 sub-sectors.

Building Technologies is the largest Level 2 sub-sector and Windows is the largest of the four Level 3 sub-sectors, making up 41% of the market. Example companies in this sub-sector would include window manufacturers, agents and installers.

Alternative Fuels has five sub-sectors at level 3, of which, Other Biofuels accounts for 67% of Sales. Example companies of this sub-sector would include process designers and consultancy, process implementation and sales and application development specialists.

Alternative Fuel Vehicles has only two sub-sectors at level 3, with Alternative Fuels (main stream) for Vehicles Only holding 64% of the market share. Example companies in this sub-sector would include selling agencies, alternative fuel development companies and consulting and applications development for vehicle conversion specialists.

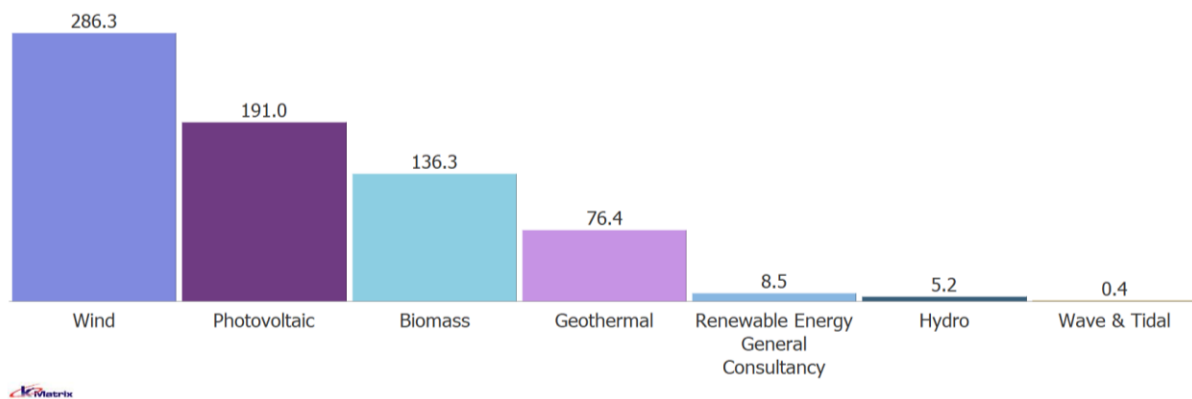
Energy Management has six sub-sectors at level 3, with Gas Supply holding 28% of the market share. Example companies in this sub-sector would include registered gas engineers, measurement and control systems and fitting and maintenance.

1.4 Marches LEP's LCEGS Level 1 - Renewable Energy Market

In this section we look at the Renewable Energy market in greater detail. Initially we split the market into eight further sub-sectors, Level 2, and then look at the highest performing Level 2 sub-sectors in more detail by highlighting activity happening within them at Level 3.

1.4.1 Renewable Energy Market at Level 2

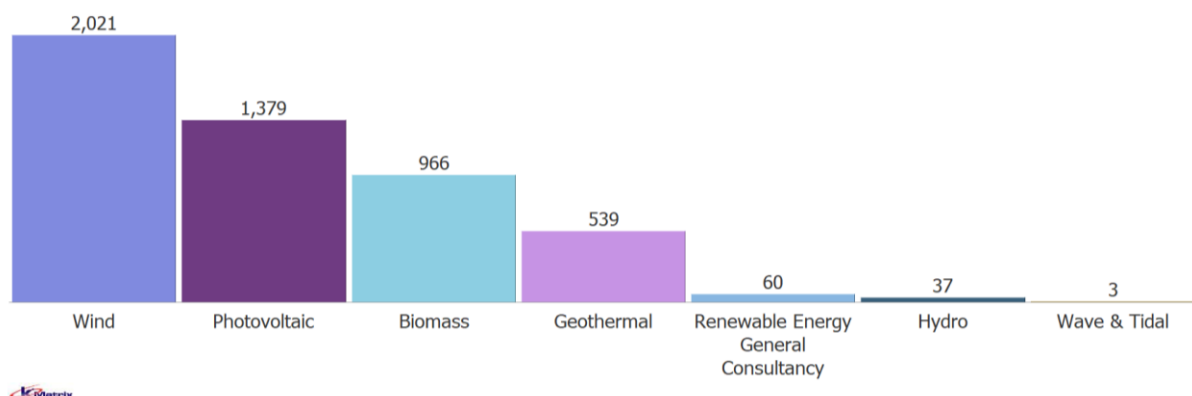
Figure 11: Sales 2019/20 in £m (Level 2)



Renewable Energy is then split into seven sub-sectors, of which four account for 98% of sales (Figure 11). These four are made up of Wind 41%, Photovoltaic 27%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from £253.2m to £286.3m; Photovoltaic from £169.0m to £191.0m; Biomass from £120.6m to £136.3m and Geothermal from £67.6m to £76.4m.

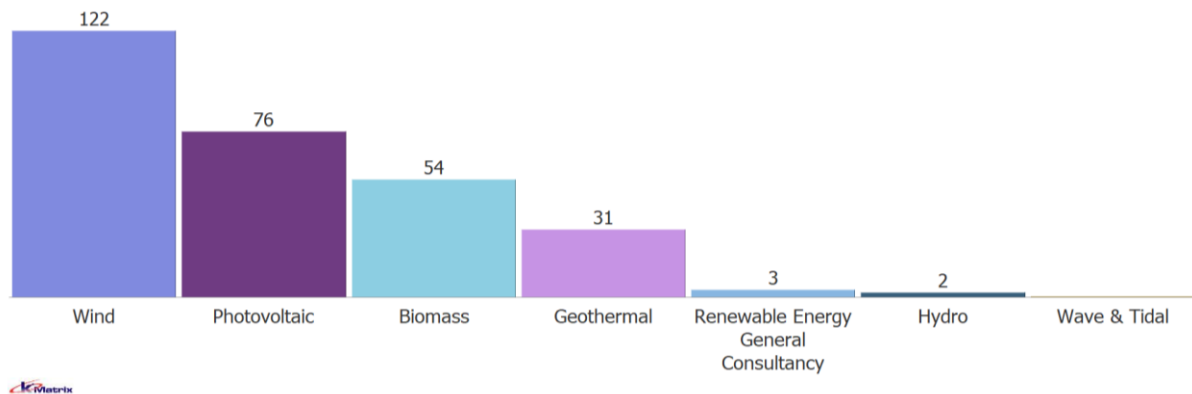
Figure 12: Employment 2019/20 (Level 2)



The same four sub-sectors account for 98% of employment (Figure 12). They are made up of Wind 40%, Photovoltaic 28%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from 1,904 to 2,021; Photovoltaic from 1,303 to 1,379; Biomass from 911 to 966 and Geothermal from 509 to 539.

Figure 13: Companies 2019/20 (Level 2)



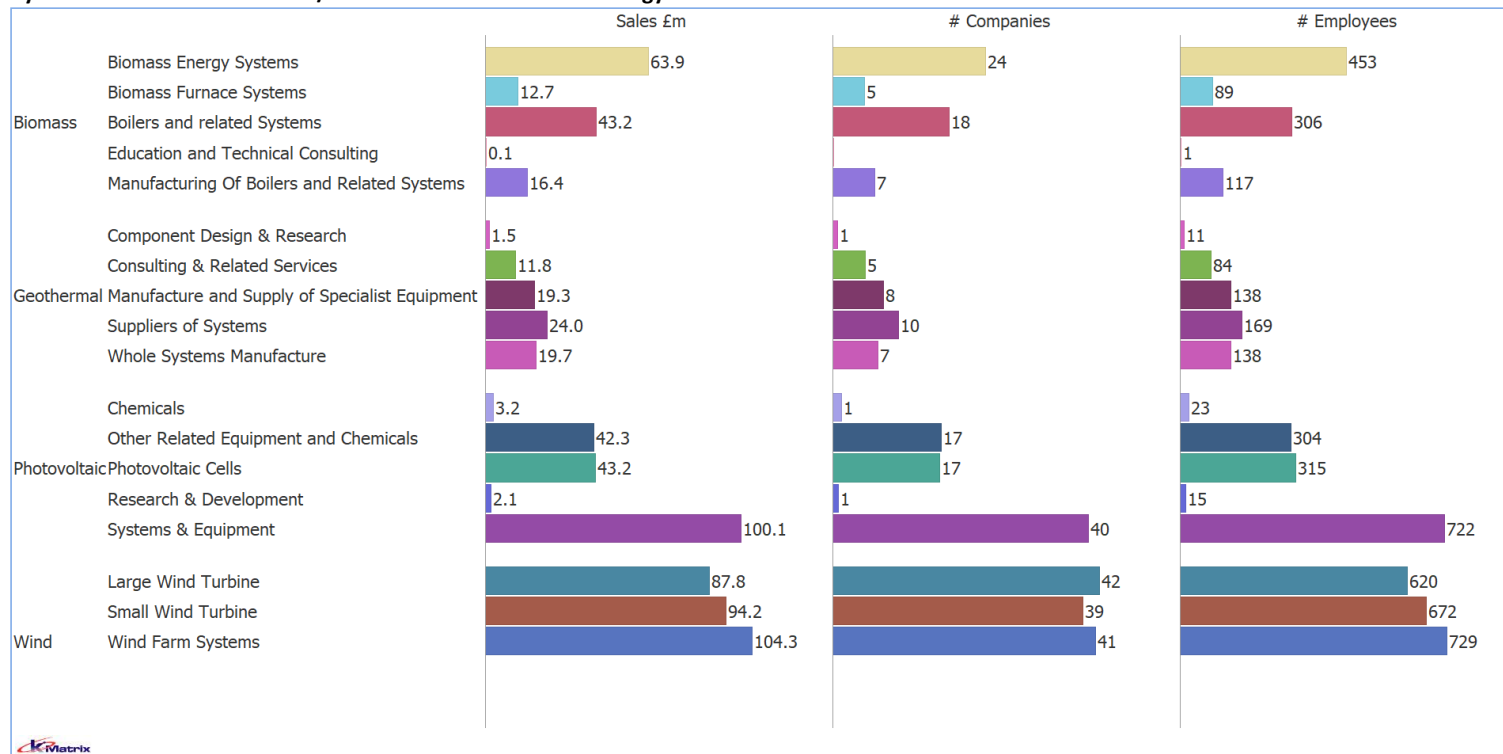
The same four sub-sectors also account for 98% of companies (Figure 13). They are made up of Wind 42%, Photovoltaic 26%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from 109 to 122; Photovoltaic from 68 to 76; Biomass from 48 to 54 and Geothermal from 28 to 31.

Note: there are 0 companies listed for Wave & Tidal, because these are engineering services to the wave and tidal sector from various companies, delivered by the equivalent of 3 employees from various organisations, however counting all of those organisations as companies would give a false impression of the sub-sector being larger than it is. The sales are opportunistic and not necessarily regular by their nature.

1.4.2 Renewable Energy Market at Level 3

Figure 14: Summary of selected metrics for 2019/20 for selected Renewable Energy Level 2 sub-sectors at Level 3



The top four Level 2 sub-sectors for Low Carbon are Wind, Photovoltaic, Biomass and Geothermal, making up 98% of the Renewable Energy market in the Marches LEP. Figure 14 shows a summary of the Sales, Companies and Employees for these Level 2 sub-sectors, broken out into their Level 3 sub-sectors.

Wind is the largest Level 2 sub-sector with 41% of sales and has three sub-sectors at Level 3, the largest being Wind Farm Systems which makes up 36% of sales in this market. Example companies include those providing power firming systems and services, maintenance services and grid integration services.

Photovoltaic has five sub-sectors at level 3, the largest being Systems & Equipment which makes up 52% of sales in this market. Example companies include systems developers, suppliers and installers.

Biomass has five sub-sectors at level 3, the largest being Biomass Energy Systems which makes up 47% of the sales in this market, example companies include developers, installers and consultancies.

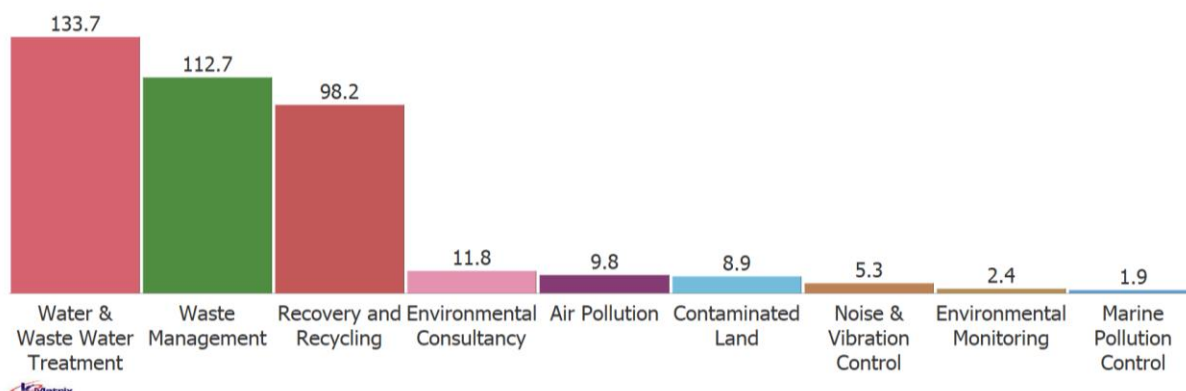
Geothermal has five sub-sectors at Level 3, the largest being Suppliers of Systems which makes up 31% of the sales in this market. Example companies include lateral geothermal systems providers and installers at the domestic and small commercial level and vertical control systems developers and suppliers.

1.5 Marches LEP's LCEGS Level 1 - Environmental Market

In this section we look at the Environmental market in greater detail. Initially we split the market into eight further sub-sectors, Level 2, and then look at the highest performing Level 2 sub-sectors in more detail by highlighting the activity happening within them at Level 3.

1.5.1 Environmental Market at Level 2

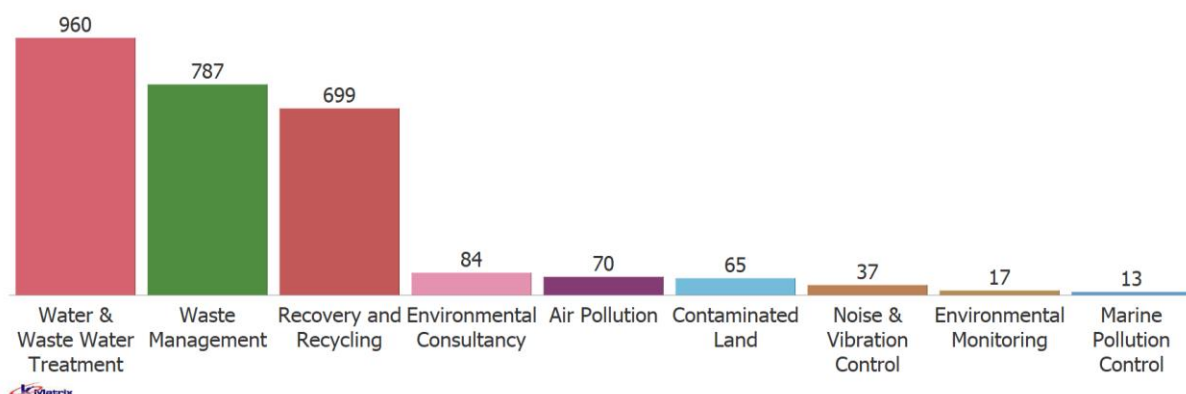
Figure 15: Sales 2019/20 in £m (Level 2)



Environmental is split into nine sub-sectors, of which three account for 90% of sales (Figure 15). These three are made up of Water Supply & Waste Water Treatment 35%, Waste Management 29% and Recovery & Recycling 26%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water Supply and Waste Water Treatment from £118.3m to £133.7m; Waste Management from £99.7m to £112.7m and Recovery and Recycling from £86.8m to £98.2.

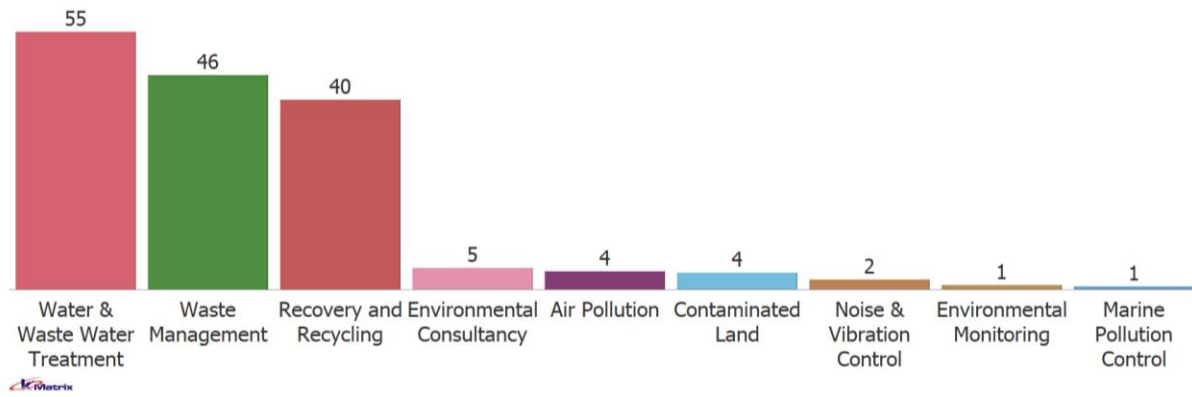
Figure 16: Employment 2019/20 (Level 2)



The same three sub-sectors account for 89% of employment (Figure 16). They are made up of Water Supply & Waste Water Treatment 35%, Waste Management 29% and Recovery & Recycling 26%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water & Waste Water Treatment from 907 to 960; Waste Management from 743 to 787 and Recovery and Recycling from 659 to 699.

Figure 17: Companies 2019/20 (Level 2)



The same three sub-sectors also account for 90% of companies (Figure 17). They are made up of Water Supply & Waste Water Treatment 35%, Waste Management 29% and Recovery & Recycling 25%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water & Waste Water Treatment from 49 to 55; Waste Management from 41 to 46 and Recovery and Recycling from 36 to 40.

1.5.2 Environmental Market at Level 3

Figure 18: Summary of selected metrics for 2019/20 for Waste Management and Water & Waste Water Treatment sub-sectors at Level 3



Figure 18 shows the Sales, Companies and Employees for the Waste Management and Water & Waste Water Treatment Level 2 sub-sectors broken down into their Level 3 sub-sectors.

Water & Waste Water Treatment is made up of four Level 3 sub-sectors, the largest being Water Treatment and Distribution which makes up 77% of sales. Example activities include development and implementation by utilities along with supply, consultancy and implementation by independent consulting engineers.

Waste Management is made up of four Level 3 sub-sectors with sales more evenly distributed across them than for the Water and Waste Water Treatment market. The largest Level 3 sub-sector is Equipment for Waste Treatment which makes up 35% of sales in the market. Example companies are those

involved in development, manufacture and supply. The next largest sub-sector is Construction & Operation of Waste Treatment Facilities which makes up 34% of sales. Example companies are those involved in both public and private operations management and supply and installation of operational equipment.

Figure 19: Summary of selected metrics for 2019/20 for Recovery and Recycling at Level 3

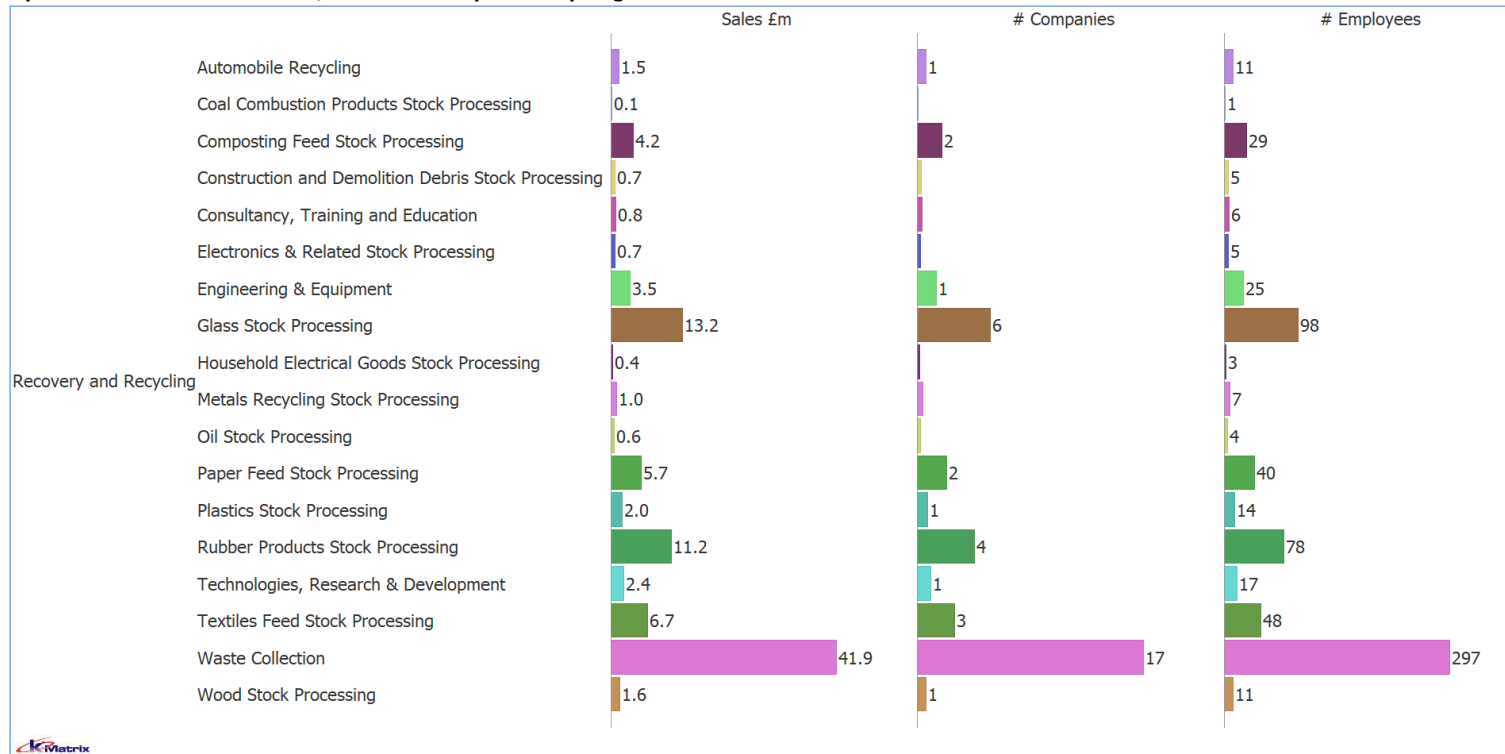


Figure 19 shows the Sales, Companies and Employees for the Level 2 Recovery & Recycling sub-sector broken down into its Level 3 sub-sectors. There are eighteen Level 3 sub-sectors and Waste Collection, including the collection of all waste, both municipal and commercial (landfill and recyclates), is clearly the largest sub-sector making up 43% of all sales in the Recovery and Recycling sub-sector. There are then a number of waste stream stock processing sub-sectors with the largest ones being Glass, Rubber Products, Textiles, Paper and Composting.

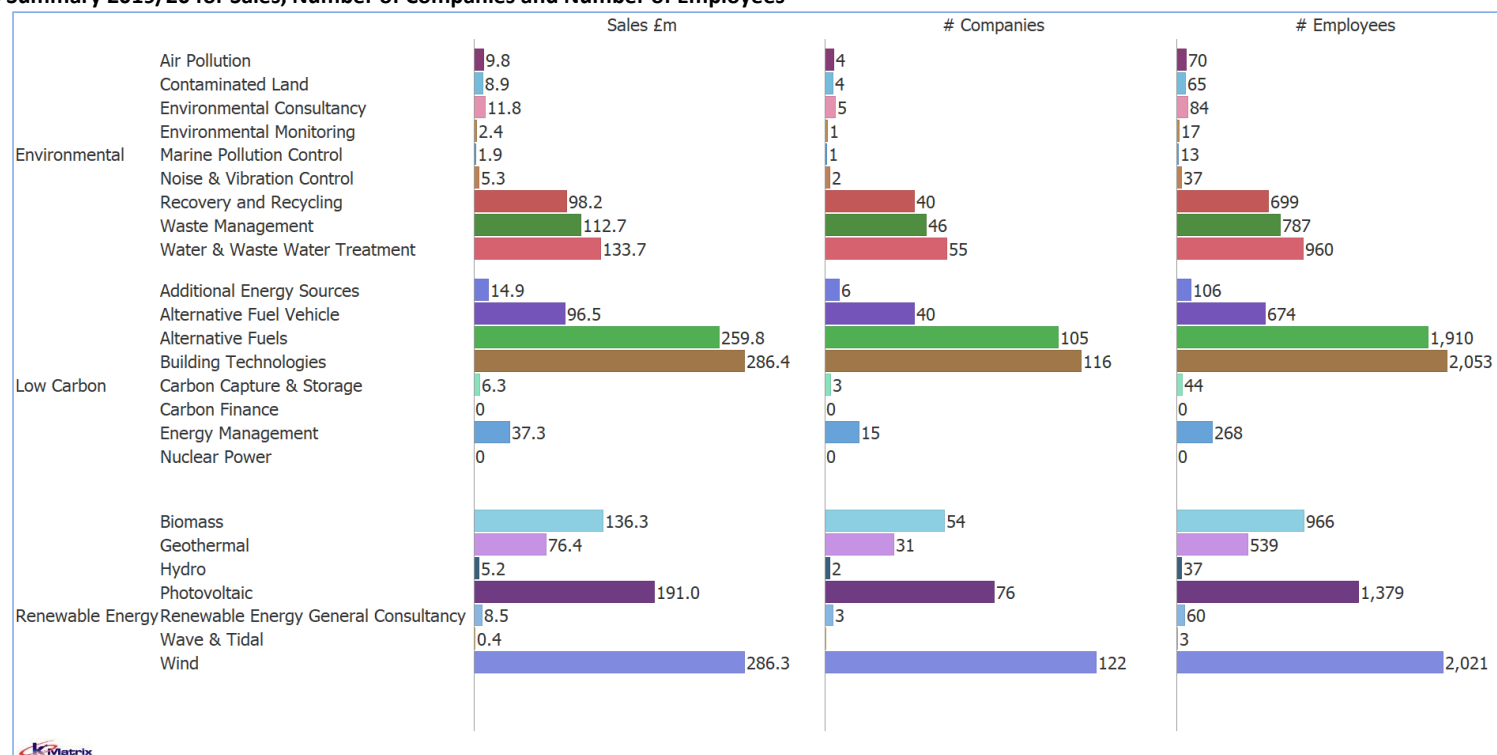
1.6 Marches LEP's LCEGS Level 2 Summary

Figure 20 compares all 24 sub-sectors of LCEGS and shows that the four leading sub-sectors: Building Technologies (16%), Wind (16%), Alternative Fuels (15%) and Photovoltaic (11%) have the largest share in terms of sales, company numbers and employment and accounted for 57% of the Marches LEP's LCEGS sector activity in 2019/20.

There is then a second grouping of seven sub-sectors that are: Biomass 8%, Water & Waste Water Treatment 7%, Waste Management 7%, Recovery and Recycling 5%, Alternative Fuel Vehicle 5%, Geothermal 4% and Energy Management 2%, and that make up a further 39% of the LCEGS sector sales in 2019/20.

These 11 sub-sectors dominate the LCEGS sector sales and together made up 96% of its overall sales in 2019/20.

Figure 20: LCEGS Summary 2019/20 for Sales, Number of Companies and Number of Employees



1.7 Marches LEP and the MEH's LCEGS compared

The Marches LEP accounts for 7% of the Midlands Energy Hub Region's LCEGS sector.

Figure 21: Marches LEP Measures 2019/20 by Level 1

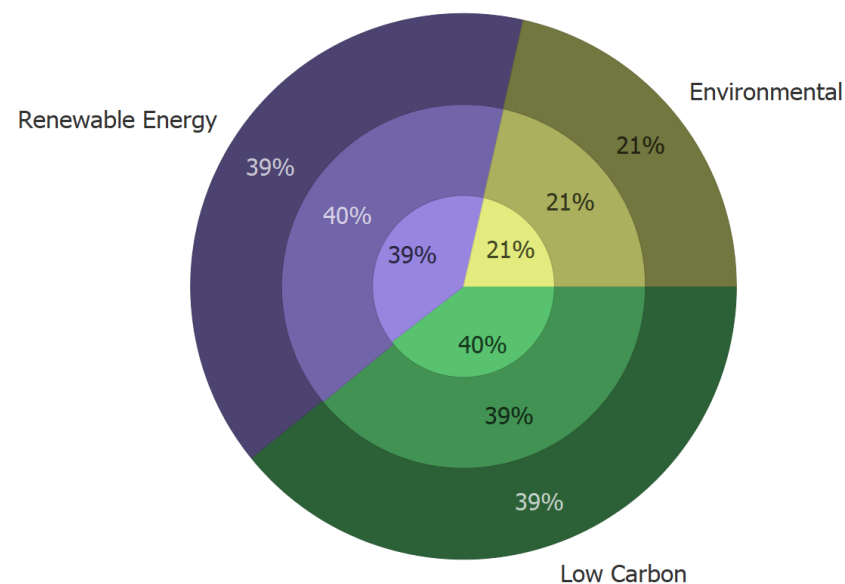
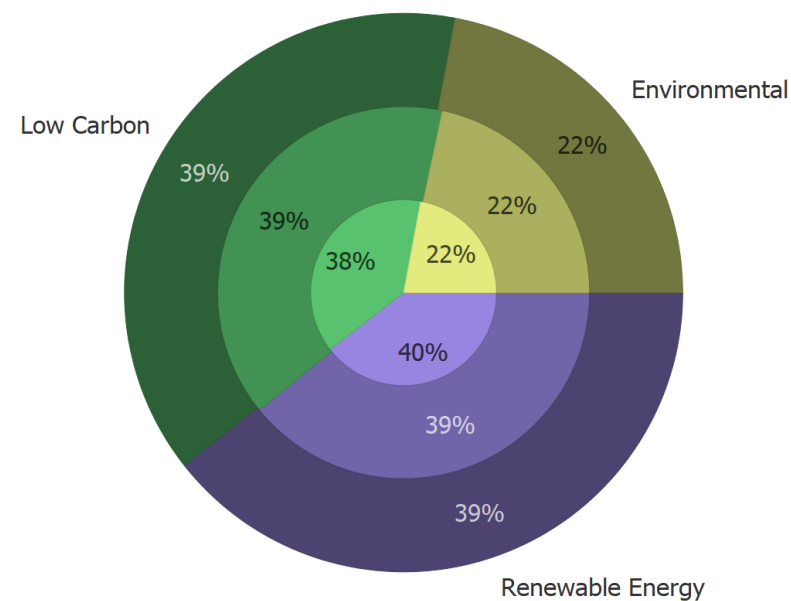


Figure 22: MEH Measures 2019/20 by Level 1



Figures 21 and 22 compare the profile of the Marches LEP and the MEH region's LCEGS activities at Level 1 for sales (outer circle), companies (middle circle) and employment (inner circle). Marches LEP is broadly in line with the MEH LCEGS sector, with slightly more emphasis on the Low Carbon market sub-sector than the regional average.

Figure 23: Marches LEP's LCEGS sub-sectors for 2019/20 at Level 2

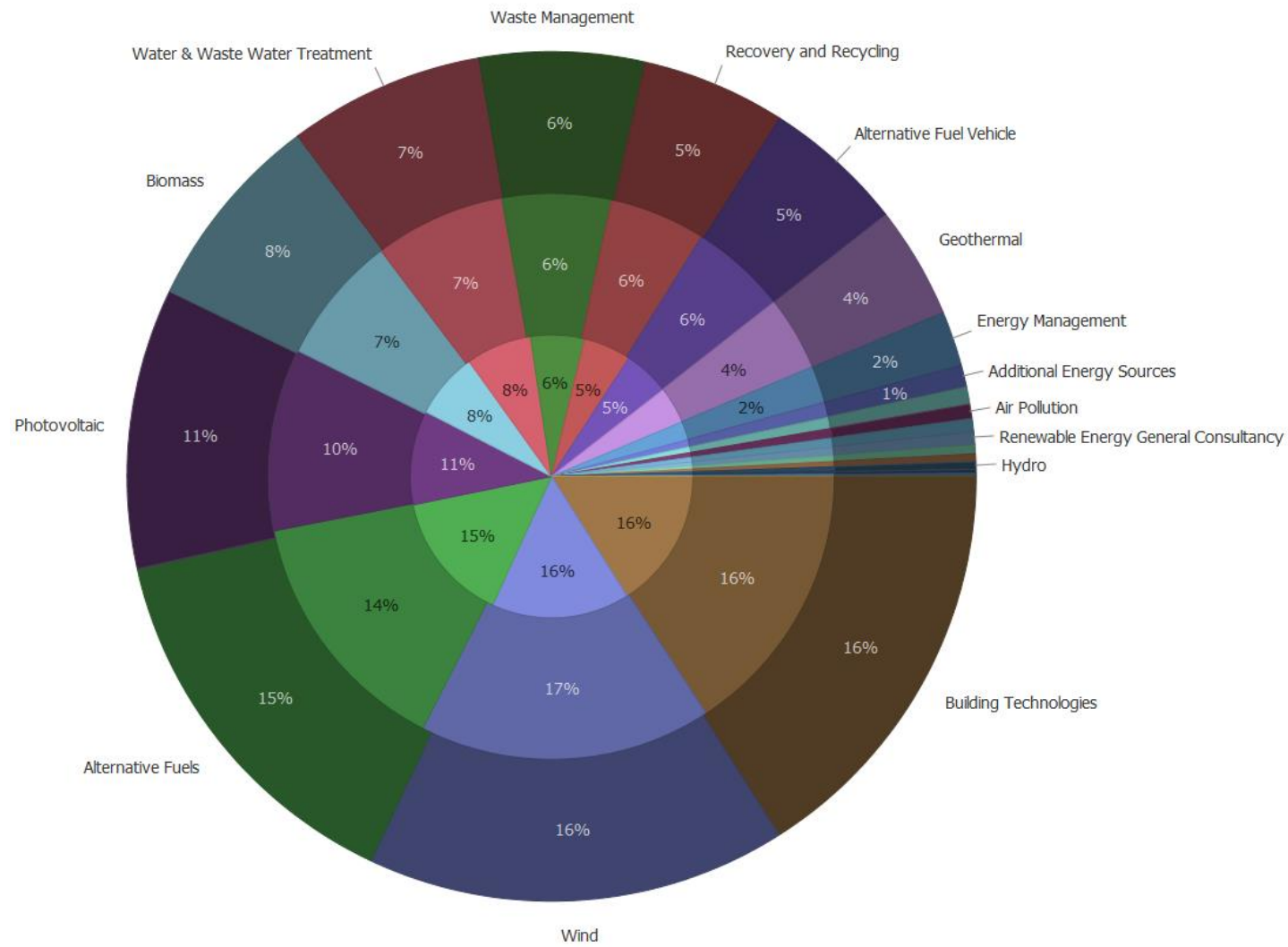
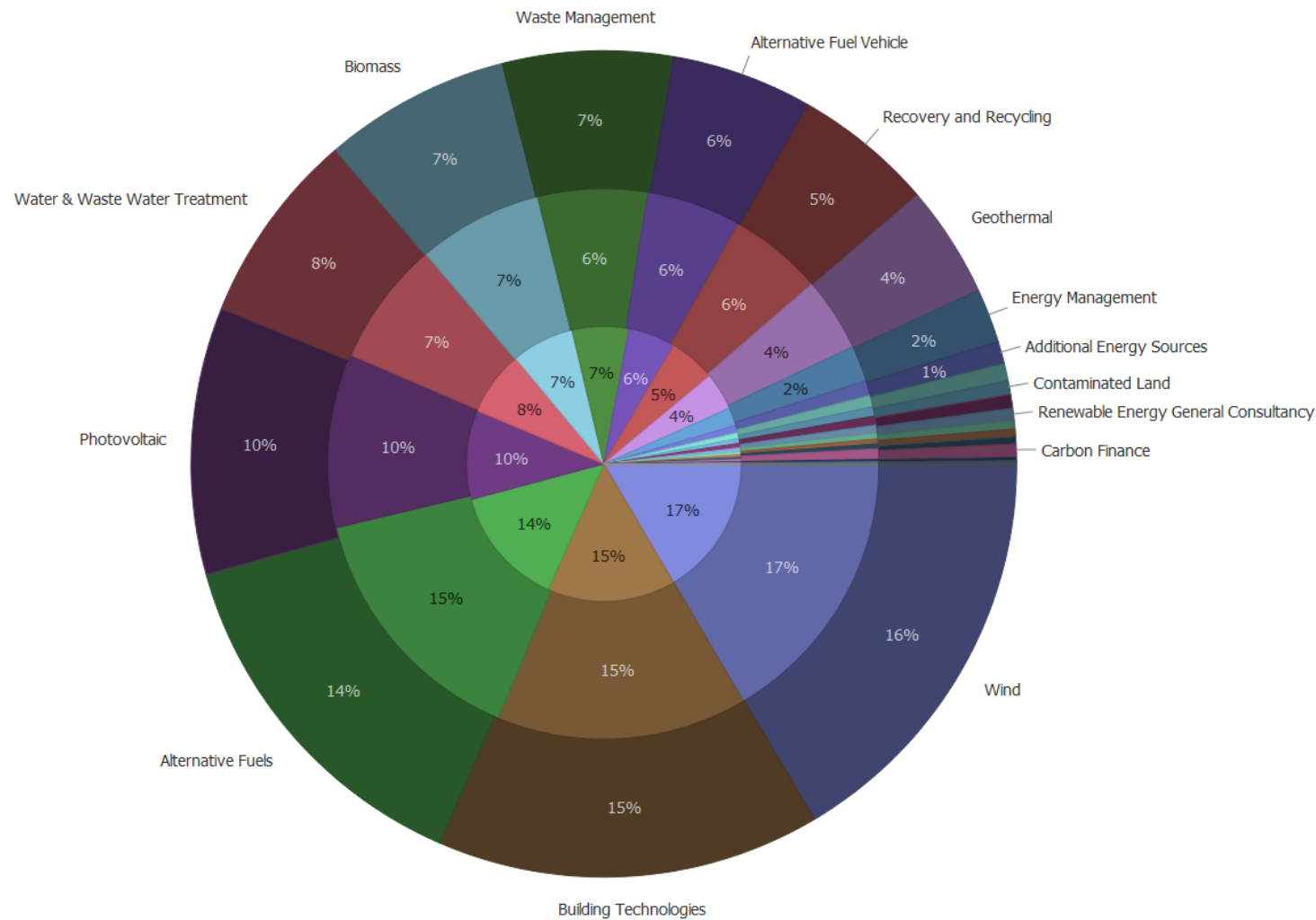


Figure 24: MEH's LCEGS sub-sectors for 2019/20 at Level 2

Figures 23 and 24 extends the analysis by comparing the profile of the Marches LEP and MEH's LCEGS activities at Level 2 for sales (outer circle), companies (middle circle) and employment (inner circle).



There are differences between the two, such as slightly stronger Building Technologies, Alternative Fuels and Photovoltaic and Biomass in the Marches LEP than the regional average. Sub-sectors which are weaker in the Marches LEP than the regional average include Water & Waste Water Treatment, Waste Management and Alternative Fuel Vehicle.

Other differences relate to percentage share of market for the different measures, although this is within 1% of the Regional average.

1.8 Marches LEP's LCEGS Investment in R&D

This section examines the investment profile of the Marches LEP at the sector level and Level 1 for 2017/18, 2018/19 and 2019/20 and for Level 2 and the top Level 3 subsectors.

Figure 25: Marches LEP's LCEGS Investment in R&D by Fiscal Year

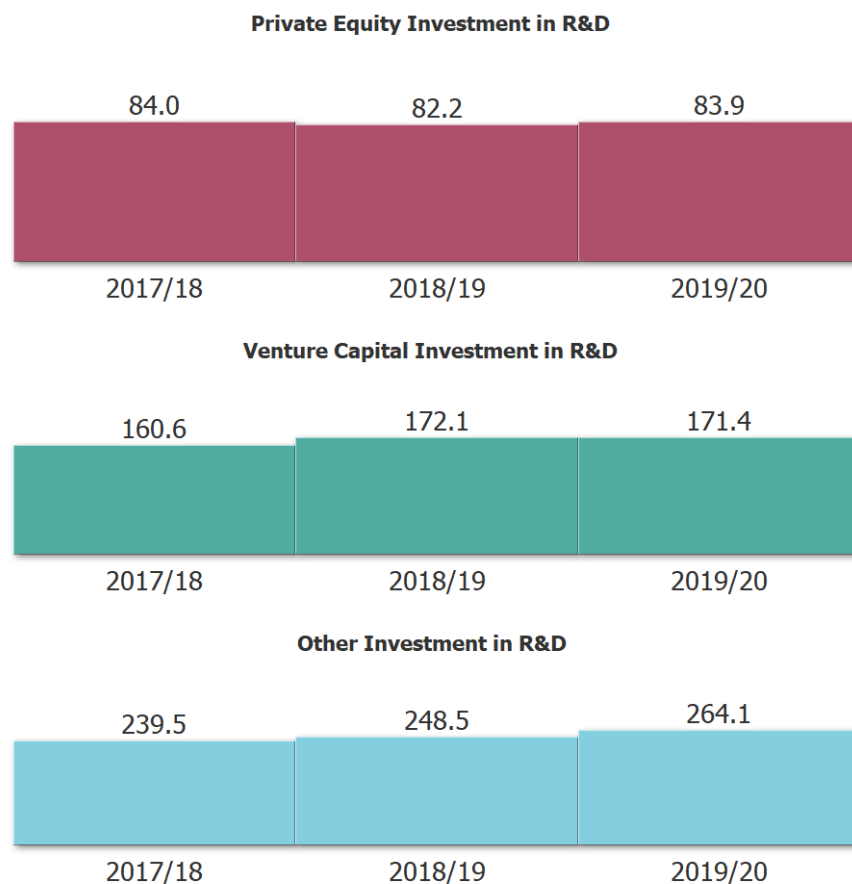


Figure 25 shows the investment for the three financial years of the sector study, made into the whole LCEGS sector.

Private Equity Investment has not grown, being £84m in 2017/18 and £84m in 2019/20.

By comparison, the MEH region's growth rates were 5.8% and 6.1%.

Venture Capital Investment has grown from £161m in 2017/18 to £171m in 2019/20, representing 7.2% growth between 2017/18 and 2018/19 and -0.4% growth between 2018/19 and 2019/20.

By comparison, the MEH region's growth rates were 5.4% and 6.2%.

Other Investment has grown from £240m in 2017/18 to £264m in 2019/20, representing 3.8% growth between 2017/18 and 2018/19 and 6.3% growth between 2018/19 and 2019/20.

By comparison, the MEH region's growth rates were 6.2% and 5.6%.

Figure 26: Marches LEP's LCEGS Investment in R&D by Fiscal Year – Level 1

Figure 26 shows the investment for the three financial years of the sector study, made into the LCEGS sector, split into Level 1.

Private Equity Investment in R&D

84.0	82.2	83.9
Environmental (16.2)	Environmental (18.5)	Environmental (18.7)
Renewable Energy (33.4)	Low Carbon (30.4)	Low Carbon (30.0)
Low Carbon (34.3)	Renewable Energy (33.3)	Renewable Energy (35.2)
2017/18	2018/19	2019/20

Private Equity Investment was split in 2019/20 Renewable Energy 42%, Low Carbon 36% and Environmental 22%. This is slightly different to the sales split of 39%, 39% and 21%.

Venture Capital Investment in R&D

160.6	172.1	171.4
Environmental (34.4)	Environmental (36.5)	Environmental (37.4)
Renewable Energy (62.3)	Renewable Energy (67.1)	Low Carbon (60.4)
Low Carbon (63.8)	Low Carbon (68.4)	Renewable Energy (73.6)
2017/18	2018/19	2019/20

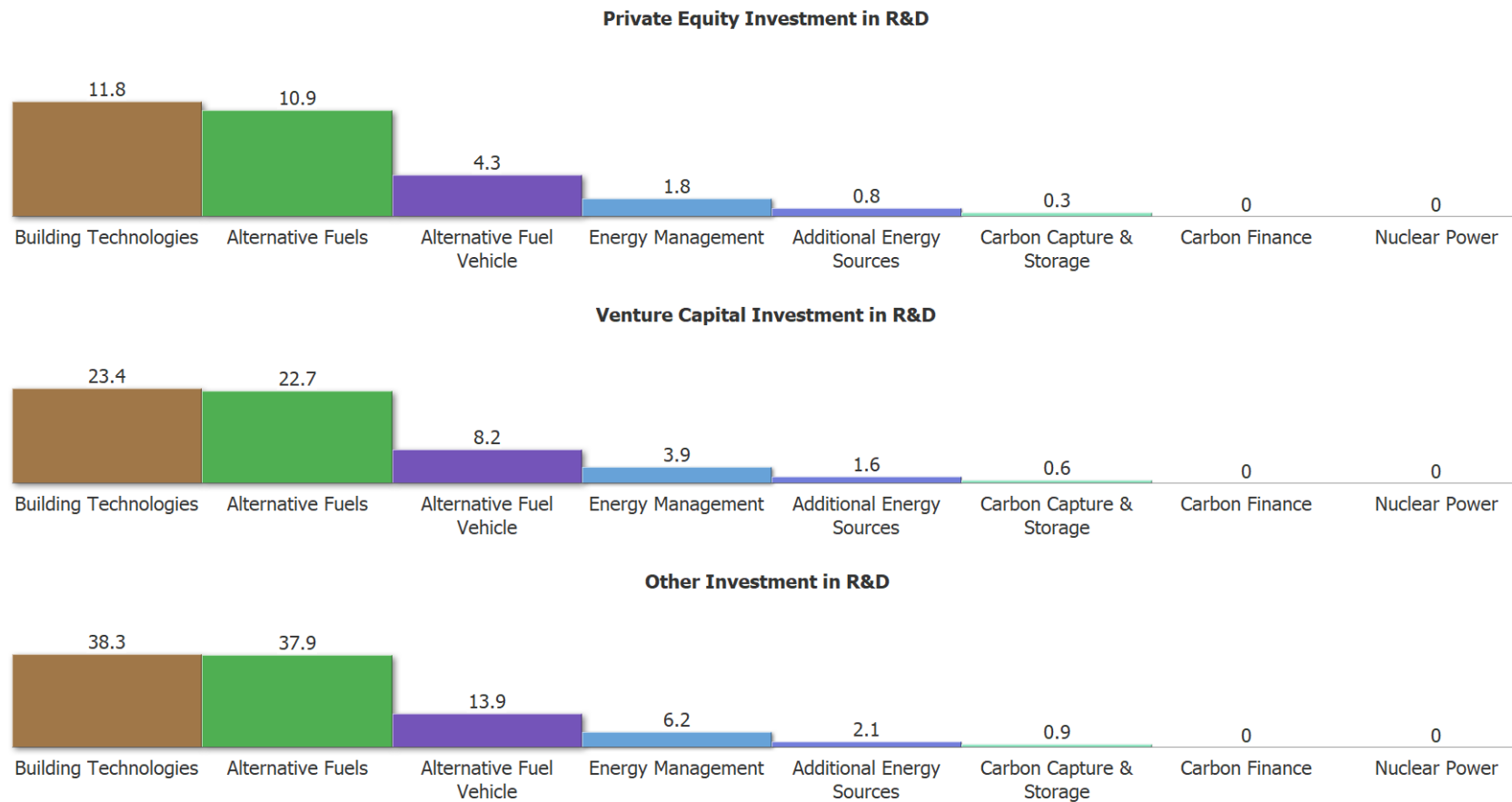
Venture Capital Investment was split in 2019/20 Renewable Energy 43%, Low Carbon 35% and Environmental 22%. This is slightly different to the sales split of 39%, 39% and 21%.

Other Investment in R&D

239.5	248.5	264.1
Environmental (49.1)	Environmental (52.4)	Environmental (60.0)
Low Carbon (92.8)	Low Carbon (98.0)	Low Carbon (99.4)
Renewable Energy (97.6)	Renewable Energy (98.1)	Renewable Energy (104.8)
2017/18	2018/19	2019/20

Other Investment was split in 2019/20 Renewable Energy 40%, Low Carbon 38% and Environmental 23%. This is broadly in line with the sales split of 39%, 39% and 21%.

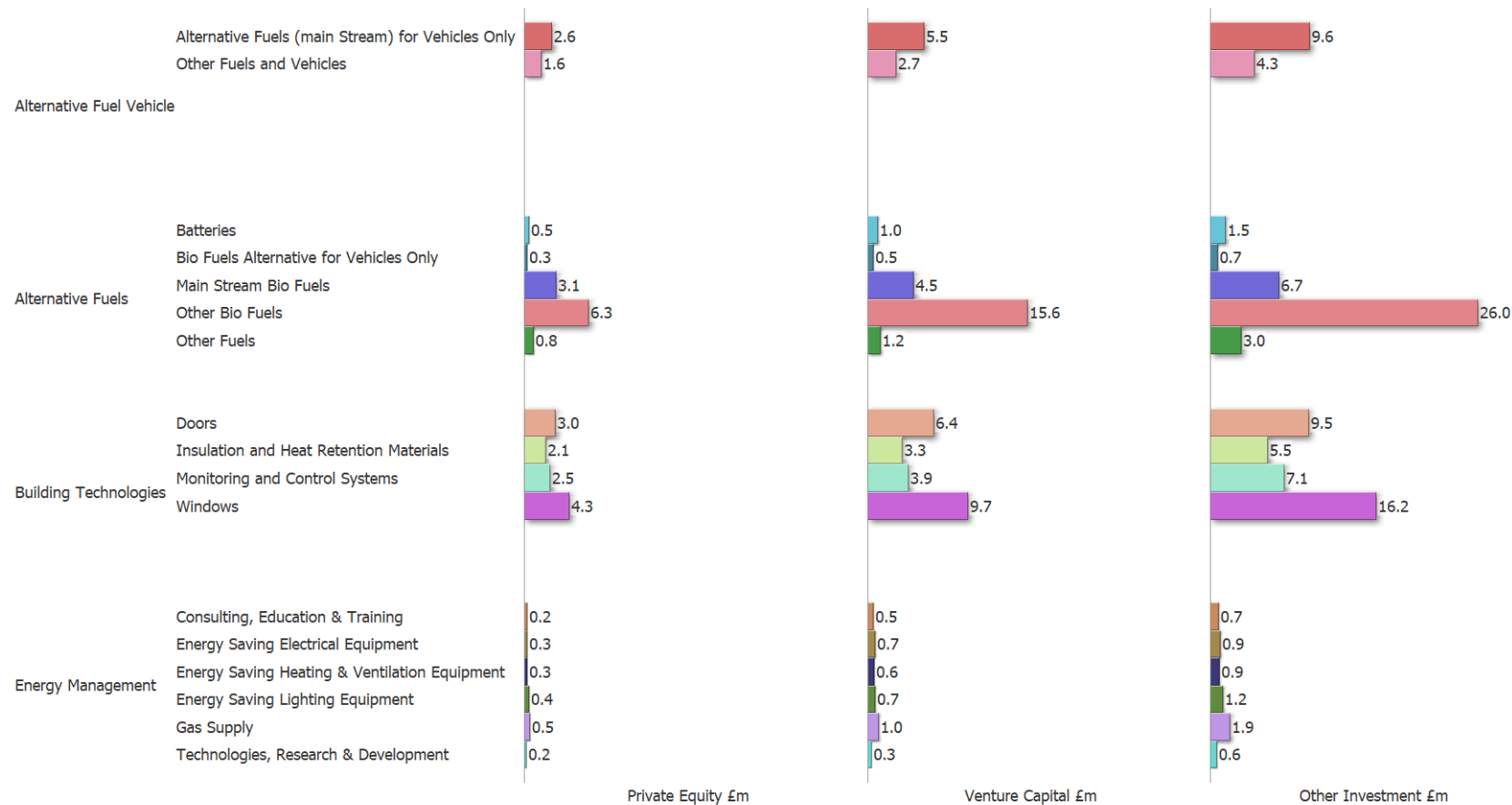
Figure 27: Marches LEP's LCEGS Investment in R&D 2019/20 – Level 2 Low Carbon



Investment for each of the top four Low Carbon sub-sectors was variable between 2017/18 and 2019/20:

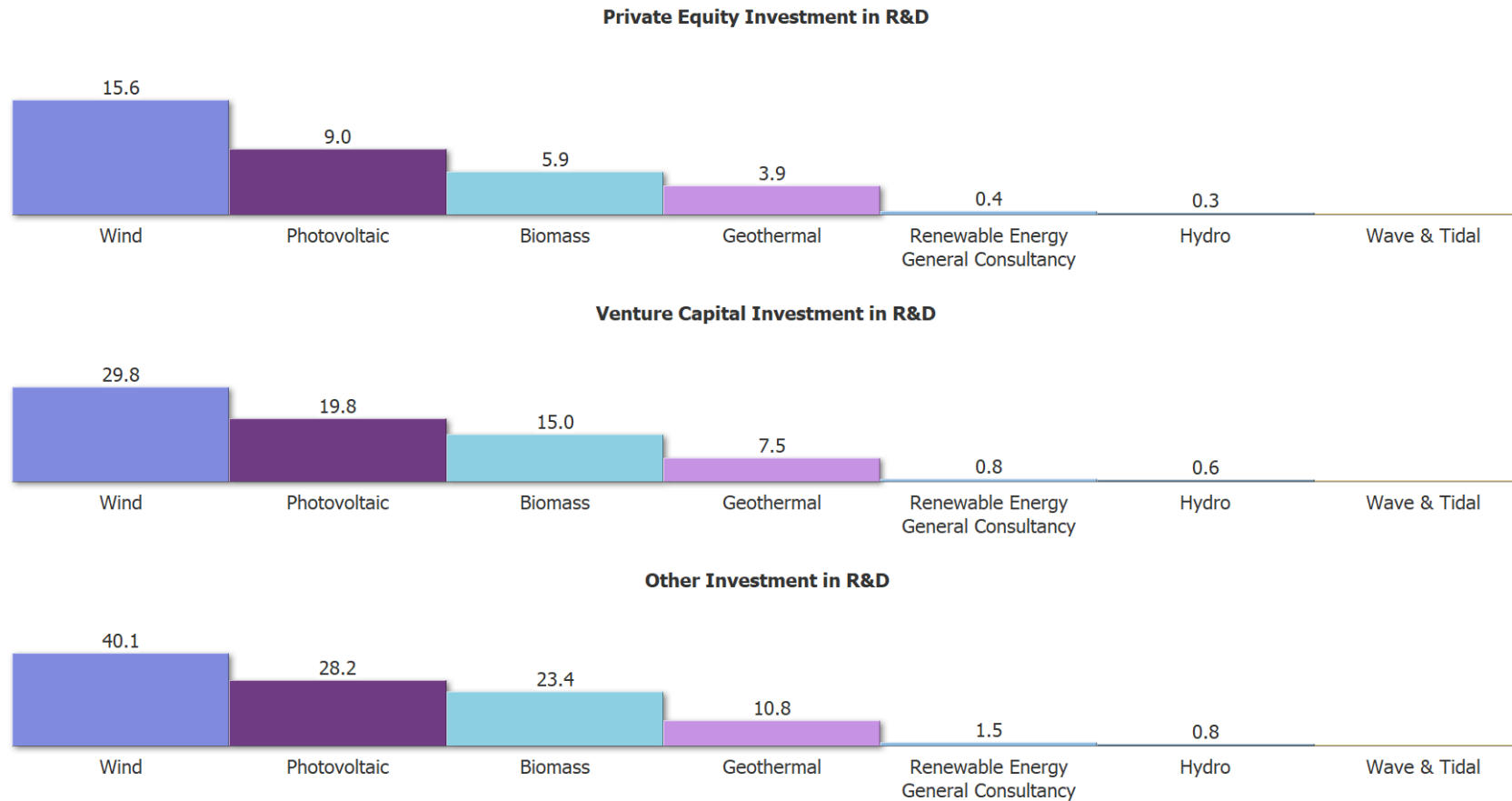
- Building Technologies from £14m to £12m for Private Equity, £27m to £23m for Venture Capital and £37m to £38m for Other Investment
- Alternative Fuels from £14m to £11m for Private Equity, £21m to £23m for Venture Capital and £35m to £38m for Other Investment
- Alternative Fuel Vehicle from £5m to £4m for Private Equity, £11m to £8m for Venture Capital and £13m to £14m for Other Investment
- Energy Management staying at £2m for Private Equity, £4m for Venture Capital and from £5m to £6m for Other Investment

Figure 28: Marches LEP's LCEGS Investment in R&D 2019/20 – Low Carbon top Level 3 sub-sectors



Investment for the Level 3 sub-sectors of the top Level 2 sub-sectors within Low Carbon have grown between 2017/18 and 2019/20. The pattern of investment for Private Equity, Venture Capital and Other Investment is similar to the Sales pattern in section 2.3.

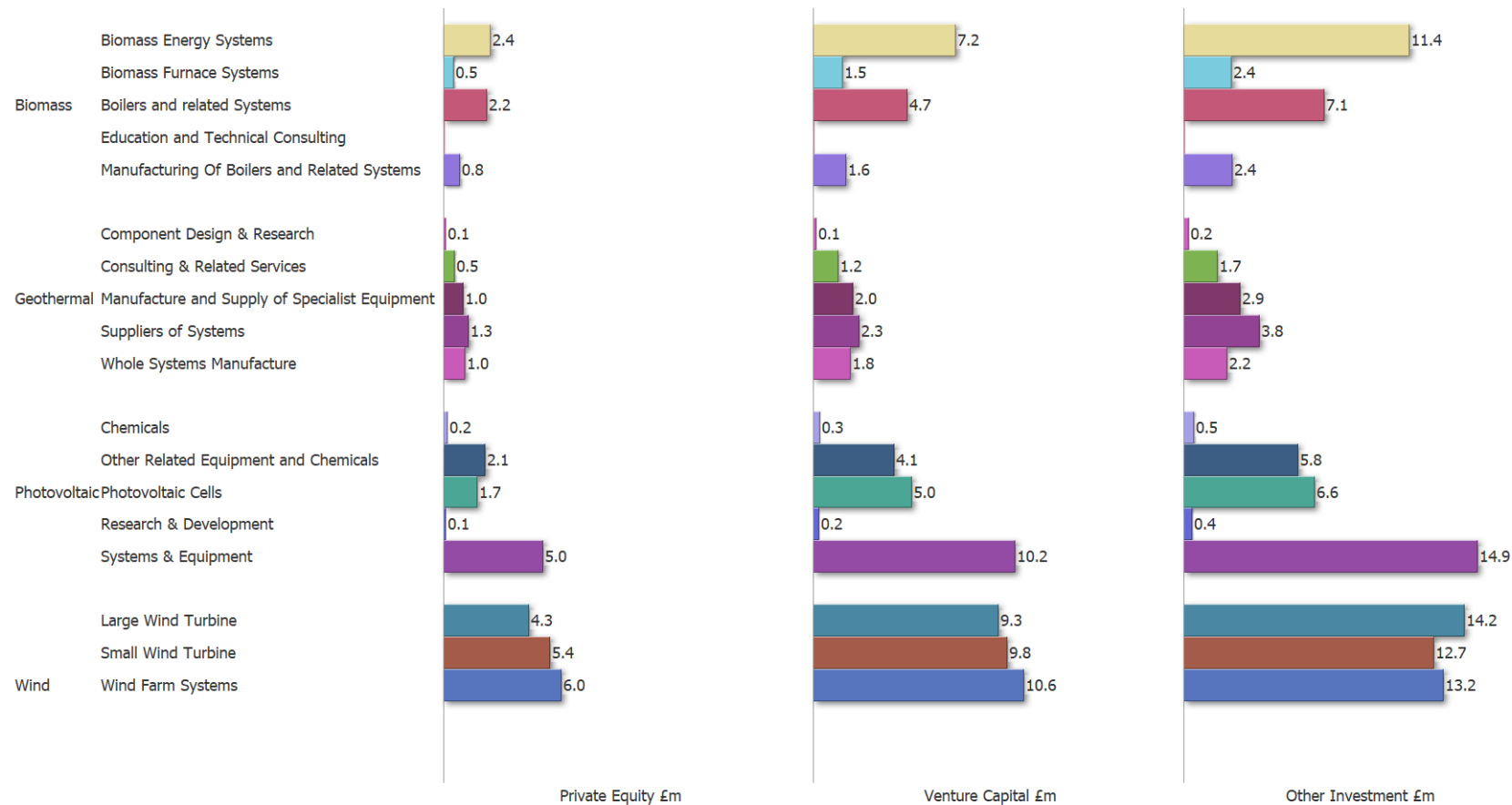
Figure 29: Marches LEP's LCEGS Investment in R&D 2019/20 – Level 2 Renewable Energy



Investment for each of the top four Renewable Energy sub-sectors predominantly grew between 2017/18 and 2019/20:

- Wind from £14m to £16m for Private Equity, £24m to £30m for Venture Capital and £39 to £40m for Other Investment
- Photovoltaic staying at £9m for Private Equity, from £19m to £20m for Venture Capital and £29m to £28m for Other Investment
- Biomass staying at £6m for Private Equity, from £12m to £15m for Venture Capital and £17m to £23m for Other Investment.
- Geothermal from £3m to £4m for Private Equity, £7m to £8m for Venture Capital and staying at £11m for Other Investment.

Figure 30: Marches LEP's LCEGS Investment in R&D 2019/20 – Renewable Energy top Level 3 sub-sectors



Investment for the Level 3 sub-sectors of the top Level 2 sub-sectors within Renewable Energy have grown between 2017/18 and 2019/20. The pattern of investment for Private Equity and Venture Capital is similar to the Sales pattern in section 2.4. Other Investment is showing proportionally more investment into Large Wind Turbine compared with sales than the other Level 3 Wind sub-sectors.

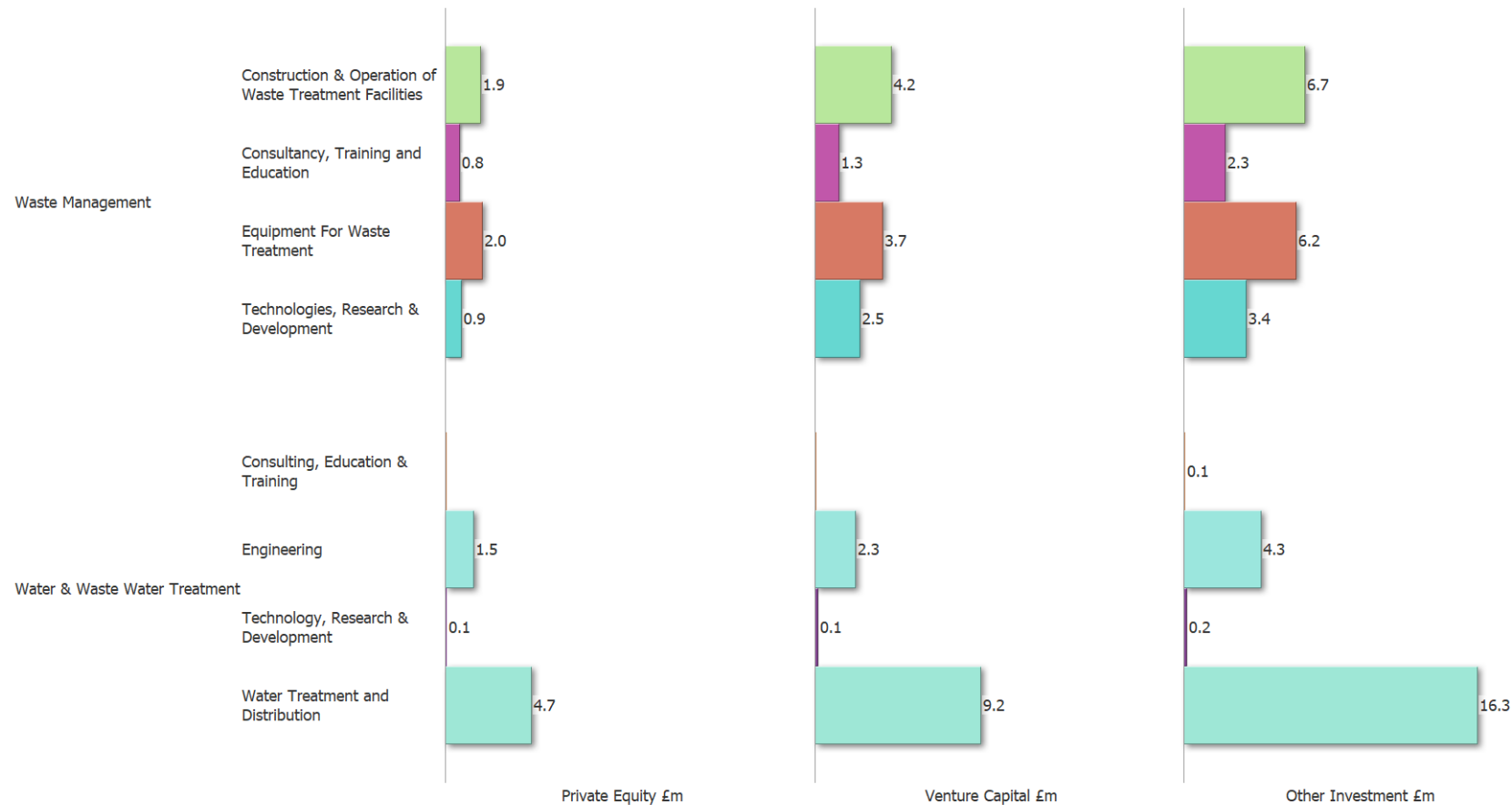
Figure 31: Marches LEP's LCEGS Investment in R&D 2019/20 – Level 2 Environmental



Investment for each of the top three Environmental sub-sectors grew between 2017/18 and 2019/20:

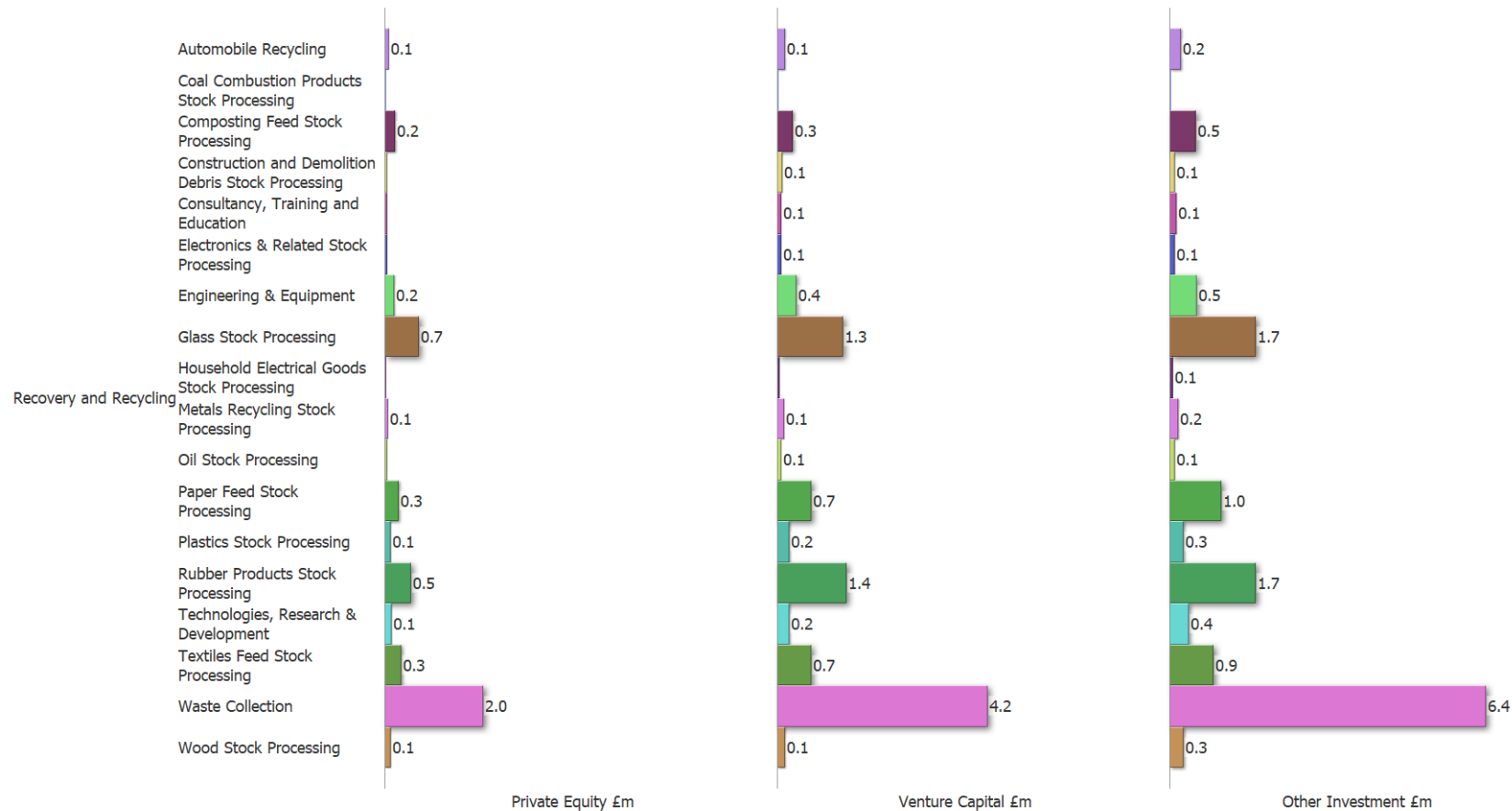
- Water & Waste Water Treatment staying at £6m for Private Equity, from £11m to £12m for Venture Capital and £13m to £15m for Other Investment.
- Waste Management from £5m to £6m for Private Equity, £10m to £12m for Venture Capital and £14m to £19m for Other Investment
- Recovery and Recycling staying at £5m for Private Equity, from £9m to £10m for Venture Capital and £13m to £15m for Other Investment.

Figure 32: Marches LEP's LCEGS Investment in R&D 2019/20 – Environmental top Level 3 sub-sectors, Waste Management and Water and Waste Water Treatment



Investment for the Level 3 sub-sectors of the top Level 2 sub-sectors within Environmental have grown between 2017/18 and 2019/20. The pattern of investment for Private Equity, Venture Capital and Other Investment is similar to the Sales pattern in section 2.5.

Figure 33: Marches LEP's LCEGS Investment in R&D 2019/20 – Environmental top Level 3 sub-sectors, Recovery and Recycling



Investment for the Level 3 sub-sectors of the top Level 2 sub-sectors within Environmental have grown between 2017/18 and 2019/20. The pattern of investment for Private Equity, Venture Capital and Other Investment is similar to the Sales pattern in section 2.5.

1.9 Marches LEP's LCEGS Company Size

In this section we look at the number of companies within the Marches LEP, split by size of company, using the standard classification of company size. Growth between one year and the next is shown in red.

Company size classifications:

- Start-up = any company formed during the previous 12 months, for 2017/18 that would include companies formed during 2016/17 and so on
- Micro = companies with 2-9 employees
- SME = Small and Medium-sized companies, with 10-249 employees
- Large = companies with 250-1,500 employees
- Corporations = any company with 1,501 or more employees
- Total Companies = the total company count

Start-ups listed in 2017/18 will have been formed in 2016/17, those listed in 2018/19 will have been formed in 2017/18 and those in 2019/20 will have been formed in 2018/19. Start-up companies are a discrete category, not dependent on number of employees and are not double counted in the other categories.

Table 1 shows the company count for the LCEGS sector across the Marches LEP, split by Start-up, Micro, SME, Large and Corporations, with the Total Number of Companies for reference. The table is also split by Level 1, providing both a sector and Level 1 overview.

Table 1: Marches LEP's LCEGS Number of Companies Split by Company Size, with Growth 2017/18 to 2019/20 – Level 1

	# Start-up					# Micro					# SMEs				
	Growth			Growth		Growth			Growth		Growth			Growth	
Level 1	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Environmental	7	14.3%	8	0.0%	8	42	7.1%	45	4.4%	47	70	7.1%	75	5.3%	79
Low Carbon	13	7.7%	14	0.0%	14	77	6.5%	82	4.9%	86	128	7.0%	137	4.4%	143
Renewable Energy	13	7.7%	14	7.1%	15	77	7.8%	83	4.8%	87	129	7.0%	138	4.3%	144
Total	33	9.1%	36	2.8%	37	196	7.1%	210	4.8%	220	327	7.0%	350	4.6%	366
	# Large					# Corporations					Total # Companies				
	Growth			Growth		Growth			Growth		Growth			Growth	
Level 1	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Environmental	14	7.1%	15	6.7%	16	7	14.3%	8	0.0%	8	141	6.4%	150	4.7%	157
Low Carbon	26	7.7%	28	3.6%	29	13	7.7%	14	0.0%	14	256	7.0%	274	4.4%	286
Renewable Energy	26	7.7%	28	3.6%	29	13	7.7%	14	0.0%	14	258	7.0%	276	4.7%	289
Total	66	7.6%	71	4.2%	74	33	9.1%	36	0.0%	36	655	6.9%	700	4.6%	732

Table 1 shows that the growth in the number of companies per size grouping is similar across the Level 1 sub-sectors, with growth between 2018/19 and 2019/20 being stronger in all size groupings than the previous year.

The strongest growth between 2018/19 and 2019/20 of 7.1% was seen in Start-ups in the Renewable Energy sub-sector, with the weakest growth of 0.0% seen in Start-ups in the Environmental and Low Carbon sub-sectors and large companies in all three sub-sectors. Although there was no growth in some company sizes per sub-sector, there was no contraction during the reporting period.

Tables 2a and 2b show the company count for the LCEGS sector across the Marches LEP, split by Start-up, Micro, SME, Large and Corporations, with the Total Number of Companies again for reference. The table is also split by Level 2.

Table 2a: Marches LEP's LCEGS Number of Companies Split by Company Size, with Growth 2017/18 to 2019/20 – Level 2

Level 1	Level 2	# Start-up					# Micro					# SMEs				
		Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
		2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Environmental	Air Pollution	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	2	0.0%	2	0.0%	2
Environmental	Contaminated Land	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	2	0.0%	2	0.0%	2
Environmental	Environmental Consultancy	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	2	0.0%	2	0.0%	2
Environmental	Environmental Monitoring	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Environmental	Marine Pollution Control	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Environmental	Noise & Vibration Control	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1
Environmental	Recovery and Recycling	2	0.0%	2	0.0%	2	11	9.1%	12	0.0%	12	18	5.6%	19	5.3%	20
Environmental	Waste Management	2	0.0%	2	0.0%	2	12	8.3%	13	7.7%	14	20	10.0%	22	4.5%	23
Environmental	Water & Waste Water Treatment	2	50.0%	3	0.0%	3	15	6.7%	16	0.0%	16	25	4.0%	26	7.7%	28
Low Carbon	Additional Energy Sources	0	0.0%	0	0.0%	0	2	0.0%	2	0.0%	2	3	0.0%	3	0.0%	3
Low Carbon	Alternative Fuel Vehicle	2	0.0%	2	0.0%	2	11	9.1%	12	0.0%	12	18	5.6%	19	5.3%	20
Low Carbon	Alternative Fuels	5	0.0%	5	0.0%	5	28	7.1%	30	3.3%	31	47	8.5%	51	3.9%	53
Low Carbon	Building Technologies	5	20.0%	6	0.0%	6	31	9.7%	34	2.9%	35	52	5.8%	55	5.5%	58
Low Carbon	Carbon Capture & Storage	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1
Low Carbon	Carbon Finance	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Low Carbon	Energy Management	1	0.0%	1	0.0%	1	4	0.0%	4	25.0%	5	7	0.0%	7	14.3%	8
Low Carbon	Nuclear Power	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Renewable Energy	Biomass	2	50.0%	3	0.0%	3	14	7.1%	15	6.7%	16	24	8.3%	26	3.8%	27
Renewable Energy	Geothermal	1	0.0%	1	100.0%	2	8	12.5%	9	0.0%	9	14	7.1%	15	6.7%	16
Renewable Energy	Hydro	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1
Renewable Energy	Photovoltaic	3	33.3%	4	0.0%	4	20	10.0%	22	4.5%	23	34	8.8%	37	2.7%	38
Renewable Energy	Renewable Consultancy	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1	2	0.0%	2	0.0%	2
Renewable Energy	Wave & Tidal	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Renewable Energy	Wind	5	20.0%	6	0.0%	6	32	9.4%	35	5.7%	37	54	7.4%	58	5.2%	61
Total		30	16.7%	35	2.9%	36	195	8.2%	211	3.8%	219	327	6.7%	349	4.9%	366

Table 2b: Marches LEP's LCEGS Number of Companies Split by Company Size, with Growth 2017/18 to 2019/20 – Level 2

Level 1	Level 2	# Large					# Corporations					Total # Companies				
		Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
		2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Environmental	Air Pollution	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	4	0.0%	4	0.0%	4
Environmental	Contaminated Land	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	3	33.3%	4	0.0%	4
Environmental	Environmental Consultancy	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	4	25.0%	5	0.0%	5
Environmental	Environmental Monitoring	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1
Environmental	Marine Pollution Control	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	1	0.0%	1	0.0%	1
Environmental	Noise & Vibration Control	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	2	0.0%	2	0.0%	2
Environmental	Recovery and Recycling	4	0.0%	4	0.0%	4	2	0.0%	2	0.0%	2	36	5.6%	38	5.3%	40
Environmental	Waste Management	4	0.0%	4	25.0%	5	2	0.0%	2	0.0%	2	41	7.3%	44	4.5%	46
Environmental	Water & Waste Water Treatment	5	0.0%	5	0.0%	5	2	50.0%	3	0.0%	3	49	6.1%	52	5.8%	55
Low Carbon	Additional Energy Sources	1	0.0%	1	0.0%	1	0	0.0%	0	0.0%	0	6	0.0%	6	0.0%	6
Low Carbon	Alternative Fuel Vehicle	4	0.0%	4	0.0%	4	2	0.0%	2	0.0%	2	36	8.3%	39	2.6%	40
Low Carbon	Alternative Fuels	10	0.0%	10	10.0%	11	5	0.0%	5	0.0%	5	94	8.5%	102	2.9%	105
Low Carbon	Building Technologies	10	10.0%	11	9.1%	12	5	20.0%	6	0.0%	6	104	6.7%	111	4.5%	116
Low Carbon	Carbon Capture & Storage	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	2	0.0%	2	50.0%	3
Low Carbon	Carbon Finance	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Low Carbon	Energy Management	1	0.0%	1	100.0%	2	1	0.0%	1	0.0%	1	14	7.1%	15	0.0%	15
Low Carbon	Nuclear Power	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Renewable Energy	Biomass	5	0.0%	5	0.0%	5	2	50.0%	3	0.0%	3	48	6.3%	51	5.9%	54
Renewable Energy	Geothermal	3	0.0%	3	0.0%	3	1	0.0%	1	100.0%	2	28	7.1%	30	3.3%	31
Renewable Energy	Hydro	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	2	0.0%	2	0.0%	2
Renewable Energy	Photovoltaic	7	0.0%	7	14.3%	8	3	33.3%	4	0.0%	4	68	7.4%	73	4.1%	76
Renewable Energy	Renewable Consultancy	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	3	0.0%	3	0.0%	3
Renewable Energy	Wave & Tidal	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Renewable Energy	Wind	11	9.1%	12	0.0%	12	5	20.0%	6	0.0%	6	109	6.4%	116	5.2%	122
Total		65	3.1%	67	7.5%	72	30	16.7%	35	2.9%	36	655	7.0%	701	4.3%	731

Table 2 shows that the growth in the number of companies per size grouping is more variable at this level of detail, as would be expected with a smaller number of companies having a greater impact on growth rates. For example, a 50% increase in Water & Waste Water Treatment is seen in the Corporations category when 2 companies grew to 3.

1.10 Marches LEP's LCEGS by Skills

In this section we look at the skills within the Marches LEP, through the number of employees listed in accordance with Standard Occupational Classification 2020 Index. This data will be overlaid with demand mapping during the Policy development and Growth forecasting phase of the study. Table 3 shows the number of employees within each standard Occupational Class for the LCEGS sector as a whole, per year.

Table 3: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – LCEGS Sector

Skill	LCEGS Sector Totals				
	2017/18	Growth %	2018/19	Growth %	2019/20
Technicians	297	10.6%	328	-0.1%	328
Snr Management SME	684	11.9%	766	8.0%	827
Supervisory	687	-4.7%	654	19.8%	784
Middle / Junior Management	680	7.3%	729	0.4%	733
Designer / Developer	101	12.9%	114	4.0%	118
Clerical	350	0.1%	350	20.9%	423
Self Employed	92	23.1%	114	-4.8%	108
Advisor or Agent	65	0.4%	66	10.2%	72
Educator	2	19.0%	3	-18.2%	2
Specialist or Consultant	371	4.9%	389	19.7%	466
Editor	11	5.0%	12	12.1%	13
Industrial Researchers	116	12.9%	131	4.5%	137
Scientist	55	-6.8%	51	14.6%	59
Maintenance Engineer	764	7.2%	819	20.8%	990
Civil Engineer	56	-1.8%	55	5.7%	58
Production Engineer	150	8.1%	162	10.4%	179
Power distribution Engineer	361	14.7%	414	-7.4%	383
Construction Engineer	78	-13.5%	67	43.3%	97
Sales Exec	374	0.6%	376	16.3%	438
Marketing Personnel	367	9.6%	402	13.9%	459
General Semi Skilled Worker	765	5.8%	809	8.3%	876
General Labour	921	-8.7%	841	33.4%	1,123
Other Employees	1,034	18.2%	1,222	-30.3%	853
Administrative workers	398	12.8%	449	-11.4%	398
Total Number of Employees	12,073	3.2%	12,456	2.7%	12,792

At the sector-level we can see that the number of employees per occupational classification varies considerably between each year. For example, the Educator classification saw growth of 19.0% between 2017/18 and -18.2% between 2018/19.

Due to the varied nature of the LCEGS sector, which draws from many more traditional sectors such as Engineering, Construction and many others, the decrease in employee numbers from year to year can be a result of employees working within the same company, but within a different sector. An example would be a company engineering components within both the Wind sub-sector and Automotive sector, where one year the company services more Wind than Automotive contracts, the employee numbers would count more Wind employees; the following year the company services more Automotive contracts than Wind contracts, resulting in an apparent reduction in the number of employees for the Wind sector, which is true with regards to those working *within the LCEGS Sector* but it does not necessarily follow that they are job losses within companies themselves.

The Total Number of Employees increases year on year, which is more reliable indication of employment growth due to the larger numbers being less impacted by the natural fluctuations mentioned above.

Table 4 shows the number of employees within each standard Occupational Class for the Level 1 sub-sectors.

Table 4: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Level 1

Skill	Low Carbon					Renewable Energy					Environmental				
	Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Technicians	99	10.6%	109	0.0%	109	118	10.6%	131	-0.1%	131	79	10.7%	88	-0.2%	88
Snr Management SME	170	12.0%	190	8.0%	206	390	11.8%	436	8.0%	471	124	12.0%	139	8.0%	150
Supervisory	175	-4.8%	167	19.8%	199	385	-4.7%	367	19.8%	440	127	-4.7%	121	19.9%	145
Middle / Junior Management	174	7.3%	187	0.3%	188	379	7.2%	407	0.6%	409	126	7.5%	135	0.0%	136
Designer / Developer	27	13.1%	30	3.9%	31	30	12.8%	34	4.0%	35	44	12.9%	50	4.1%	52
Clerical	91	0.0%	91	21.0%	110	193	0.2%	193	20.7%	233	67	-0.1%	66	21.1%	81
Self Employed	34	23.1%	42	-4.6%	40	24	23.1%	30	-5.1%	28	34	23.0%	42	-4.8%	40
Advisor or Agent	33	0.4%	33	10.1%	36	8	0.6%	8	10.4%	9	25	0.5%	25	10.2%	27
Educator	0	19.1%	0	-18.5%	0	0	18.6%	0	-18.3%	0	2	19.0%	2	-18.2%	2
Specialist or Consultant	104	5.4%	109	19.2%	130	188	4.6%	197	20.0%	236	79	4.8%	83	19.6%	99
Editor	2	5.1%	3	11.6%	3	3	5.1%	3	12.0%	3	6	4.9%	6	12.3%	7
Industrial Researchers	68	12.9%	76	4.5%	80	13	12.6%	15	4.7%	16	35	12.9%	40	4.4%	42
Scientist	38	-6.7%	35	14.5%	40	5	-7.0%	5	14.9%	5	12	-6.9%	11	14.7%	13
Maintenance Engineer	195	7.4%	209	20.6%	252	406	7.1%	435	20.8%	525	163	7.2%	175	20.8%	212
Civil Engineer	13	-1.8%	13	5.7%	14	13	-1.9%	13	5.8%	13	30	-1.8%	29	5.7%	31
Production Engineer	48	8.1%	52	10.3%	58	62	8.0%	67	10.5%	74	39	8.1%	43	10.4%	47
Power distribution Engineer	80	14.7%	92	-7.5%	85	198	14.7%	227	-7.5%	210	83	14.6%	95	-7.3%	88
Construction Engineer	17	-13.6%	15	43.4%	21	26	-13.5%	22	43.3%	32	35	-13.5%	30	43.4%	44
Sales Exec	114	0.6%	115	16.6%	134	186	0.7%	188	16.1%	218	73	0.6%	74	16.5%	86
Marketing Personnel	114	9.6%	125	14.0%	143	188	9.5%	205	13.9%	234	66	9.7%	72	13.8%	82
General Semi Skilled Worker	199	5.7%	210	8.5%	228	402	5.8%	426	8.3%	461	164	5.8%	173	8.2%	187
General Labour	322	-8.8%	294	33.4%	392	481	-8.6%	440	33.4%	587	117	-8.6%	107	33.5%	143
Other Employees	249	23.5%	308	-38.7%	189	590	17.8%	695	-27.6%	503	195	12.8%	219	-26.7%	161
Administrative workers	110	12.8%	124	-11.4%	110	204	12.8%	230	-11.4%	203	84	12.7%	95	-11.4%	84
Total Number of Employees	4,773	3.1%	4,919	2.8%	5,055	4,721	3.2%	4,874	2.7%	5,004	2,579	3.2%	2,662	2.7%	2,733

A similar pattern is seen the Level 1 figures, with natural fluctuations in employee numbers. The numbers do give an indication of the relative scale of employment between sub-sectors in the different occupational classes.

The top 11 sub-sectors account for 94% of employment in the LCEGS sector in the Marches LEP. Tables 5a-5d shows the number of employees within each standard Occupational Class for the top 11 Level 2 sub-sectors of the LCEGS sector.

Table 5a: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Alternative Fuel Vehicle, Alternative Fuels and Biomass

Skill	Alternative Fuel Vehicle					Alternative Fuels					Biomass				
	Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Technicians	5	10.7%	5	-0.9%	5	41	10.5%	45	0.3%	45	22	10.6%	24	-0.1%	24
Snr Management SME	8	10.8%	9	8.3%	10	33	12.7%	37	7.8%	40	89	11.7%	99	8.1%	107
Supervisory	11	-5.0%	10	22.0%	12	40	-4.6%	38	19.0%	45	86	-4.7%	82	20.0%	98
Middle / Junior Management	10	6.8%	11	1.8%	11	40	7.6%	43	-0.5%	43	84	7.0%	90	1.0%	91
Designer / Developer	1	12.0%	1	4.3%	1	8	13.6%	9	3.5%	9	10	12.7%	11	4.0%	12
Clerical	6	0.5%	6	20.1%	8	20	-0.4%	20	21.7%	24	43	0.4%	43	20.5%	51
Self Employed	6	23.1%	8	-5.4%	7	10	23.0%	13	-4.3%	12	4	23.2%	5	-4.9%	5
Advisor or Agent	11	1.1%	11	10.6%	13	1	-0.5%	1	9.6%	1	1	0.5%	1	10.2%	2
Educator	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	0	18.6%	0	-18.3%	0
Specialist or Consultant	2	7.7%	2	15.4%	2	33	5.9%	35	19.3%	41	47	4.3%	49	20.3%	59
Editor	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0	1	5.2%	1	11.8%	2
Industrial Researchers	18	11.6%	20	5.2%	21	16	13.8%	19	4.3%	19	2	12.6%	2	4.6%	2
Scientist	2	-7.1%	2	15.3%	2	30	-6.7%	28	14.4%	32	3	-7.0%	3	15.0%	3
Maintenance Engineer	15	6.5%	16	21.5%	19	50	7.9%	53	20.1%	64	87	7.2%	93	20.8%	112
Civil Engineer	2	-2.0%	2	6.1%	2	0	-1.9%	0	5.3%	0	1	-1.8%	1	5.8%	2
Production Engineer	0	0.0%	0	0.0%	0	30	8.3%	32	10.2%	35	13	8.1%	14	10.5%	16
Power distribution Engineer	2	14.6%	3	-6.9%	2	10	14.6%	11	-7.7%	10	43	14.8%	49	-7.5%	45
Construction Engineer	2	-13.4%	2	42.5%	3	0	-13.7%	0	44.3%	0	1	-13.5%	1	43.4%	2
Sales Exec	12	1.5%	13	14.1%	14	40	0.1%	40	17.9%	47	43	0.8%	43	15.9%	50
Marketing Personnel	12	9.1%	13	13.8%	15	40	9.8%	44	14.2%	51	43	9.5%	47	14.0%	53
General Semi Skilled Worker	10	6.5%	11	6.3%	12	55	5.4%	58	9.5%	63	87	5.7%	92	8.6%	100
General Labour	16	-8.1%	15	33.7%	20	72	-9.0%	66	33.4%	88	91	-8.8%	83	33.4%	111
Other Employees	13	21.4%	16	-45.9%	9	51	25.7%	64	-50.5%	32	129	16.2%	150	-26.3%	111
Administrative workers	9	12.8%	10	-11.4%	9	27	12.8%	31	-11.4%	27	45	12.9%	51	-11.5%	45
Total Number of Employees	634	3.8%	658	2.4%	674	1,806	2.7%	1,855	3.0%	1,910	911	3.1%	940	2.7%	966

Table 5b: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Building Technologies, Energy Management and Geothermal

Skill	Building Technologies					Energy Management					Geothermal				
	Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Technicians	43	10.6%	47	-0.2%	47	7	10.6%	7	0.1%	7	10	10.7%	11	-0.1%	11
Snr Management SME	109	11.9%	122	8.0%	132	12	12.0%	14	8.2%	15	39	12.0%	44	8.1%	48
Supervisory	103	-4.8%	99	19.8%	118	13	-4.8%	12	19.8%	15	38	-4.7%	36	19.9%	44
Middle / Junior Management	103	7.3%	111	0.4%	111	13	7.2%	14	0.4%	14	38	7.4%	40	0.2%	40
Designer / Developer	12	12.9%	14	4.1%	15	3	13.2%	4	4.0%	4	4	12.8%	5	4.1%	5
Clerical	54	0.0%	54	20.9%	65	7	0.0%	7	21.0%	8	19	0.0%	19	21.1%	23
Self Employed	12	23.1%	15	-4.4%	14	3	23.3%	4	-4.4%	4	2	22.9%	3	-4.9%	3
Advisor or Agent	14	-0.1%	14	9.8%	16	3	0.0%	3	9.8%	3	2	0.5%	2	10.2%	2
Educator	0	0.0%	0	0.0%	0	0	19.1%	0	-18.5%	0	0	0.0%	0	0.0%	0
Specialist or Consultant	58	5.2%	61	19.0%	72	7	4.9%	8	19.8%	9	20	4.5%	20	20.1%	25
Editor	0	5.1%	0	11.9%	1	1	5.2%	1	11.5%	1	1	4.8%	1	12.5%	1
Industrial Researchers	27	13.3%	30	4.2%	31	3	13.3%	3	4.3%	3	2	12.6%	2	4.5%	2
Scientist	4	-6.8%	3	14.6%	4	1	-6.8%	1	14.4%	2	1	-6.9%	1	14.9%	1
Maintenance Engineer	105	7.2%	113	20.8%	137	16	7.5%	17	20.4%	20	40	7.1%	43	20.9%	52
Civil Engineer	7	-1.7%	6	5.6%	7	2	-1.9%	2	5.5%	3	2	-1.8%	2	5.7%	2
Production Engineer	14	8.0%	15	10.5%	17	3	7.8%	3	10.6%	3	7	8.0%	7	10.5%	8
Power distribution Engineer	56	14.6%	64	-7.5%	59	7	14.8%	8	-7.8%	8	20	14.6%	23	-7.3%	21
Construction Engineer	10	-13.6%	9	43.5%	12	3	-13.6%	2	43.8%	3	2	-13.5%	1	43.2%	2
Sales Exec	50	0.7%	50	16.2%	58	8	0.3%	8	16.8%	9	20	0.6%	20	16.3%	24
Marketing Personnel	50	9.5%	55	13.9%	62	7	9.9%	8	13.7%	9	20	9.6%	22	13.8%	25
General Semi Skilled Worker	109	5.7%	116	8.3%	125	15	5.8%	16	8.5%	17	40	5.8%	43	8.3%	46
General Labour	205	-8.8%	187	33.4%	249	22	-8.8%	20	33.5%	27	61	-8.7%	55	33.4%	74
Other Employees	154	23.9%	190	-35.4%	123	19	22.3%	24	-35.8%	15	57	21.3%	70	-32.3%	47
Administrative workers	61	12.8%	69	-11.4%	61	8	13.0%	9	-11.5%	8	20	12.8%	23	-11.5%	20
Total Number of Employees	1,938	3.1%	1,999	2.7%	2,053	253	3.0%	261	2.7%	268	509	3.2%	525	2.7%	539

Table 5c: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Photovoltaic, Recovery & Recycling and Waste Management

Skill	Photovoltaic					Recovery and Recycling					Waste Management				
	Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Technicians	35	10.6%	39	0.3%	39	24	10.7%	27	-0.3%	27	19	10.7%	21	-0.5%	21
Snr Management SME	109	12.1%	122	7.9%	132	28	11.8%	31	8.3%	34	34	11.8%	38	7.8%	42
Supervisory	107	-4.6%	102	19.1%	121	28	-4.9%	27	19.9%	32	36	-4.7%	35	20.5%	42
Middle / Junior Management	106	7.6%	114	-0.4%	114	27	7.2%	29	0.6%	30	36	7.4%	39	0.3%	39
Designer / Developer	8	13.2%	9	4.0%	9	21	13.1%	24	3.8%	24	8	12.2%	9	4.5%	9
Clerical	53	-0.1%	53	21.2%	64	14	0.1%	14	20.9%	17	20	-0.2%	20	21.2%	24
Self Employed	5	23.1%	6	-4.3%	6	7	23.4%	9	-4.9%	8	10	22.7%	12	-5.1%	11
Advisor or Agent	1	0.1%	1	10.0%	1	3	0.3%	3	10.0%	3	14	0.6%	14	10.3%	15
Educator	0	0.0%	0	0.0%	0	0	19.3%	0	-18.8%	0	1	18.8%	1	-18.0%	1
Specialist or Consultant	49	5.2%	52	19.3%	62	24	4.5%	25	20.5%	30	20	4.6%	20	19.6%	25
Editor	0	0.0%	0	0.0%	0	1	5.3%	1	11.5%	1	2	4.7%	2	13.0%	3
Industrial Researchers	4	13.2%	4	4.3%	4	6	13.0%	7	4.6%	8	19	12.9%	21	4.3%	22
Scientist	0	-6.8%	0	14.4%	0	6	-6.9%	5	14.6%	6	3	-6.9%	3	15.0%	4
Maintenance Engineer	107	7.6%	115	20.4%	139	36	7.4%	38	20.5%	46	46	6.4%	49	21.5%	59
Civil Engineer	3	-1.9%	3	5.4%	3	11	-2.0%	11	5.7%	11	7	-1.6%	7	5.9%	8
Production Engineer	15	8.4%	16	10.2%	18	13	7.6%	14	10.7%	15	8	8.3%	9	10.4%	10
Power distribution Engineer	55	14.6%	63	-7.4%	58	19	15.0%	22	-8.0%	20	23	14.3%	26	-6.9%	25
Construction Engineer	5	-13.6%	5	43.7%	7	11	-13.5%	9	43.4%	14	9	-13.5%	8	43.0%	11
Sales Exec	52	0.4%	52	17.0%	61	24	0.4%	24	16.5%	28	19	1.1%	19	15.8%	22
Marketing Personnel	53	9.6%	58	14.0%	66	19	10.0%	21	13.5%	24	17	9.3%	19	13.9%	22
General Semi Skilled Worker	112	5.6%	118	8.8%	128	47	6.2%	50	7.6%	54	42	5.8%	45	7.9%	48
General Labour	141	-8.9%	129	33.3%	172	48	-8.6%	44	33.6%	59	26	-8.5%	24	33.4%	32
Other Employees	158	18.1%	186	-28.1%	134	38	23.2%	47	-43.8%	27	58	11.6%	64	-21.9%	50
Administrative workers	56	12.6%	63	-11.3%	56	20	13.1%	22	-11.5%	20	25	12.5%	28	-11.3%	25
Total Number of Employees	1,303	2.9%	1,341	2.8%	1,379	659	3.2%	680	2.7%	699	743	3.4%	768	2.5%	787

Table 5d: Marches LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Water & Waste Water Treatment

Skill	Water & Waste Water Treatment					Wind				
	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Technicians	30	10.6%	33	0.1%	33	50	10.7%	55	-0.4%	55
Snr Management SME	51	12.4%	57	7.9%	62	150	11.7%	168	8.1%	181
Supervisory	50	-4.7%	48	19.4%	57	152	-4.8%	145	20.2%	174
Middle / Junior Management	51	7.6%	54	-0.5%	54	148	7.0%	159	1.2%	161
Designer / Developer	12	13.0%	13	4.3%	14	7	12.5%	8	4.1%	8
Clerical	26	-0.1%	26	21.3%	31	77	0.5%	77	20.4%	93
Self Employed	13	23.0%	16	-4.5%	16	11	23.1%	14	-5.6%	13
Advisor or Agent	2	0.2%	2	10.0%	2	1	0.3%	1	10.3%	1
Educator	0	19.0%	0	-18.1%	0	0	0.0%	0	0.0%	0
Specialist or Consultant	29	5.2%	30	19.0%	36	70	4.5%	73	20.2%	88
Editor	1	5.0%	1	12.1%	1	0	5.5%	0	11.4%	0
Industrial Researchers	2	12.9%	3	4.4%	3	2	11.9%	2	5.1%	2
Scientist	1	-6.9%	1	14.8%	1	0	-6.9%	0	14.9%	0
Maintenance Engineer	68	7.5%	73	20.5%	88	169	6.7%	180	21.1%	218
Civil Engineer	9	-1.7%	8	5.6%	9	6	-2.0%	6	6.0%	6
Production Engineer	16	8.5%	17	10.1%	19	26	7.7%	28	10.7%	31
Power distribution Engineer	33	14.5%	38	-7.2%	35	79	14.8%	91	-7.5%	84
Construction Engineer	12	-13.6%	10	43.5%	15	17	-13.4%	14	43.2%	21
Sales Exec	23	0.4%	23	17.0%	27	70	0.9%	71	15.6%	82
Marketing Personnel	23	9.7%	25	14.1%	28	71	9.4%	77	13.8%	88
General Semi Skilled Worker	61	5.5%	64	8.9%	70	160	5.9%	169	7.8%	182
General Labour	31	-8.8%	28	33.4%	37	184	-8.2%	169	33.6%	225
Other Employees	80	8.5%	87	-21.2%	68	241	17.6%	284	-26.9%	207
Administrative workers	31	12.6%	35	-11.3%	31	80	12.8%	91	-11.4%	80
Total Number of Employees	907	3.1%	935	2.8%	960	1,904	3.5%	1,971	2.5%	2,021

Again, a similar pattern is seen the Level 2 figures as those in Level 1, with natural fluctuations in employee numbers. As for Level 1, the numbers do give an indication of the relative scale of employment between sub-sectors in the different occupational classes.

1.11 Marches LEP's LCEGS Growth

In Section 1.1 annual growth in Marches LEP's LCEGS sales, companies and employment was compared with growth in the MEH's LCEGS sector as a whole for 2017/18 to 2019/20. Table 6 shows the Marches LEP annual growth in more detail by breaking it down into sub-sectors for each of the three years. Growth between one year and the next is shown in red. The Marches LEP covers 7% of the MEH's total LCEGS sector in terms of sales. The growth rates for the N2N2 LEP are stronger than the MEH regional average, but exhibit a similar pattern, being relatively uniform across sub-sector compared with the UK. The UK growth rates are affected by the activity in London, which are more volatile than in other areas of the country, such as the MEH region. As such, the MEH growth rates are more indicative of the growth rates you would expect in regions not affected by activities in London. The growth rates for the Marches LEP are in line with this trend.

While annual growth in the LCEGS sector as a whole has varied between 2.7 and 7.1% for each of the three parameters, Table 6 shows that the sector has grown evenly in terms of sales across the Level 2 sub-sectors. The advantage of even growth is less volatility and more stability and certainty in the market. It is illustrative of the whole LCEGS sector growing together due to better coordination across networks and chains of supply than the national average. There is more variation in growth between sub-sectors in terms of the number of employees and companies, as they respond to different pressures within different sub-sectors.

The Marches has consistently grown more strongly than the MEH average for every sub-sector, and is above the UK average for some Level 2 sub-sectors, which are a reflection of the opportunities that are being created by drivers of growth including policy, regulation and consumer choices, these include:

- Air Pollution, where the Marches growth rates were 6.2% between 2017/18 and 2018/19 and 6.4% between 2018/19 and 2019/20 and the UK growth rates were 1.7% between 2017/18 and 2018/19 and -4.3% between 2018/19 and 2019/20
- Alternative Fuel Vehicle, where the Marches growth rates were 6.3% between 2017/18 and 2018/19 and 6.4% between 2018/19 and 2019/20 and the UK growth rates were 7.4% between 2017/18 and 2018/19 and -1.6% between 2018/19 and 2019/20
- Alternative Fuels, where the Marches growth rates were 6.1% between 2017/18 and 2018/19 and 6.4% between 2018/19 and 2019/20 and the UK growth rates were 10.2% between 2017/18 and 2018/19 and 3.3% between 2018/19 and 2019/20
- Contaminated Land, where the Marches growth rates were 6.2% between 2017/18 and 2018/19 and 6.4% between 2018/19 and 2019/20 and the UK growth rates were 5.5% between 2017/18 and 2018/19 and -4.3% between 2018/19 and 2019/20
- Energy Management, where the Marches growth rates were 6.3% between 2017/18 and 2018/19 and 6.4% between 2018/19 and 2019/20 and the UK growth rates were 6.7% between 2017/18 and 2018/19 and -1.0% between 2018/19 and 2019/20

Table 6: Marches LEP's LCEGS Sales (£m), Company and Employment Growth 2017/18 to 2019/20

Level 1	Level 2	Sales £m					# Companies					# Employees				
		Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
		2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Environmental	Air Pollution	8.7	6.2%	9.2	6.4%	9.8	4	7.1%	4	4.7%	4	66	3.1%	68	2.7%	70
Environmental	Contaminated Land	7.9	6.2%	8.4	6.4%	8.9	3	7.1%	4	4.9%	4	61	3.1%	63	2.7%	65
Environmental	Environmental Consultancy	10.4	6.2%	11.1	6.4%	11.8	4	7.1%	5	4.4%	5	79	3.1%	82	2.7%	84
Environmental	Environmental Monitoring	2.2	6.2%	2.3	6.4%	2.4	1	7.1%	1	4.5%	1	16	3.2%	17	2.7%	17
Environmental	Marine Pollution Control	1.7	6.2%	1.8	6.4%	1.9	1	7.2%	1	4.4%	1	13	3.0%	13	2.8%	13
Environmental	Noise & Vibration Control	4.6	6.2%	4.9	6.4%	5.3	2	7.2%	2	5.0%	2	35	3.6%	36	2.5%	37
Environmental	Recovery and Recycling	86.8	6.2%	92.3	6.4%	98.2	36	7.1%	38	4.8%	40	659	3.2%	680	2.7%	699
Environmental	Waste Management	99.7	6.2%	105.9	6.4%	112.7	41	6.5%	44	4.8%	46	743	3.4%	768	2.5%	787
Environmental	Water & Waste Water Treatment	118.3	6.2%	125.6	6.4%	133.7	49	6.7%	52	4.6%	55	907	3.1%	935	2.8%	960
Low Carbon	Additional Energy Sources	13.2	6.2%	14.0	6.4%	14.9	6	7.4%	6	5.1%	6	100	3.4%	104	2.6%	106
Low Carbon	Alternative Fuel Vehicle	85.3	6.3%	90.7	6.4%	96.5	36	6.9%	39	4.4%	40	634	3.8%	658	2.4%	674
Low Carbon	Alternative Fuels	230.0	6.1%	244.1	6.4%	259.8	94	7.8%	102	3.7%	105	1,806	2.7%	1,855	3.0%	1,910
Low Carbon	Building Technologies	253.4	6.2%	269.2	6.4%	286.4	104	7.1%	111	4.5%	116	1,938	3.1%	1,999	2.7%	2,053
Low Carbon	Carbon Capture & Storage	5.6	6.2%	5.9	6.4%	6.3	2	6.9%	2	4.8%	3	42	3.4%	43	2.6%	44
Low Carbon	Carbon Finance	0.0	0.0%	0.0	0.0%	0.0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Low Carbon	Energy Management	33.0	6.3%	35.1	6.4%	37.3	14	7.2%	15	5.0%	15	253	3.0%	261	2.7%	268
Low Carbon	Nuclear Power	0.0	0.0%	0.0	0.0%	0.0	0	0.0%	0	0.0%	0	0	0.0%	0	0.0%	0
Renewable Energy	Biomass	120.6	6.2%	128.1	6.4%	136.3	48	6.8%	51	5.1%	54	911	3.1%	940	2.7%	966
Renewable Energy	Geothermal	67.6	6.2%	71.8	6.4%	76.4	28	7.0%	30	4.8%	31	509	3.2%	525	2.7%	539
Renewable Energy	Hydro	4.6	6.3%	4.9	6.5%	5.2	2	7.7%	2	4.8%	2	35	3.6%	36	2.6%	37
Renewable Energy	Photovoltaic	169.0	6.2%	179.5	6.4%	191.0	68	6.8%	73	4.7%	76	1,303	2.9%	1,341	2.8%	1,379
Renewable Energy	Renewable Consultancy	7.6	6.2%	8.0	6.4%	8.5	3	6.2%	3	5.4%	3	57	3.7%	59	2.4%	60
Renewable Energy	Wave & Tidal	0.3	6.2%	0.3	6.4%	0.4	0	7.3%	0	4.7%	0	2	3.0%	3	2.8%	3
Renewable Energy	Wind	253.2	6.2%	269.0	6.4%	286.3	109	7.3%	116	5.1%	122	1,904	3.5%	1,971	2.5%	2,021
Total		1,583.8	6.2%	1,682.2	6.4%	1,790.0	654	7.1%	700	4.6%	733	12,073	3.2%	12,456	2.7%	12,792

Some sub-sectors have shown stronger growth across the 3-year study period 2017/18 to 2019/20 than the UK average and should be considered strengths of the region and include:

- Hydro with 13.3% (MEH 11.0%, UK 1.8%)
- Alternative Fuel Vehicle with 13.1% (MEH 11.4%, UK 5.7%)
- Energy Management with 13.1% (MEH 11.4%, UK 5.7%)
- Renewable Energy General Consultancy 13.1% (MEH 11.3%, UK 10.8%)
- Environmental Monitoring 13.0% (MEH 11.3%, UK 12.2%)

- Marine Pollution Control 13.0% (MEH 11.4%, UK 12.7%)
- Air Pollution with 13.0% (MEH 11.4%, UK 5.8%)
- Waste Management 13.0% (MEH 11.2%, UK 12.6%)
- Water & waste Water Treatment 10.3% (MEH 11.3%, UK 12.7%)
- Contaminated Land Reclamation and Remediation with 8.8% (MEH 11.4%, UK 1.0%)

Some sub-sectors have shown weaker growth across the 3-year study period 2017/18 to 2019/20 than the UK average and include:

- Environmental Consultancy with 13.0% (MEH 11.3%, UK 16.8%)
- Noise & Vibration Control with 13.1% (MEH 11.4%, UK 23.3%)
- Carbon Capture & Storage with 13.1% (MEH 11.3%, UK 19.0%)
- Biomass with 13.0% (MEH 11.3%, UK 28.2%)
- Geothermal with 13.0% (MEH 11.3%, UK 18.8%)
- Photovoltaic with 13.0% (MEH 11.3%, UK 24.3%)
- Wave & Tidal with 13.0% (MEH 11.2%, UK 24.9%)
- Wind with 13.0% (MEH 11.3%, UK 42.2%)

By overlaying the sales for each sub-sector as a proportion of the UK market, the impact of stronger or weaker sales growth can be examined more closely. Table 7 shows how the Marches LEP compares with the UK as a whole for the 24 Level 2 sub-sectors. The LEP as a % of UK Sales and MEH Sales has been converted to a Proportionality Factor, where 1.0 equals the sector value (0.8% and 6.7% respectively), below 1.0 represents a smaller market than the sector total proportion and above 1.0 represents a market which is larger than the sector total proportion. Likewise the LEP/ UK and LEP/MEH Growth Factor indicates where growth is stronger than the UK (above 1.0) or weaker than the UK (below 1.0)

Table 7: UK, MEH and Marches LEP's LCEGS Sales (£m) and 3-Year Growth Comparison

		UK		MEH			LEP							
Level 1	Level 2	UK Sales	UK 3- Year	MEH Sales £m	MEH 3- year Growth %	MEH as % of UK	LEP Sales £m	LEP 3- year growth %	LEP as % of UK	LEP/UK Sales Prop.	LEP/UK Growth Factor	LEP as % of MEH	LEP/MEH Growth Factor	LEP/MEH Sales Prop
		£m	Growth %											
		2019/20	%	2019/20	%		2019/20							
Environmental	Air Pollution	1,283.9	5.8%	143.2	11.4%	11.2%	9.8	13.0%	0.8%	0.7	2.2	6.8%	1.1	1.0
Environmental	Contaminated Land Reclamation & Remediation	1,269.2	1.0%	143.3	11.4%	11.3%	8.9	13.0%	0.7%	0.7	13.5	6.2%	1.1	0.9
Environmental	Environmental Consultancy and Related Services	1,268.4	16.8%	179.9	11.3%	14.2%	11.8	13.0%	0.9%	0.9	0.8	6.6%	1.1	1.0
Environmental	Environmental Monitoring, Instrumentation and Analysis	247.6	12.2%	38.0	11.3%	15.4%	2.4	13.0%	1.0%	0.9	1.1	6.4%	1.2	1.0
Environmental	Marine Pollution Control	206.3	12.7%	27.7	11.4%	13.4%	1.9	13.0%	0.9%	0.9	1.0	6.8%	1.1	1.0
Environmental	Noise & Vibration Control	394.7	23.3%	79.5	11.4%	20.1%	5.3	13.1%	1.3%	1.2	0.6	6.6%	1.2	1.0
Environmental	Recovery and Recycling	11,071.7	13.7%	1,452.5	11.3%	13.1%	98.2	13.1%	0.9%	0.8	1.0	6.8%	1.2	1.0
Environmental	Waste Management	7,384.8	12.6%	1,769.7	11.2%	24.0%	112.7	13.0%	1.5%	1.4	1.0	6.4%	1.2	0.9
Environmental	Water Supply and Waste Water Treatment	10,943.9	12.7%	2,014.9	11.3%	18.4%	133.7	13.0%	1.2%	1.1	1.0	6.6%	1.1	1.0
Low Carbon	Additional Energy Sources	2,129.7	15.9%	234.7	11.3%	11.0%	14.9	13.1%	0.7%	0.7	0.8	6.3%	1.2	0.9
Low Carbon	Alternative Fuel Vehicle	19,578.8	5.7%	1,472.3	11.4%	7.5%	96.5	13.1%	0.5%	0.5	2.3	6.6%	1.2	1.0
Low Carbon	Alternative Fuels	32,416.4	13.8%	3,761.4	11.4%	11.6%	259.8	13.0%	0.8%	0.8	0.9	6.9%	1.1	1.0
Low Carbon	Building Technologies	24,963.7	13.7%	3,995.6	11.5%	16.0%	286.4	13.0%	1.1%	1.1	0.9	7.2%	1.1	1.1
Low Carbon	Carbon Capture & Storage	816.0	19.0%	90.3	11.3%	11.1%	6.3	13.1%	0.8%	0.7	0.7	7.0%	1.2	1.0
Low Carbon	Carbon Finance	16,336.5	27.6%	133.9	17.7%	0.8%	0.0	0.0%	0.0%	0.0	0.0	0.0%	0.0	0.0
Low Carbon	Energy Management	3,950.9	5.7%	559.7	11.4%	14.2%	37.3	13.1%	0.9%	0.9	2.3	6.7%	1.1	1.0
Low Carbon	Nuclear Power	4,946.3	2.9%	5.4	29.0%	0.1%	0.0	0.0%	0.0%	0.0	0.0	0.0%	0.0	0.0
Renewable Energy	Biomass	11,234.4	28.2%	1,943.2	11.3%	17.3%	136.3	13.0%	1.2%	1.1	0.5	7.0%	1.2	1.0
Renewable Energy	Geothermal	19,687.0	18.8%	1,163.0	11.3%	5.9%	76.4	13.0%	0.4%	0.4	0.7	6.6%	1.2	1.0
Renewable Energy	Hydro	703.5	1.8%	74.4	11.0%	10.6%	5.2	13.3%	0.7%	0.7	7.3	7.1%	1.2	1.0
Renewable Energy	Photovoltaic	11,132.4	24.3%	2,773.4	11.3%	24.9%	191.0	13.0%	1.7%	1.6	0.5	6.9%	1.1	1.0
Renewable Energy	Renewable Energy General Consultancy	722.1	10.8%	122.8	11.3%	17.0%	8.5	13.0%	1.2%	1.1	1.2	7.0%	1.2	1.0
Renewable Energy	Wave & Tidal	171.5	24.9%	4.1	11.2%	2.4%	0.4	13.0%	0.2%	0.2	0.5	8.8%	1.2	1.3
Renewable Energy	Wind	36,664.3	42.2%	4,373.1	11.3%	11.9%	286.3	13.0%	0.8%	0.7	0.3	6.5%	1.2	1.0
		219,523.9	18.9%	26,556.2	11.4%	12.1%	1,790.0	13.0%	0.8%			6.7%		

Figure 34 shows how the Marches LEP compares with the UK for the 24 Level 2 sub-sectors, with regards to size of market and growth across the three-year study period 2017/18 to 2019/20.

The x-axis represents the LEP/UK sales proportionality factor, which was calculated for each sub-sector by dividing the LEP sales a percentage of the UK, by 1.1 %. This proportionality factor demonstrates where the Marches LEP holds a larger or smaller share of the UK market than would be expected, where:

- 1 = 1.1% of the UK market
- >1 = larger than 1.1% share
- <1 = smaller than 1.1% share

The y-axis represents the growth rate of the Marches LEP's Level 2 sub-sectors compared with the UK. This was calculated by dividing the 3-year growth rate of the LEP by the average UK growth rate. This growth rate factor demonstrates which sub-sectors have a stronger or slower growth rate than the UK, where:

- 1 = the UK growth rate
- >1 = stronger than the UK average growth
- <1 = weaker than UK growth

The graph is split into four quadrants along 1 on each axis, with sub-sectors in each demonstrating:

- Top right = larger market share than expected and stronger growth than the UK average
- Bottom Right = larger market share than expected, but weaker growth than the UK average
- Top left = smaller market share than expected, but stronger growth than the UK average
- Bottom left = smaller market share than expected and weaker growth than the UK average

The bubbles represent the 24 Level 2 sub-sectors and are sized by the 2019/20 sales £m, illustrating the relative sizes of each sub-sector.

Figure 34 clearly illustrates the strong growth of the two relatively small sub-sectors, Contaminated Land & Reclamation and Hydroelectric. Contaminated Land & Reclamation and Hydroelectric are strengths, because they are both close to the expected size of market (0.7 for Contaminated Land and 0.7 for Hydro) and are growing significantly stronger than the UK average (13.0% LEP vs. 1.0% UK for Contaminated Land and 13.3% vs. 1.8% UK for Hydro)

Figure 34: LEP/UK Sales proportionality factor vs. LEP/UK Growth factor of Level 2 Sub-sectors – Bubbles Sized by Sales £m

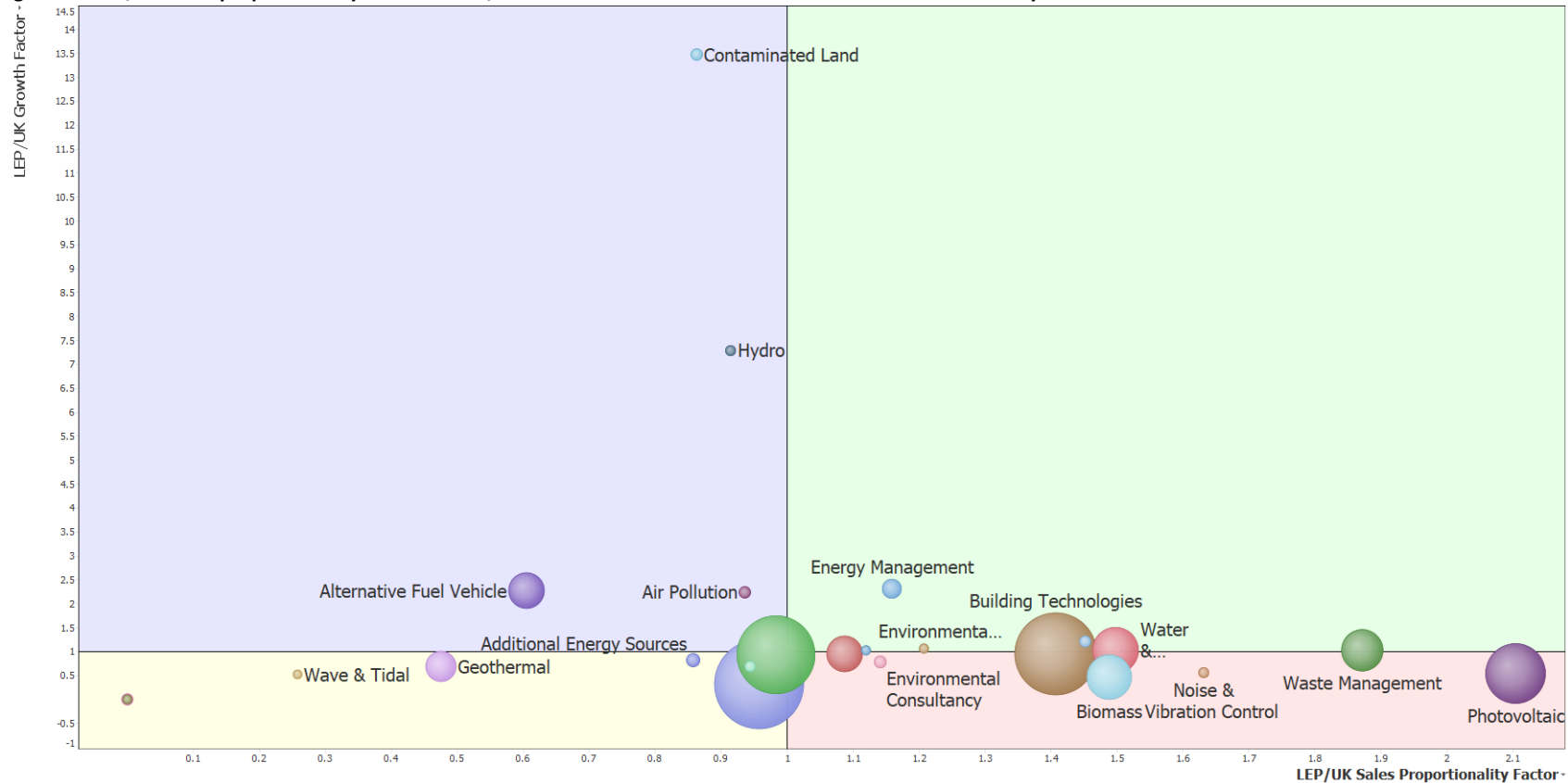
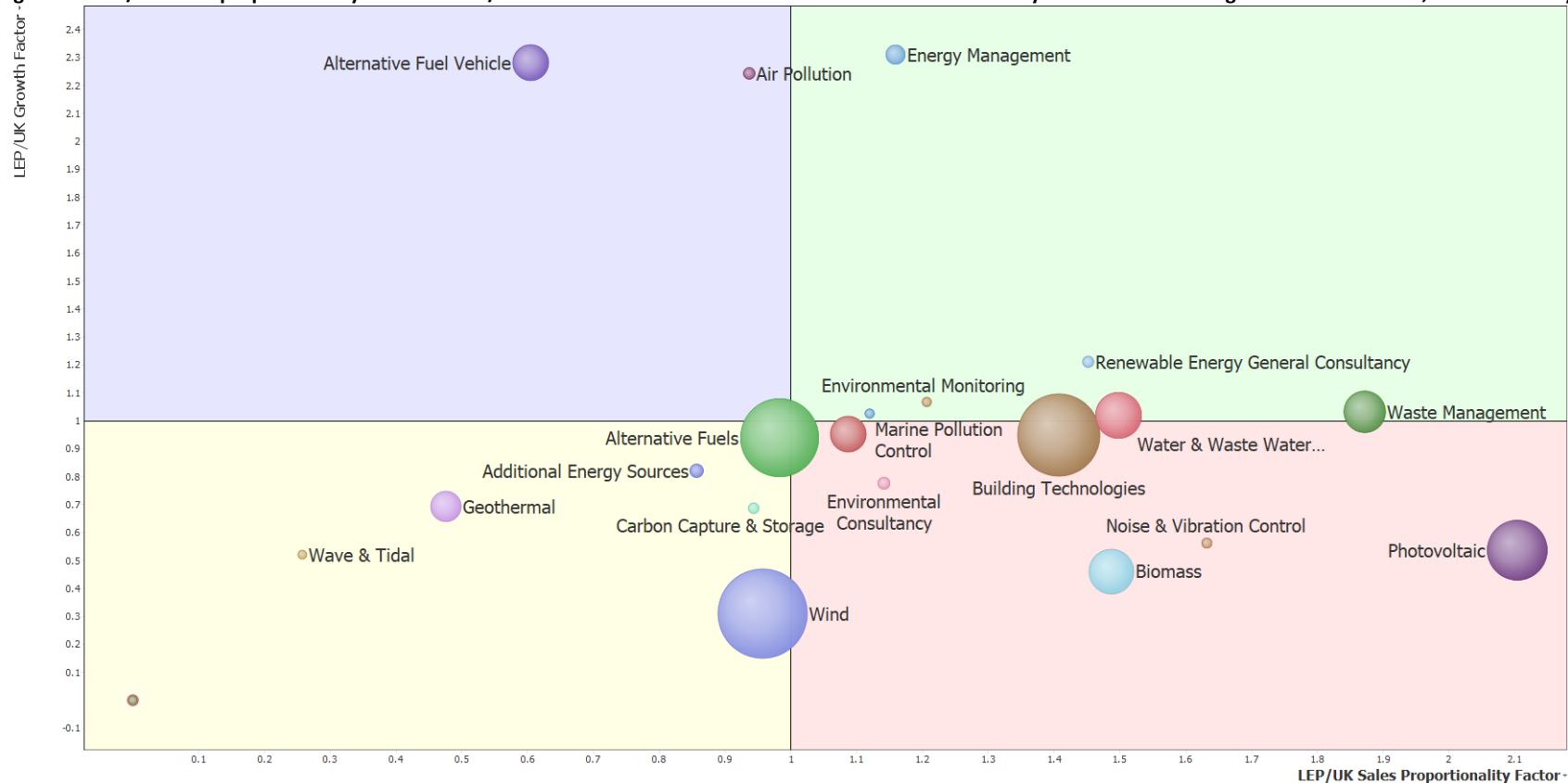


Figure 35 provides the same information as figure 1, but with Contaminated Land and Hydro excluded. By excluding these outliers with very strong growth, we can examine the other sub-sectors. Energy Management has the ideal characteristics of above UK average growth and above LEP average size. Those in the lower right quadrant (red) hold a larger UK share than the average LCEGS UK market share. The large size of sub-sectors such as Photovoltaic, Building Technologies, Water & Waste Water Treatment, Waste Management and Biomass set these sub-sector apart as being strengths. Alternative Fuel Vehicle has a smaller market share than expected, but stronger growth than the UK average. Those in the lower left (yellow) quadrant such as Geothermal and Wave & tidal can be considered relative weaknesses.

Figure 35: LEP/UK Sales proportionality factor vs. LEP/UK Growth factor of Level 2 Sub-sectors – Bubbles Sized by Sales £m – Excluding Contaminated Land, Nuclear and Hydro



1.12 Marches LEP's LCEGS Sector Scalability

In this section we explain the concept of scalability, what influences it, how it can be combined with GVA to explore opportunities and finally why it is different to using only growth.

Scalability refers to the combination of:

- Existence of appropriate available market
- The scalability of technology within a company, area or market
- Affordability of technology
- Availability of appropriate skill sets in the locality
- Historic growth
- Accessibility of networks and chains of supply

All of these factors are taken into consideration when grading scalability.

The scalability of the sector has been calculated by attributing a scalability factor of 'Low', 'Medium' or 'High' per product or service at the Local Authority level, which has been given the corresponding value of 1 = Low; 2 = Medium and 3 = High. We have then taken the average of those values for the products and services grouped together for the Levels to produce an index of scalability.

For example, there are 30 products and services within the Level 3 sub-sector of Windows, within the Building technologies (Low Carbon) sub-sector. For each Local Authority (using Amber Valley as an example), each product and service was allocated a scalability factor:

11 products and services listed as 'High' with a score of 3

15 products and services listed as 'Medium' with a score of 2

4 products and services listed as 'Low' with a score of 1

Calculation:

$$\frac{(11 \times 3) + (15 \times 2) + (4 \times 1)}{30} = 2.23$$

The scalability index has been calculated for the 2769 products and services at Level 5 of the dataset, for each Local Authority, with the average being used to plot the potential for scalability against the GVA of the sector at Level 2.

Figure 36 shows the GVA plotted against the scalability index of the 24 Level 2 sub-sectors for the Marches LEP, with each bubble sized by the GVA of that sub-sector. The most desirable position would be the top right-hand corner of the graph, with high GVA and high Scalability. We can see that the Alternative Fuels sub-sector has the best combination of size and scalability, while Environmental Monitoring may be small in terms of market, but is highly scalable. Alternative Fuel Vehicle is a good example of a sub-sector which has good GVA but low scalability. Scalability graphs for each Local Authority can be found in Appendix 4. Environmental Monitoring and Marine Pollution Control are small, but significantly more scalable than the regional average.

Figure 36: Marches LEP's Scalability vs. GVA of Level 2 Sub-sectors – Bubbles Sized by GVA

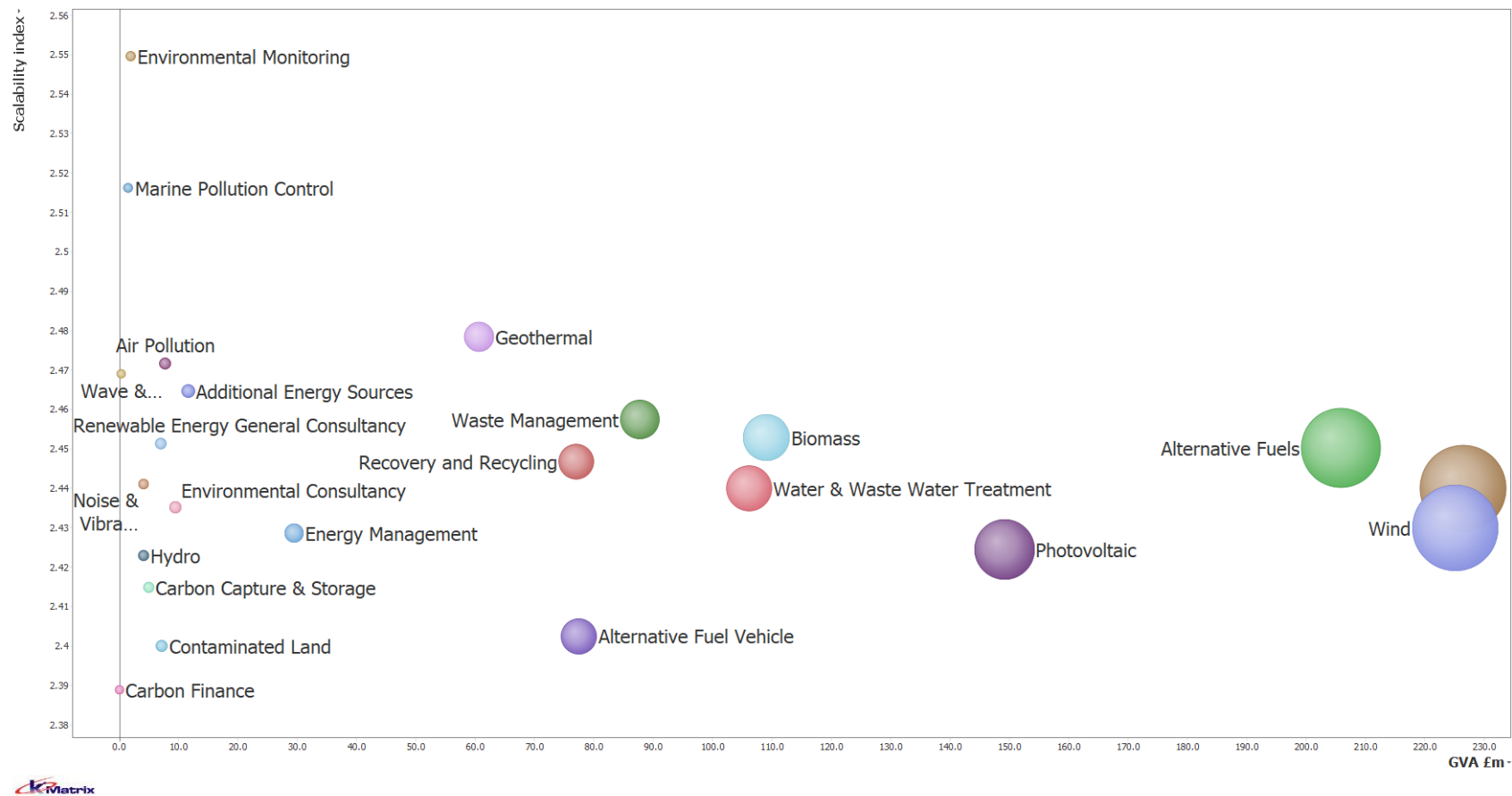
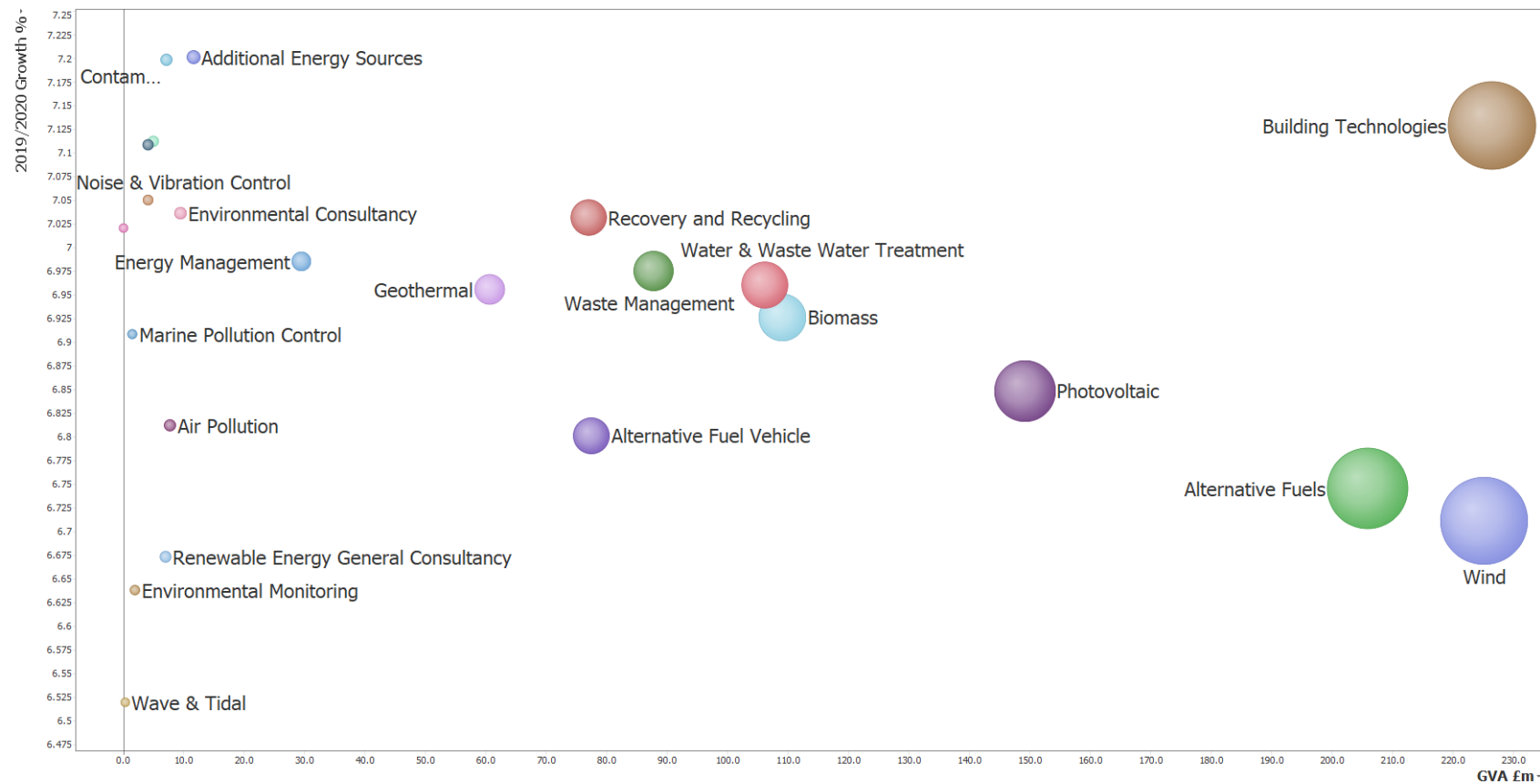


Figure 37 shows the same principle as Figure 36, but with GVA plotted against the growth rates of the Level 2 sub-sectors for 2019/20. This figure illustrates a different pattern of opportunity to the use of the scalability index. When only viewing growth, we can see that the Building Technologies sub-sector occupies the most favourable position of large size and high growth. But in terms of scalability, other factors which can form barriers to scalability, such as restrictions in the supply chain or network of supply or the availability of skills etc. For this reason, scalability is a more useful measure than previous growth when looking at opportunities.

Figure 37: Marches LEP's 2019/20 Growth Rates vs. GVA of Level 2 Sub-sectors – Bubbles Sized by GVA



1.13 Marches LEP's LCEGS Demand Analysis

This section provides data and analysis regarding the demand analysis which feeds into the Growth 2030/2050 sister report, produced as part of this project. There are three sub-sections:

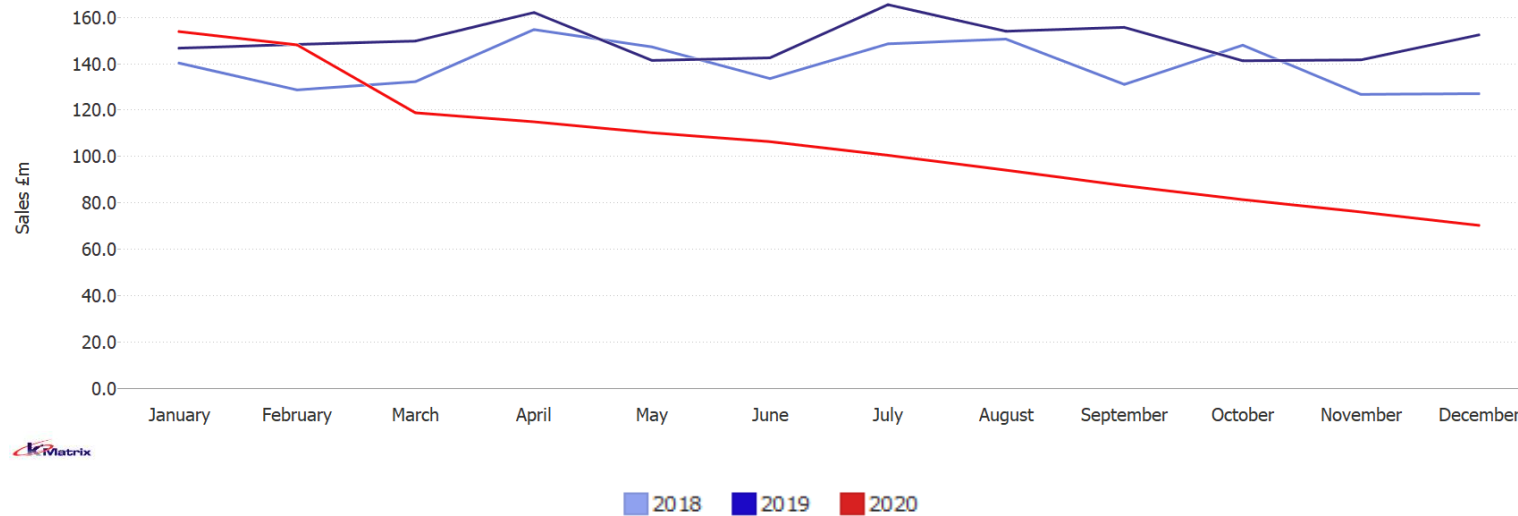
- 1.12.1 Current employment and growth required for 2030 and 2050 net zero targets.
- 1.12.2 Current training provision and potential for upskilling of the current workforce within each Level 2 sub-sector
- 1.12.3 Potential of Level 2 sub-sectors to impact on CO2 reduction.

1.13.1 Current employment, skills gaps and forecasts for 2030 and 2050 net zero targets

In this section we explore the current levels of employment, per Standard Occupational Classification, identifying skills gaps that are present in the sector and sub-sectors and then estimate the skills requirements needed to achieve net zero targets for 2030 and 2050.

It is difficult to untangle the impact of Covid and the impact of Brexit on the LCEGS sector and for the purposes of this study, we have not attempted to do so. A sister document produced during this study, which maps the monthly LCEGS sector for the MEH region and the nine LEPs, to Level 2 sub-sector detail provides the evidence of the significant impact on the sector since March 2020. The impact during 2020 is illustrated in figure 38, which shows the LCEGS sales, by month for 2018, 2019 and 2020 for the Marches LEP. Although there has been support for business during the pandemic, many people and businesses have postponed work. There is a large section of the LCEGS sector that will always function, for example waste will be collected, water purified, electricity produced etc. Unfortunately, much of the activity in the sector can and has been postponed until there is more certainty in the market. It is anticipated that the sector will bounce back as restrictions are lifted, particularly with not just the political will, but more so the social emphasis on net zero.

Figure 38: Marches LEP LCEGS Sales, by month 2018, 2019 and 2020



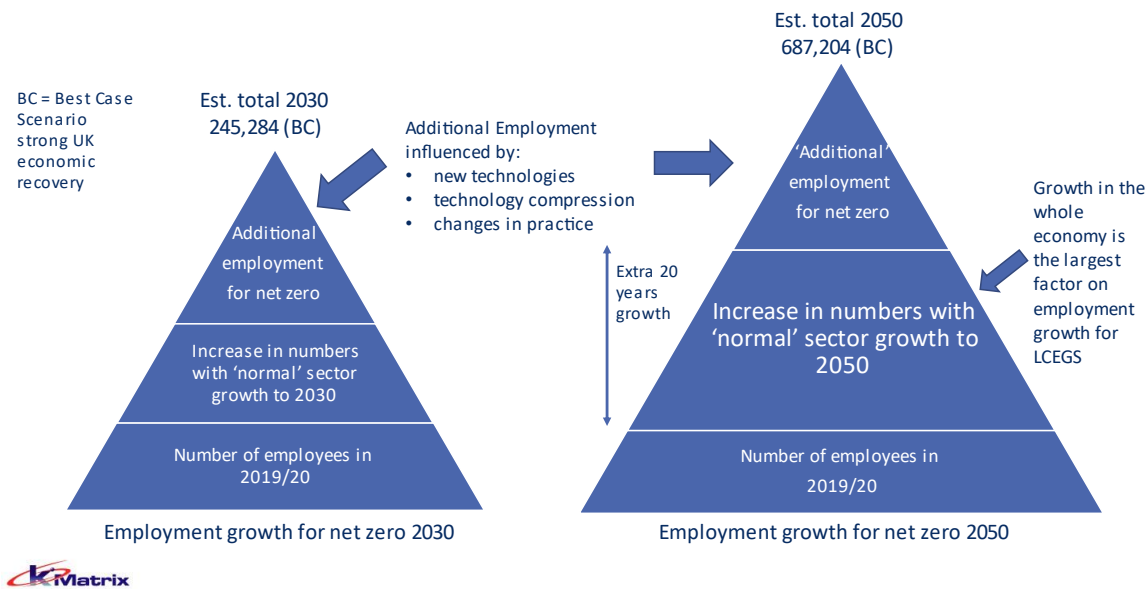
Due to the uncertainty surrounding the current and potential future economic performance of the UK (and global) economy, the forecasting estimates have been produced on a best case vs. worst case scenario basis:

Timeline for Net Zero Implications of Covid-19 and Brexit

Net Zero 2030	Best-Case Scenario
	Worst-Case Scenario
Net Zero 2050	Best-Case Scenario
	Worst-Case Scenario

Worst-case scenario refers to a situation with the economy being slow to recover, with slow growth and therefore slow recovery of the LCEGS sector. Best-case scenario refers to a situation where the economy 'bounces' back, with strong growth and rapid recovery of the LCEGS sector. In theory, the need to decarbonize will increase with the expansion of the whole economy, therefore the number of employees required to reach net zero will be larger in a best-case scenario than in a worst-case scenario.

The growth forecasts for both 2030 and 2050 begin with the same baseline employment figures for 2019/20, illustrated by the wide base of the triangles in the diagram.



On top of that, the normal growth in the sector that will increase between 2020 and 2030 or 2050 sits on top of that base and has the greatest effect on the growth of the employment numbers. The effect of normal sector growth is more significant for the 2050 target than the 2030 target due to an additional 20 years of normal growth. The extent of growth is determined by whether the UK economy as a whole bounces back from 2020 or takes more time.

On top of that growth is the additional employment required to achieve net zero. In this diagram, the additional employment section is sized the same for both targets. This is to emphasise that to reach net zero by 2030 would require **relatively** more people with less technology, whereas by 2050, streamlined processes, new technologies, technology

compression and changes in practice are likely to lead to a situation requiring **relatively** fewer people, but improved technology.

In essence, most of the employment growth is likely to be normal sector growth, resulting in a higher number of employees in 2050 than 2030, regardless of net zero targets. The LCEGS sector will not stand still during decarbonisation, new technologies and processes will be developed, and the wider economy will still grow. Decarbonisation will not be linear, the quicker it is achieved, the more people are likely to be needed, however, the longer it takes, the more opportunity for technology to impact. In reality, the additional employment component of growth is more nuanced and varies between sub-sectors and geographical area.

Table 8 shows the current 2019/20 employment figures and the estimated employment required to achieve net zero by 2030 and 2050, best- and worst-case scenarios for the LCEGS sector for the Marches LEP.

Shortage of employees refers to the employees that are 'imported' from outside the area, representing a skills gap and the estimated employment requirement and growth assumes those skills gaps are filled.

Employment Total in this analysis is lower than elsewhere in the study. The total employment count in other areas of the study are triangulated from the output and are the number of people required to produce the output recorded, bearing in mind the skills, technology and nature of the sector and sub-sectors in each location. When this data is then overlaid with the data on the SOC classification, there are some jobs that do not 'fit'. Not all jobs can be split into the SOC classification system, because there are new sectors whose job descriptions are not an exact match. It is not appropriate to allocate them as "Other Employees" because they are often combinations of the SOC classifications, also in start-ups and micro companies the same person can be performing several roles with different SOC's for a few days at a time. In a sector comprised of predominately micro and SMEs, this lack of transparency has a higher impact than other sectors comprised of fewer, larger companies.

The employment count refers to 'heads equivalent', so although for example, there are 2 Educators listed, with a shortage of 1, making a total of 3 in the region, this will equate to over 30 people providing 'pockets' of time, to equate to 3 full time jobs.

A limitation of the SOC system is in terms of measuring the number of people involved in installation, distribution, multi-engineering, monitoring or other job descriptions, which could be informative and perhaps future projects could look at breaking the total employment numbers into classifications of job descriptions using the industries own language and tailored to each sub-sector.

The purpose of the data is to indicate skills gaps of those jobs we **can** measure within this project, in order to inform training needs etc. As such, we have based the forecasts on those job descriptions we can measure and forecast on those. In order to reach net zero, the estimation of employment requirement not only takes into account the number of people required to achieve it, within the network and chain of supply, but also forecasts change of practice, e.g., improved manufacturing processes.

In summary, the estimation of employment requirements represents the number of employees likely to be employed in 2030 or 2050, having achieved net zero and can be considered the target numbers of employees per SOC. In terms of changes in number of employees, there are three factors in play:

- The usual increase in employment numbers through normal sector growth
- The additional increase in employment numbers needed to achieve net zero
- These two growths are moderated by the introduction of new technologies, technology compression and changes in practice over time

Table 8: Marches LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Sector Data

SOC	Current Employment				Net Zero by 2030				Net Zero by 2050			
	# Employees 2019/20	Shortage of Employees		# Employees if Skills Gap Filled	Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
		2019/20	Shortage as a % of Total Employees		Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	328	76	23.3%	404	429	6.1%	560	38.6%	663	63.9%	1,555	284.5%
Snr Management SME	827	82	9.9%	909	1,079	18.7%	1,412	55.3%	1,662	82.9%	3,955	335.0%
Supervisory	784	81	10.4%	865	1,020	17.9%	1,349	55.9%	1,581	82.7%	3,772	335.8%
Middle / Junior Management	733	74	10.1%	807	958	18.8%	1,259	56.1%	1,478	83.2%	3,508	334.8%
Designer / Developer	118	31	26.4%	150	154	2.8%	203	35.3%	238	59.2%	571	281.3%
Clerical	423	1	0.2%	424	555	30.8%	723	70.5%	853	101.1%	2,031	379.0%
Self Employed	108	14	12.9%	122	142	16.5%	185	51.6%	219	79.0%	519	325.0%
Advisor or Agent	72	12	16.7%	85	95	12.6%	124	46.3%	145	71.9%	349	312.5%
Educator	2	1	32.0%	3	3	0.2%	4	26.9%	4	51.9%	11	273.8%
Specialist or Consultant	466	15	3.2%	481	606	26.2%	793	65.1%	947	97.1%	2,246	367.2%
Editor	13	0	3.8%	13	17	25.6%	22	65.1%	26	94.5%	62	359.2%
Industrial Researchers	137	11	8.1%	148	178	20.5%	234	57.9%	278	87.8%	665	349.2%
Scientist	59	21	36.2%	80	78	-2.3%	100	24.9%	115	44.5%	282	253.1%
Maintenance Engineer	990	62	6.3%	1,052	1,294	23.0%	1,694	61.1%	2,019	92.0%	4,756	352.3%
Civil Engineer	58	15	26.6%	74	76	3.5%	99	35.0%	117	59.6%	279	279.0%
Production Engineer	179	70	39.0%	249	234	-5.8%	306	23.3%	360	45.1%	863	247.3%
Power distribution Engineer	383	115	30.0%	498	499	0.1%	658	32.1%	775	55.5%	1,844	270.1%
Construction Engineer	97	16	16.9%	113	127	12.0%	166	47.0%	196	73.6%	464	310.6%
Sales Exec	438	50	11.5%	488	569	16.7%	755	54.8%	884	81.1%	2,122	334.9%
Marketing Personnel	459	52	11.2%	510	605	18.6%	786	54.1%	916	79.6%	2,214	334.1%
General Semi Skilled Worker	876	19	2.1%	895	1,146	28.1%	1,509	68.7%	1,781	99.1%	4,201	369.5%
General Labour	1,123	0	0.0%	1,123	1,463	30.3%	1,923	71.3%	2,257	101.1%	5,401	381.0%
Other Employees	853	42	4.9%	894	1,115	24.7%	1,452	62.3%	1,726	93.0%	4,125	361.2%
Administrative workers	398	9	2.2%	406	520	28.0%	685	68.6%	796	96.0%	1,917	371.7%
Total	9,922	870	8.8%	10,792	12,962	20.1%	17,002	57.5%	20,039	85.7%	47,709	342.1%

Table 8 shows that the skills gap throughout the sector varies considerably between SOC's within the sector, with significant gap's within large occupational groupings for Production Engineers 39.0% (MEH 35.7%), Power Distribution Engineer 30.0% (MEH 29.8%) and Technicians 23.3% (MEH 22.2%). Conversely,

there are low skills gap's within large occupational grouping such as General Semi-skilled Worker 2.1% (MEH 2.1%) Maintenance Engineer 6.3% (MEH 6.3%), Specialist or Consultant 3.2% (MEH 3.3%) and Administrative Workers 2.2% (MEH 2.1%).

Key points at a sector-level:

- Estimated growth in employees to reach net zero under worst-case scenario economic growth conditions by 2030 is 20.1% (MEH 20.3%)
- Estimated growth in employees to reach net zero under best-case scenario economic growth conditions by 2030 is 57.5% (MEH 57.9%)
- Estimated growth in employees to reach net zero under worst-case scenario economic growth conditions by 2050 is 85.7% (MEH 86.0%)
- Estimated growth in employees to reach net zero under best-case scenario economic growth conditions by 2050 is 342.1% (MEH 342.4%)

Tables 9, 10 and 11 provide the estimated employment growth for the three Level 1 sub-sectors.

The Level 1 sub-sectors have different shortages of employees, representing skills gaps:

Low Carbon – 10.8% (MEH 10.5%)

Renewable Energy – 6.9% (MEH 7.0%)

Environmental – 10.5% (MEH 10.3%)

Skill gaps between SOC's also varies between Level 1 sub-sectors:

Production Engineers: Low Carbon 55.9% (MEH 47.3%); Renewable Energy 28.1% (MEH 27.9%) and Environmental 35.5% (MEH 34.9%)

Power Distribution Engineers: Low Carbon 34.0% (MEH 33.7%); Renewable Energy 27.2% (MEH 27.1%) and Environmental 32.8% (MEH 32.6%)

Technicians: Low Carbon 31.1% (MEH 27.9%); Renewable Energy 16.9% (MEH 17.3%) and Environmental 23.1% (22.9%)

Shortages also vary between Level 2 sub-sectors, for example the shortage in Production Engineers for Geothermal is 70.6% (MEH 68.8%), but only 12.4% (MEH 13.4%) in Photovoltaic. Level 2 tables are located in Appendix 5.

Growth requirements are similar at the sub-sector level of analysis, but demonstrates more variation in SOC's between sub-sectors, for example to reach net zero by 2030, best case scenario would require growth in:

Production Engineers of: Low Carbon 9.3% (MEH 17.0%); Renewable Energy 34.9% (MEH 34.5%) and Environmental 25.9% (MEH 27.0%)

Power Distribution Engineers of: Low Carbon 28.6% (MEH 28.1%); Renewable Energy 35.3% (MEH 35.1%) and Environmental 28.1% (MEH 29.3%)

Technicians of: Low Carbon 29.2% (MEH 34.2%); Renewable Energy 46.5% (MEH 45.9%) and Environmental 40.0% (MEH 39.6%)

Table 9: Marches LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Low Carbon

SOC	Low Carbon				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	109	34	31.1%	143	143	-0.2%	185	29.2%	220	53.8%	513	258.2%
Snr Management SME	206	23	11.4%	229	267	16.6%	353	54.3%	418	82.5%	988	331.1%
Supervisory	199	25	12.8%	225	260	15.5%	339	50.9%	403	79.1%	951	322.8%
Middle / Junior Management	188	23	12.1%	210	246	17.0%	326	55.0%	377	78.9%	907	331.1%
Designer / Developer	31	9	28.0%	40	41	1.5%	53	32.5%	63	56.8%	150	274.1%
Clerical	110	0	0.2%	110	144	31.2%	185	68.1%	220	100.6%	520	374.0%
Self Employed	40	6	15.8%	46	52	13.4%	68	46.7%	80	73.9%	194	318.6%
Advisor or Agent	36	6	16.7%	42	47	12.5%	61	46.3%	72	72.5%	174	314.7%
Educator	0	0	26.5%	0	0	3.5%	0	30.8%	0	59.6%	1	282.2%
Specialist or Consultant	130	5	3.8%	135	171	26.2%	224	65.5%	268	97.6%	630	365.6%
Editor	3	0	4.0%	3	4	26.5%	5	63.7%	6	93.1%	14	365.1%
Industrial Researchers	80	7	8.4%	86	104	20.0%	135	56.6%	162	87.5%	387	348.2%
Scientist	40	15	37.4%	56	54	-3.0%	69	23.6%	78	40.8%	195	250.3%
Maintenance Engineer	252	20	8.0%	273	327	20.0%	435	59.6%	516	89.1%	1,201	340.6%
Civil Engineer	14	4	30.0%	18	18	0.5%	24	32.7%	28	56.9%	66	271.6%
Production Engineer	58	32	55.9%	90	76	-15.3%	98	9.3%	116	29.3%	278	208.7%
Power distribution Engineer	85	29	34.0%	114	111	-3.0%	147	28.6%	172	50.8%	411	260.1%
Construction Engineer	21	4	20.5%	25	27	8.3%	36	41.3%	43	68.7%	101	300.2%
Sales Exec	134	19	14.5%	153	175	14.4%	229	49.8%	268	75.2%	644	320.4%
Marketing Personnel	143	21	14.5%	163	188	15.1%	245	50.0%	289	77.3%	686	320.5%
General Semi Skilled Worker	228	6	2.6%	234	301	28.5%	392	67.4%	465	99.0%	1,108	373.6%
General Labour	392	0	0.0%	392	510	30.1%	671	71.0%	787	100.6%	1,916	388.2%
Other Employees	189	11	5.7%	199	247	24.0%	320	60.3%	389	95.2%	912	357.4%
Administrative workers	110	3	2.8%	113	146	29.1%	189	66.7%	220	94.1%	530	367.4%
Total	2,798	304	10.8%	3,102	3,660	18.0%	4,789	54.4%	5,662	82.5%	13,476	334.5%

Table 10: Marches LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Renewable Energy

SOC	Renewable Energy				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	131	22	16.9%	153	171	11.7%	224	46.5%	265	73.0%	624	307.4%
Snr Management SME	471	43	9.1%	514	616	19.9%	798	55.2%	942	83.3%	2,246	337.0%
Supervisory	440	40	9.0%	480	571	19.1%	760	58.4%	883	84.2%	2,130	344.1%
Middle / Junior Management	409	37	9.1%	446	534	19.7%	704	57.7%	829	85.8%	1,956	338.2%
Designer / Developer	35	8	21.4%	43	46	6.9%	61	40.5%	71	65.5%	172	300.3%
Clerical	233	0	0.2%	234	304	30.2%	399	70.8%	470	101.1%	1,118	378.8%
Self Employed	28	3	9.3%	31	37	20.7%	49	57.3%	57	85.7%	133	332.3%
Advisor or Agent	9	2	16.7%	11	12	12.4%	16	46.2%	19	74.1%	45	309.7%
Educator	0	0	9.5%	0	0	12.6%	0	56.8%	0	82.5%	0	372.7%
Specialist or Consultant	236	7	2.8%	243	307	26.4%	399	64.4%	481	97.9%	1,136	367.8%
Editor	3	0	3.3%	3	4	26.5%	6	67.4%	7	94.9%	15	355.5%
Industrial Researchers	16	1	7.3%	17	21	23.0%	27	62.6%	32	89.4%	76	352.0%
Scientist	5	2	28.6%	7	7	5.3%	9	32.7%	11	60.2%	26	270.9%
Maintenance Engineer	525	28	5.4%	554	690	24.5%	901	62.7%	1,071	93.4%	2,538	358.2%
Civil Engineer	13	3	21.3%	16	18	8.6%	23	41.3%	27	65.8%	65	296.6%
Production Engineer	74	21	28.1%	95	96	1.5%	128	34.9%	149	57.5%	357	276.7%
Power distribution Engineer	210	57	27.2%	267	273	2.1%	362	35.3%	427	59.8%	1,012	278.2%
Construction Engineer	32	4	12.3%	36	42	17.2%	55	53.2%	65	80.9%	153	325.0%
Sales Exec	218	20	9.2%	238	281	18.0%	378	58.5%	441	85.3%	1,059	344.7%
Marketing Personnel	234	21	9.2%	255	308	20.6%	401	56.8%	462	80.7%	1,129	342.2%
General Semi Skilled Worker	461	8	1.8%	469	599	27.6%	799	70.2%	939	100.1%	2,191	366.7%
General Labour	587	0	0.0%	587	764	30.2%	1,008	71.6%	1,182	101.3%	2,799	376.8%
Other Employees	503	23	4.5%	526	658	25.1%	857	63.0%	1,006	91.4%	2,432	362.5%
Administrative workers	203	4	1.8%	207	263	27.2%	350	69.2%	407	96.7%	982	374.2%
Total	5,080	353	6.9%	5,433	6,624	21.9%	8,712	60.4%	10,244	88.6%	24,394	349.0%

Table 11: Marches LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Environmental

SOC	Environmental				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	88	20	23.1%	108	115	6.6%	151	40.0%	177	64.2%	418	287.0%
Snr Management SME	150	16	10.6%	166	196	17.9%	260	56.9%	302	81.9%	721	334.3%
Supervisory	145	16	11.1%	161	189	17.6%	250	55.4%	295	83.0%	691	329.2%
Middle / Junior Management	136	15	10.8%	150	178	18.7%	229	52.9%	272	81.5%	645	329.7%
Designer / Developer	52	15	28.7%	67	67	1.0%	89	33.7%	104	56.6%	249	273.4%
Clerical	81	0	0.2%	81	106	31.8%	139	72.7%	163	102.0%	393	386.4%
Self Employed	40	5	12.4%	45	53	16.7%	69	52.6%	81	79.6%	192	326.5%
Advisor or Agent	27	5	16.7%	32	36	12.9%	46	46.4%	54	70.4%	130	310.5%
Educator	2	1	32.3%	3	3	0.0%	3	26.7%	4	51.4%	10	273.3%
Specialist or Consultant	99	3	3.5%	102	128	25.4%	170	66.1%	199	94.5%	479	368.0%
Editor	7	0	4.0%	7	9	24.8%	12	64.5%	14	94.9%	33	358.6%
Industrial Researchers	42	3	7.8%	45	54	20.4%	71	58.5%	84	87.8%	202	350.1%
Scientist	13	5	35.5%	17	17	-3.3%	22	26.3%	26	49.8%	61	255.2%
Maintenance Engineer	212	14	6.4%	225	277	23.1%	358	59.1%	432	92.0%	1,017	351.8%
Civil Engineer	31	8	27.3%	39	40	2.8%	52	33.5%	62	58.2%	147	275.1%
Production Engineer	47	17	35.5%	64	62	-3.3%	80	25.9%	95	48.8%	228	258.0%
Power distribution Engineer	88	29	32.8%	117	115	-1.5%	150	28.1%	176	50.4%	422	261.3%
Construction Engineer	44	8	18.6%	52	57	10.2%	75	45.6%	88	70.9%	210	305.8%
Sales Exec	86	11	12.5%	96	113	17.1%	148	53.4%	174	80.3%	418	333.9%
Marketing Personnel	82	9	11.5%	91	109	19.0%	141	53.7%	165	80.5%	399	335.7%
General Semi Skilled Worker	187	4	2.2%	191	246	28.7%	319	66.7%	377	96.9%	902	371.4%
General Labour	143	0	0.0%	143	188	31.2%	244	70.7%	288	101.4%	686	379.0%
Other Employees	161	8	5.2%	169	210	24.1%	275	62.5%	331	95.6%	781	361.4%
Administrative workers	84	2	2.3%	86	111	28.7%	146	69.4%	169	96.6%	405	371.5%
Total	2,044	214	10.5%	2,258	2,679	18.7%	3,501	55.1%	4,133	83.1%	9,839	335.8%

1.13.2 Current Training Provision and Potential for Upskilling of the Current Workforce within each Level 2 sub-sector

In this section we explore both the current training capacity within the Marches LEP and the potential for upskilling of the workforce.

Current training capacity takes into account the current offerings from local training providers for each sub-sector and is an estimate of the provision of services compared with a national average. It takes into account those training services provided through both the traditional education system and training companies. It does not include training provided in-house by other company employees.

The potential for upskilling the workforce refers to the potential for each sub-sector to either upskill their current workforce and/or upskill workers from other sectors to easily move into the sub-sector being measured. It refers to the rate of upskilling potential compared with the rate of increase in demand, combined with the ability of the skill sets to upgrade in line with the rate of increase in demand and the rate of new technology and methods introduction.

Both the current training capacity and the potential for upskilling the workforce of the sector have been calculated by attributing a factor of 'Low', 'Medium' or 'High' per product or service at the Local Authority level, which has been given the corresponding value of 1 = Low; 2 = Medium and 3 = High. We have then taken the average of those values for the products and services grouped together for the Levels to produce an index for both factors.

For example, there are 30 products and services within the Level 3 sub-sector of Windows, within the Building technologies (Low Carbon) sub-sector. For each Local Authority (using Amber Valley as an example), each product and service was allocated a current training capacity factor:

21 products and services listed as 'High' with a score of 3
9 products and services listed as 'Medium' with a score of 2
0 products and services listed as 'Low' with a score of 1

Calculation:

$$\frac{(21 \times 3) + (9 \times 2) + (0 \times 1)}{30} = 2.7$$

The same process was applied with regards to the potential for upskilling the workforce, with the same example of Amber Valley scoring:

15 products and services listed as 'High' with a score of 3
15 products and services listed as 'Medium' with a score of 2
0 products and services listed as 'Low' with a score of 1

Calculation:

$$\frac{(15 \times 3) + (15 \times 2) + (0 \times 1)}{30} = 2.5$$

Both the current training capacity and upskilling potential indexes have been calculated for the 2769 products and services at Level 5 of the dataset, for each Local Authority, with the average being used to plot graphs comparing the two factors at Level 2 for the MEH region and the nine LEPs. This allows us to examine which sub-sectors have a current workforce which has a potential for upskilling combined with good current training capacity and which sub-sectors could benefit from additional training capacity.

Figure 39 illustrates the current training capacity compared with the upskilling potential of Level 2 sub-sectors of the Marches LEP, with the bubbles sized by sales £m. This graph shows how the Level 2 sub-sectors perform **relative to each other** within the Marches LEP. Each LEP has its own graph, with different patterns, for example, Photovoltaics upskilling potential is very high in the Black Country, but low in Greater Lincolnshire and conversely, Water and Waste Water Treatment upskilling potential is higher in Greater Lincolnshire than the Black Country.

Figure 39: Marches LEP's LCEGS Current Training Capacity against the Potential Upskilling of the Workforce by Level 2 Sub-sector

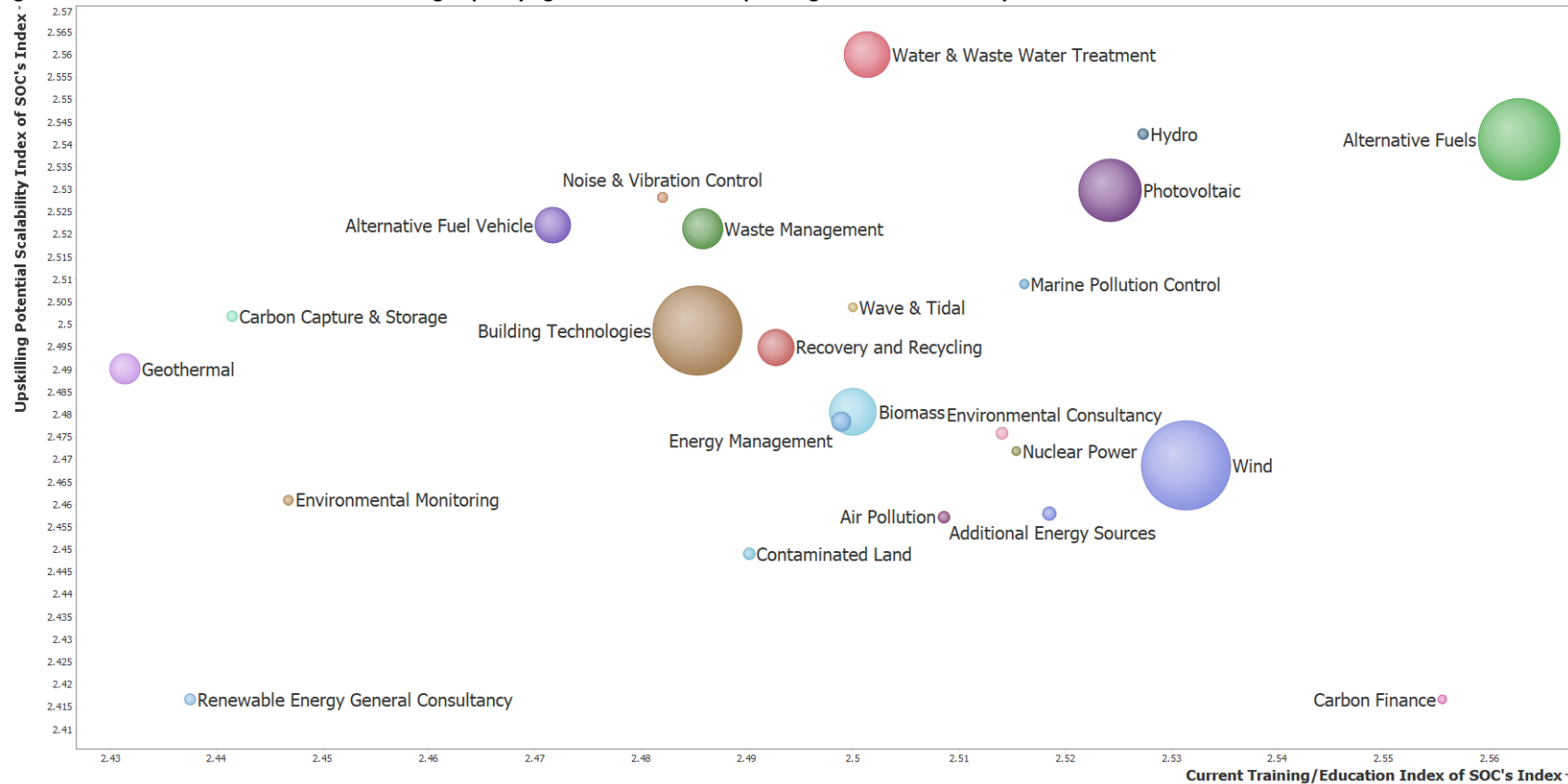


Figure 39 shows that Alternative Fuel Vehicle holds the most desirable position, with good current training capacity combined with a strong potential for upskilling. Photovoltaic is also strong, along with Water and Waste Water Treatment.

1.13.2 LCEGS Estimated CO₂ Reduction Potential of Sub-sectors

In this section we estimate CO₂ reduction potential for Level 2 sub-sectors within the Marches LEP. As outlined in the introduction to the Low Carbon Environmental Goods and Services sector of this report, there is a wide range of variance within academia regarding how to accurately measure the CO₂ reduction potential of products and services. As such, the potential reduction in CO₂ has been estimated, considering the activities within each area, the localization of chains and networks of supply and the technologies in use or being produced.

The CO₂ reduction potential has been determined for each Level 2 Sub-sector in each Local Authority, by estimating 'High', 'Medium' and 'Low'.

The 'Low', 'Medium' and 'High' categories have also been allocated a scale of Low = 1, Medium = 2 and High = 3, with the averages across the Local Authorities within each LEP being used to provide a visual representation of levels of CO₂ reduction potential within the MEH region and each LEP.

A worked example for Waste Management in the D2N2 LEP, with 17 Local Authorities:

7 Local Authorities estimated as 'High' with a score of 3

4 Local Authorities estimated as 'Medium' with a score of 2

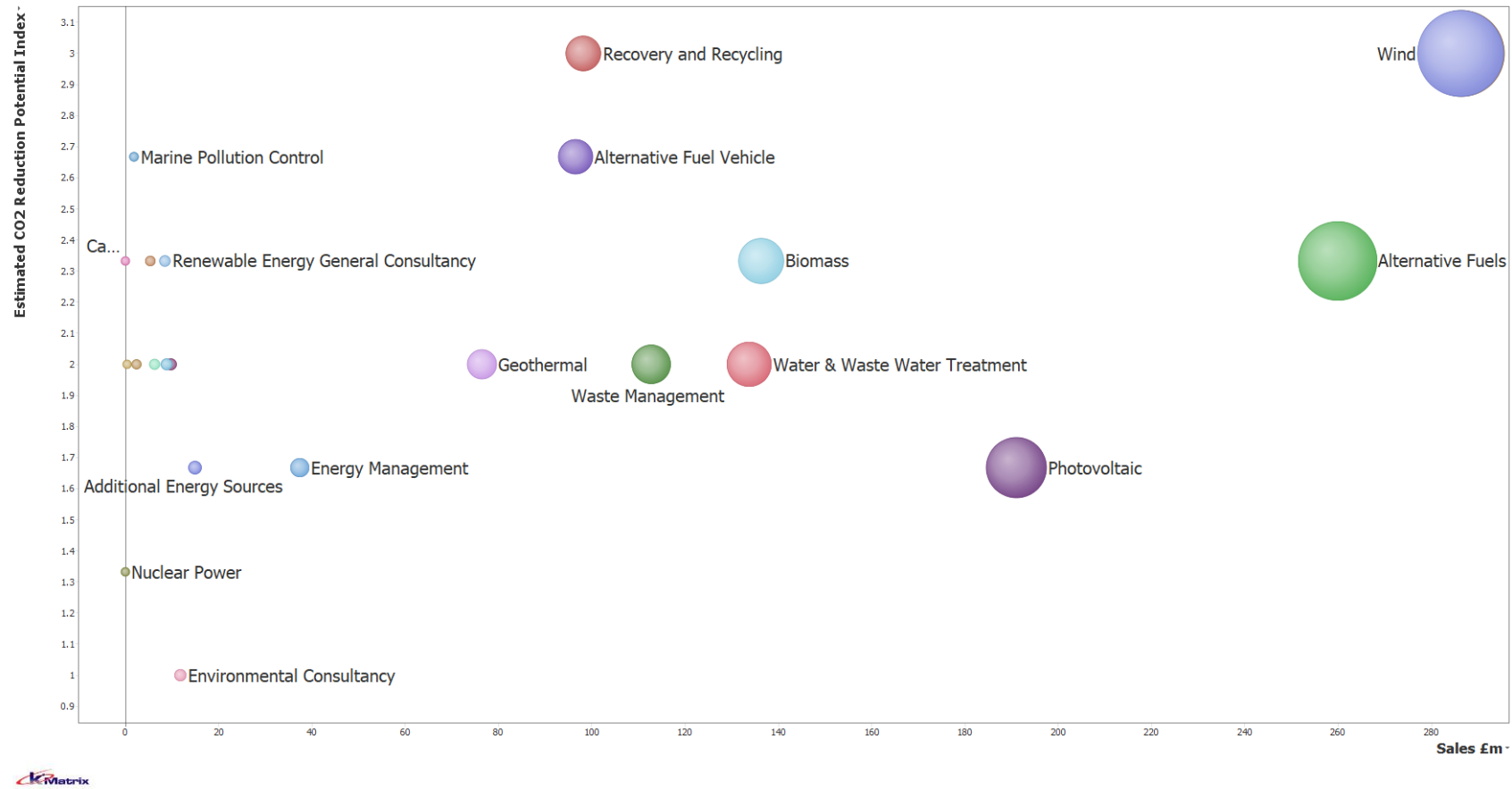
6 Local Authorities estimated as 'Low' with a score of 1

Calculation:

$$\frac{(7 \times 3) + (4 \times 2) + (6 \times 1)}{17} = 1.9$$

Figure 40 shows the estimated CO₂ reduction potential against the sales (£m) for each Level 2 sub-sector, with the bubbles sized for sales and provides a visualization of the relative market sizes and CO₂ reduction potential of the sub-sectors relative to the other sub-sectors. It illustrates the dominance of both the Building Technologies and Wind Sub-sector, in terms of both sales and CO₂ reduction potential compared with the other Level 2 sub-sectors. Building technologies sits directly behind Wind on the graph. Conversely, it also highlights the relatively small size and CO₂ reduction potential of the Environmental Consultancy Sub-sector. Alternative Fuels has a strong position in terms of large size of market and a high CO₂ reduction potential. Photovoltaic is also in a favourable position, with high CO₂ reduction potential and reasonably large market.

Figure 40: Marches LEP's LCEGS Estimated CO2 Reduction Potential against Sales (£m) by Level 2 Sub-sector



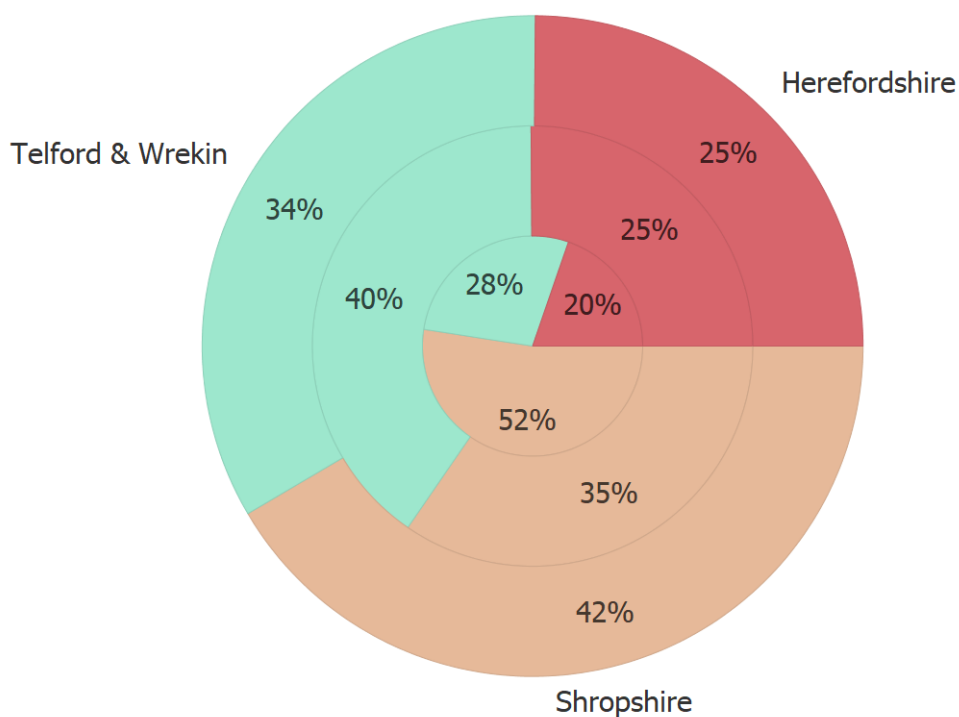
2. Marches LEP's LCEGS by Local Authority

2.1 LCEGS by Local Authority

This section of the report the analyses the Marches 3 Local Authorities.

Figure 41 shows LCEGS for 2019/20 split by Local Authority for sales (outer circle), companies (middle circle) and employment (inner circle). Shropshire accounts for 42% of the Marches LCEGS sales, 35% of companies and 52% of employment. Conversely, Telford & Wrekin accounts for only 28% of employment, but 40% of the number of companies. Herefordshire has a more even split between the three metrics.

Figure 41: Marches LEP's LCEGS 2019/20 by Local Authority for Sales, Companies and Employment



Local Authorities are analysed in more detail, by year, by economic measure and by LCEGS activity in the following section.

2.2 Local Authority Analysis by Year and Sector

Table 12 shows the key metrics of Sales, Available Sales, GVA, Number of Companies and Number of Employees for each Local Authority at the Sector Level for three years with growth rates.

Sales represent the value of sales transactions (£m) and represent the turnover of companies. Available Sales (£m) provides a value for the portion of the market that is not 'locked' by long term contracts and is realistically available for market penetration by new market entrants, without the need for aggressive marketing or pricing strategies. GVA means the Gross Value Added and is the value of the transactions minus raw materials etc and represents the profit made.

Available sales fluctuate in all Local Authorities as contracts end and new ones begin.

GVA tracks sales, with differences in growth rates between the two being identical within this LEP.

The fluctuation between company and employees' numbers are not entirely independent, but they don't necessarily track each other. The fluctuation of employees can represent employees who are redeployed into other sectors within the same company and do not necessarily represent unemployment. Redeployment to other sectors (often with the same product e.g., financial analytics) is often due to the fluctuations in contracts affecting Available Sales.

Company number fluctuations might be a result of trading in other sectors, not that the company itself has ceased to trade.

Growth is steady between years for the Local Authorities, less than 0.5% higher during 2018/19-2019/20 than the previous year.

There is significant difference in the growth rates between Local Authorities, with the strongest growth between 2018/19 and 2019/20 seen in Telford & Wrekin and the slowest by comparison in the smallest market of Herefordshire, although it should be noted that 5.3% is still strong growth.

Table 12: Local Authorities Sales, Available Sales, GVA, Number of Employees and Number of Companies 2017/18 to 2019/20

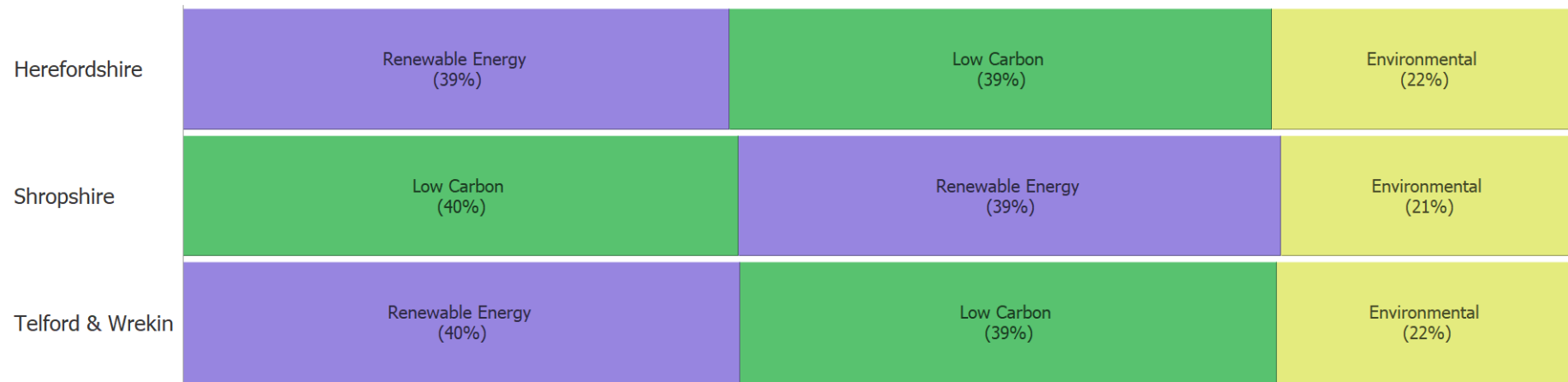
Local Authority	Sales £m					Available Sales £m					GVA £m				
	Growth		Growth		2019/20	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Herefordshire	402.2	5.1%	422.9	5.3%	445.1	242.7	3.8%	251.9	6.7%	268.7	316.7	5.1%	333.0	5.3%	350.6
Shropshire	658.4	6.1%	698.9	6.4%	743.4	404.9	2.7%	415.6	8.5%	451.0	516.8	6.1%	548.5	6.4%	583.5
Telford & Wrekin	523.1	7.1%	560.5	7.3%	601.5	314.7	5.9%	333.5	7.7%	359.1	417.0	7.1%	446.7	7.3%	479.4
Total	1,583.8	6.2%	1,682.2	6.4%	1,790.0	962.3	4.0%	1,001.0	7.8%	1,078.7	1,250.5	6.2%	1,328.3	6.4%	1,413.5

Local Authority	# Employees					# Companies				
	Growth		Growth		2019/20	Growth		Growth		2019/20
	2017/18	%	2018/19	%		2017/18	%	2018/19	%	
Herefordshire	2,352	8.2%	2,544	-0.8%	2,522	175	-3.9%	169	9.1%	184
Shropshire	6,572	-3.9%	6,318	6.2%	6,706	237	11.1%	264	-3.9%	253
Telford & Wrekin	3,149	14.1%	3,594	-0.9%	3,563	241	11.1%	268	10.1%	295
Total	12,073	3.2%	12,456	2.7%	12,792	654	7.1%	700	4.6%	733

2.3 Local Authority Analysis by Year – Level 1

Figure 42 shows the different profiles of the Marches Local Authorities when sales is split at Level 1. The Local authorities show variation in Environmental of 21% for Shropshire and 22% for Herefordshire, Shropshire and Telford & Wrekin; Low Carbon from 39% for Herefordshire and Telford & Wrekin, to 40% for Shropshire; and Renewable Energy from 39% for Herefordshire and Shropshire to 40% for Telford & Wrekin. This highlights that the Marches Local Authorities do not show many regional variations in activity within the LCEGS sector.

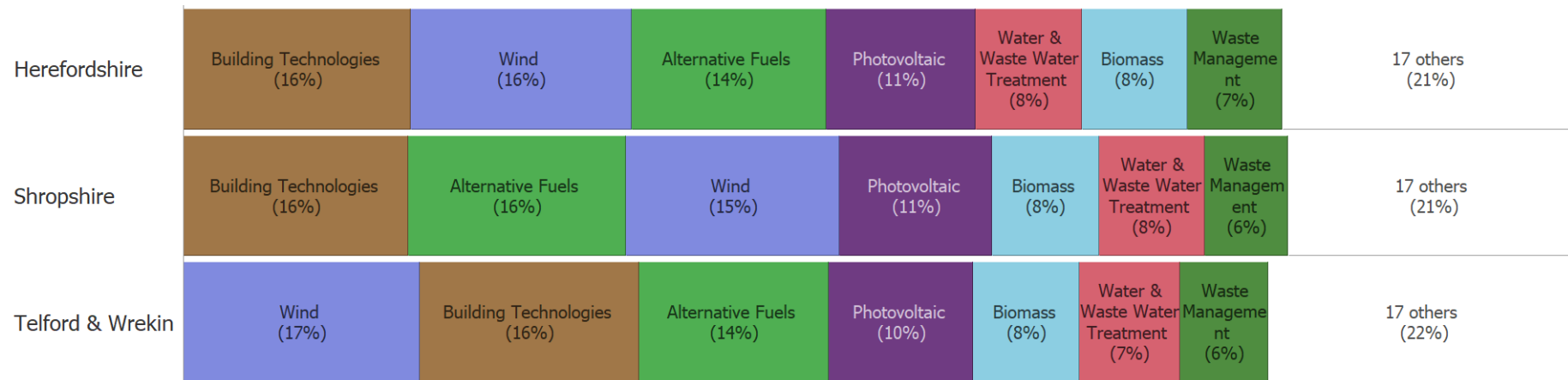
Figure 42: Marches LEP's Local Authorities LCEGS Sales 2019/20 (Level 1)



2.4 Local Authority Analysis by Year – Level 2

Figure 43 extends the analysis to include the Top 7 sub-sectors for each of the Marches LEP's Local Authorities. Typically, seven sub-sectors account for over 75% of the total value, but the sub-sectors and their rankings do differ between the 3 Local Authorities. There are consistent sub-sectors running through the Marches LEP's Local Authorities and these include Wind, Building Technologies, Alternative Fuels and Photovoltaic, they are represented in all of the Marches LEP's Local Authorities and are consistent with the Marches LEP's top four sub-sectors.

Figure 43: Marches LEP's Local Authorities LCEGS Sales 2019/20 at Level 2



2.5 Local Authority LCEGS Company Size

In this section we look at the sizes of companies within each Local Authority, with Table 13 showing a good range of growth rates between the Local Authorities.

Table 13: Local Authorities Companies by Size from 2017/18 to 2019/20

	# Start-up						# Micro						# SMEs					
	Growth			Growth			Growth			Growth			Growth			Growth		
Local Authority	2017/18	%		2018/19	%	2019/20	2017/18	%		2018/19	%	2019/20	2017/18	%		2018/19	%	2019/20
Herefordshire	9	-3.4%		8	9.1%	9	53	-4.4%		50	10.3%	55	88	-3.6%		85	8.3%	92
Shropshire	12	10.6%		13	-4.0%	13	70	11.7%		79	-3.2%	76	119	10.7%		132	-4.3%	126
Telford & Wrekin	12	12.1%		13	10.8%	15	73	11.0%		81	9.3%	88	120	11.0%		134	10.6%	148
Total	33	7.4%		35	4.9%	37	196	7.1%		210	4.9%	220	327	7.0%		350	4.5%	366
	# Large						# Corporations						Total # Companies					
	Growth			Growth			Growth			Growth			Growth			Growth		
Local Authority	2017/18	%		2018/19	%	2019/20	2017/18	%		2018/19	%	2019/20	2017/18	%		2018/19	%	2019/20
Herefordshire	17	-3.6%		17	8.9%	18	9	-4.4%		8	10.1%	9	175	-3.9%		169	9.1%	184
Shropshire	24	11.8%		26	-3.7%	26	12	11.3%		13	-4.0%	13	237	11.1%		264	-3.9%	253
Telford & Wrekin	24	11.6%		27	9.4%	30	12	11.1%		13	10.7%	15	241	11.1%		268	10.1%	295
Total	65	7.6%		70	4.3%	73	33	7.0%		35	5.0%	37	654	7.1%		700	4.6%	733

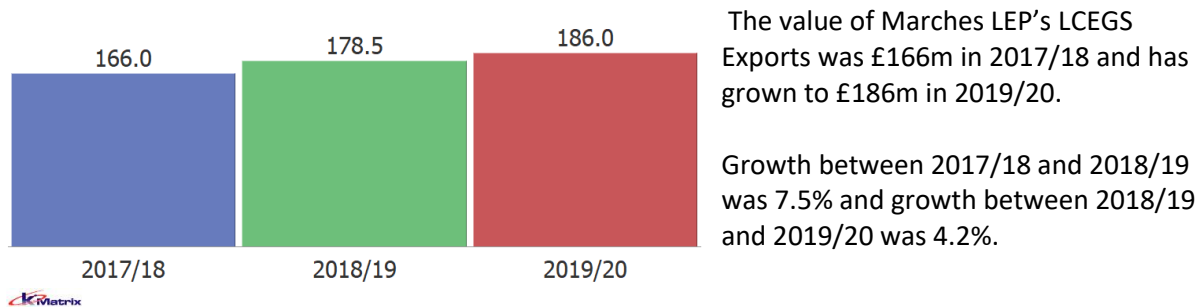
Company number fluctuations may represent companies in more than one sector (such as automotive), who trade sporadically within the LCEGS sector. Decreases in company numbers can therefore be a result of trading in other sectors, not that the company itself has ceased to trade.

3. Marches LEP's LCEGS and International Trade

3.1 Marches LEP's LCEGS Exports

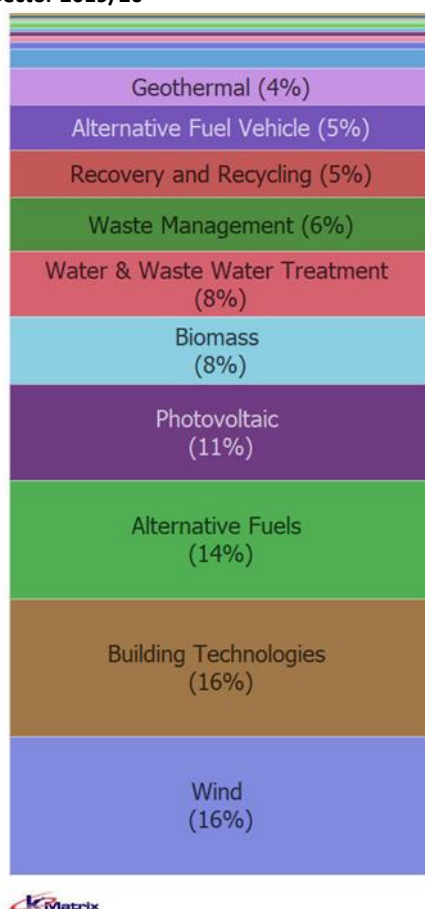
This section of the report addresses Marches LEP's LCEGS Exports over the past three years when compared with UK totals and then identifies leading LCEGS export products and services and their destination markets.

Figure 44: Marches LEP's Exports (£m) 2015/16 to 2017/18



This is compared with MEH growth of 4.5% and 6.2% and UK growth of approximately 8.7% and 9.5% respectively.

Figure 45: Marches LEP's Exports (%) by Sub-Sector 2019/20



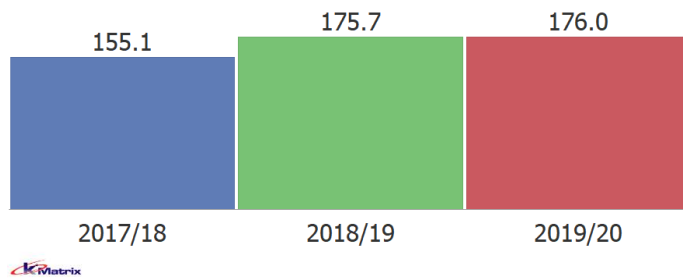
Marches LEP represented 6% of all MEH LCEGS exports in 2019/20. This is slightly below the Marches LEP's 7% of overall MEH Sales.

Figure 45 shows the proportion of Marches LEP's LCEGS exports by Level 2 sub-sector, with Wind (16%), Building Technologies (16%), Alternative Fuels (14%), Photovoltaic (11%) and Biomass (8%) being the leading sub-sectors and accounting for 65% of all Marches LEP's LCEGS exports.

This compares with the MEH proportions of Wind (17%), Building Technologies (15%), Alternative Fuels (15%), Photovoltaic (11%) and Water & Waste Water Treatment (8%) accounting for 66% of exports.

Figure 46: Marches LEP's Imports (£m) 2015/16 to 2017/18

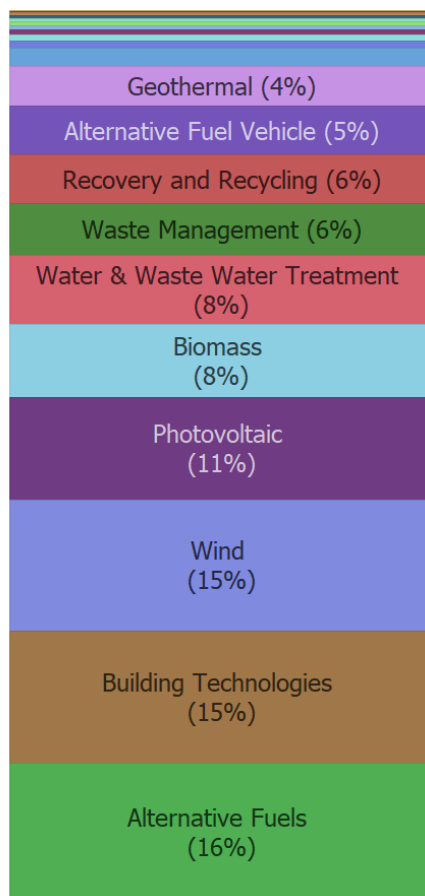
The value of Marches LEP's LCEGS Imports was £155m in 2017/18 and has grown to £176m in 2019/20.



Growth between 2017/18 and 2018/19 was 13.3% and growth between 2018/19 and 2019/20 was 0.2%.

This is compared with MEH growth of approximately 5.8% and 5.9% and UK growth of approximately 10.0% and 7.4% respectively.

Figure 47: Marches LEP's Imports (%) by Sub-Sector 2019/20



Marches LEP represented 7% of all MEH LCEGS imports in 2019/20. This is in line with the Marches LEP's 7% of overall MEH Sales.

Figure 47 shows the proportion of Marches LEP's LCEGS imports by Level 2 sub-sector, with Alternative Fuels (16%), Building Technologies (15%), Wind (15%), Photovoltaic (11%) and Biomass (8%) being the leading sub-sectors and accounting for 65% of all Marches LEP's LCEGS imports.

In Table 14 Marches LEP's LCEGS exports are shown by sub-sector for each of the three years of the report and have been expressed as a percentage of that sub-sector's overall sales. The overall average for 2019/20 is 10.4%, with less than 1.5 percentage point variation between sub-sectors, which is consistent across the three years, indicating a stable and established export market.

Table 14: Marches LEP's LCEGS Exports as a % of Sales 2017/18 to 2019/20

Level 1	Level 2	2017/18			2018/19			2019/20		
		Sales £m	Exports £m	Exports as a % of Sales	Sales £m	Exports £m	Exports as a % of Sales	Sales £m	Exports £m	Exports as a % of Sales
Environmental	Air Pollution	8.7	1.0	11.0%	9.2	0.9	10.2%	9.8	1.0	10.1%
Environmental	Contaminated Land	7.9	0.8	10.4%	8.4	0.9	10.4%	8.9	1.0	10.7%
Environmental	Environmental Consultancy	10.4	1.1	10.6%	11.1	1.2	10.6%	11.8	1.2	10.0%
Environmental	Environmental Monitoring	2.2	0.2	10.6%	2.3	0.2	10.2%	2.4	0.2	9.8%
Environmental	Marine Pollution Control	1.7	0.2	10.3%	1.8	0.2	10.5%	1.9	0.2	10.2%
Environmental	Noise & Vibration Control	4.6	0.5	10.5%	4.9	0.5	10.6%	5.3	0.5	10.4%
Environmental	Recovery and Recycling	86.8	9.4	10.8%	92.3	10.3	11.1%	98.2	10.2	10.4%
Environmental	Waste Management	99.7	10.9	10.9%	105.9	10.8	10.2%	112.7	11.6	10.3%
Environmental	Water & Waste Water Treatment	118.3	13.0	11.0%	125.6	13.0	10.3%	133.7	14.1	10.5%
Low Carbon	Additional Energy Sources	13.2	1.4	10.5%	14.0	1.4	10.1%	14.9	1.6	10.5%
Low Carbon	Alternative Fuel Vehicle	85.3	9.8	11.4%	90.7	9.5	10.5%	96.5	9.7	10.0%
Low Carbon	Alternative Fuels	230.0	23.2	10.1%	244.1	25.6	10.5%	259.8	25.7	9.9%
Low Carbon	Building Technologies	253.4	26.1	10.3%	269.2	28.1	10.4%	286.4	29.7	10.4%
Low Carbon	Carbon Capture & Storage	5.6	0.6	10.5%	5.9	0.6	10.9%	6.3	0.7	10.4%
Low Carbon	Carbon Finance	0.0	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0	0.0%
Low Carbon	Energy Management	33.0	3.4	10.2%	35.1	3.5	10.1%	37.3	4.0	10.8%
Low Carbon	Nuclear Power	0.0	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0	0.0%
Renewable Energy	Biomass	120.6	12.8	10.6%	128.1	13.9	10.8%	136.3	14.7	10.8%
Renewable Energy	Geothermal	67.6	7.2	10.6%	71.8	7.4	10.3%	76.4	8.0	10.5%
Renewable Energy	Hydro	4.6	0.5	10.0%	4.9	0.5	10.5%	5.2	0.5	9.7%
Renewable Energy	Photovoltaic	169.0	17.5	10.4%	179.5	19.1	10.7%	191.0	20.7	10.9%
Renewable Energy	Renewable Consultancy	7.6	0.8	10.1%	8.0	0.8	10.4%	8.5	0.9	10.7%
Renewable Energy	Wave & Tidal	0.3	0.0	10.2%	0.3	0.0	10.6%	0.4	0.0	10.1%
Renewable Energy	Wind	253.2	25.8	10.2%	269.0	29.8	11.1%	286.3	29.8	10.4%
Total		1,583.8	166.0	10.5%	1,682.2	178.5	10.6%	1,790.0	186.0	10.4%

In Table 15 Marches LEP's LCEGS available exports are shown by sub-sector for each of the three years of the report and have been expressed as a percentage of that sub-sector's overall exports. The overall average for 2019/20 is 24.3%, with subtle variation between sub-sectors.

Table 15: Marches LEP's LCEGS Available Exports and Available Exports as a % of Exports 2017/18 to 2019/20

Level 1	Level 2	2017/18			2018/19			2019/20		
		Exports £m	Available Exports £m	Available Exports as a % of Exports	Exports £m	Available Exports £m	Available Exports as a % of Exports	Exports £m	Available Exports £m	Available Exports as a % of Exports
Environmental	Air Pollution	1.0	0.2	24.5%	0.9	0.2	24.9%	1.0	0.2	24.3%
Environmental	Contaminated Land	0.8	0.2	24.5%	0.9	0.2	26.3%	1.0	0.2	24.4%
Environmental	Environmental Consultancy	1.1	0.3	24.9%	1.2	0.3	25.2%	1.2	0.3	24.9%
Environmental	Environmental Monitoring	0.2	0.1	25.5%	0.2	0.1	24.2%	0.2	0.1	23.7%
Environmental	Marine Pollution Control	0.2	0.0	24.9%	0.2	0.0	23.5%	0.2	0.0	25.4%
Environmental	Noise & Vibration Control	0.5	0.1	23.6%	0.5	0.1	24.0%	0.5	0.1	24.7%
Environmental	Recovery and Recycling	9.4	2.2	23.7%	10.3	2.5	24.5%	10.2	2.4	23.1%
Environmental	Waste Management	10.9	2.7	24.8%	10.8	2.6	24.1%	11.6	2.8	24.3%
Environmental	Water & Waste Water Treatment	13.0	3.2	24.6%	13.0	3.2	24.9%	14.1	3.4	24.3%
Low Carbon	Additional Energy Sources	1.4	0.4	25.8%	1.4	0.3	24.3%	1.6	0.4	24.1%
Low Carbon	Alternative Fuel Vehicle	9.8	2.3	23.6%	9.5	2.2	22.9%	9.7	2.6	27.0%
Low Carbon	Alternative Fuels	23.2	5.8	25.1%	25.6	5.6	21.8%	25.7	6.4	25.1%
Low Carbon	Building Technologies	26.1	6.1	23.2%	28.1	6.7	23.9%	29.7	7.0	23.7%
Low Carbon	Carbon Capture & Storage	0.6	0.1	24.4%	0.6	0.1	22.1%	0.7	0.1	22.3%
Low Carbon	Carbon Finance	0.0	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0	0.0%
Low Carbon	Energy Management	3.4	0.8	23.9%	3.5	0.8	23.6%	4.0	1.0	24.0%
Low Carbon	Nuclear Power	0.0	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0	0.0%
Renewable Energy	Biomass	12.8	3.0	23.4%	13.9	3.3	23.5%	14.7	3.6	24.4%
Renewable Energy	Geothermal	7.2	1.7	24.0%	7.4	1.9	25.1%	8.0	2.1	25.6%
Renewable Energy	Hydro	0.5	0.1	23.8%	0.5	0.1	24.1%	0.5	0.1	24.3%
Renewable Energy	Photovoltaic	17.5	4.3	24.6%	19.1	4.8	25.0%	20.7	5.1	24.4%
Renewable Energy	Renewable Consultancy	0.8	0.2	23.4%	0.8	0.2	21.4%	0.9	0.2	22.0%
Renewable Energy	Wave & Tidal	0.0	0.0	24.4%	0.0	0.0	24.2%	0.0	0.0	22.8%
Renewable Energy	Wind	25.8	6.4	24.7%	29.8	7.3	24.6%	29.8	7.0	23.5%
Total		166.0	40.3	24.2%	178.5	42.7	23.9%	186.0	45.2	24.3%

The sub-sectors with the highest available export to export ratio in 2019/20 are: Alternative Fuel Vehicle 27.0%; Geothermal 25.6%; Marine Pollution Control 25.4%; Alternative Fuels 25.1%; Environmental Consultancy 24.9%; Noise & Vibration Control 24.7% and Photovoltaic 24.4%.

This compares with the MEH sub-sectors with the highest available export to export ratio in 2019/20 of: Geothermal 25.0%; Building Technologies 24.9%; Marine Pollution Control 24.9%; Carbon Capture and Storage 24.9%; Environmental Consultancy 24.8% and Environmental Monitoring 24.7%.

In Table 16 Marches LEP's LCEGS imports are shown by sub-sector for each of the three years of the report and have been expressed as a percentage of that sub-sector's overall sales. The overall average for 2019/20 is 9.8%, with less than 1.5 percentage point variation between sub-sectors, which is consistent across the three years, indicating a stable and established import market.

Table 16: Marches LEP's LCEGS Imports as a % of Sales 2017/18 to 2019/20

Level 1	Level 2	2017/18			2018/19			2019/20		
		Sales £m	Imports £m	Imports as a % of Sales	Sales £m	Imports £m	Imports as a % of Sales	Sales £m	Imports £m	Imports as a % of Sales
Environmental	Air Pollution	8.7	0.9	9.9%	9.2	0.9	10.1%	9.8	0.9	9.6%
Environmental	Contaminated Land	7.9	0.8	9.8%	8.4	0.9	10.5%	8.9	0.8	9.3%
Environmental	Environmental Consultancy	10.4	1.1	10.1%	11.1	1.1	9.6%	11.8	1.1	9.4%
Environmental	Environmental Monitoring	2.2	0.2	10.7%	2.3	0.3	11.1%	2.4	0.2	9.8%
Environmental	Marine Pollution Control	1.7	0.2	9.9%	1.8	0.2	10.6%	1.9	0.2	10.7%
Environmental	Noise & Vibration Control	4.6	0.4	9.5%	4.9	0.5	10.3%	5.3	0.5	9.9%
Environmental	Recovery and Recycling	86.8	7.9	9.1%	92.3	9.4	10.2%	98.2	9.7	9.9%
Environmental	Waste Management	99.7	9.5	9.6%	105.9	10.6	10.0%	112.7	10.2	9.1%
Environmental	Water & Waste Water Treatment	118.3	10.6	8.9%	125.6	11.9	9.5%	133.7	13.7	10.2%
Low Carbon	Additional Energy Sources	13.2	1.3	10.0%	14.0	1.4	9.7%	14.9	1.5	9.9%
Low Carbon	Alternative Fuel Vehicle	85.3	8.3	9.8%	90.7	10.2	11.2%	96.5	9.6	9.9%
Low Carbon	Alternative Fuels	230.0	22.6	9.8%	244.1	26.5	10.9%	259.8	27.6	10.6%
Low Carbon	Building Technologies	253.4	24.6	9.7%	269.2	28.5	10.6%	286.4	26.0	9.1%
Low Carbon	Carbon Capture & Storage	5.6	0.5	9.9%	5.9	0.6	10.0%	6.3	0.6	10.1%
Low Carbon	Carbon Finance	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Low Carbon	Energy Management	33.0	3.3	9.8%	35.1	3.1	9.0%	37.3	3.6	9.7%
Low Carbon	Nuclear Power	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Renewable Energy	Biomass	120.6	14.1	11.7%	128.1	12.9	10.0%	136.3	14.4	10.5%
Renewable Energy	Geothermal	67.6	7.2	10.7%	71.8	7.3	10.1%	76.4	7.8	10.2%
Renewable Energy	Hydro	4.6	0.5	9.9%	4.9	0.5	10.0%	5.2	0.5	9.9%
Renewable Energy	Photovoltaic	169.0	17.1	10.1%	179.5	18.0	10.0%	191.0	20.1	10.5%
Renewable Energy	Renewable Consultancy	7.6	0.7	9.4%	8.0	0.8	10.3%	8.5	0.9	10.7%
Renewable Energy	Wave & Tidal	0.3	0.0	9.0%	0.3	0.0	9.4%	0.4	0.0	11.0%
Renewable Energy	Wind	253.2	23.3	9.2%	269.0	30.3	11.3%	286.3	25.9	9.1%
Total		1,583.8	155.1	9.8%	1,682.2	175.7	10.4%	1,790.0	176.0	9.8%

Figure 48 shows the Exports plotted against the Marches LEP's Growth from 2018/19 to 2019/20 for all Level 2 sub-sectors, with the bubbles sized according to the size of the Exports. Here we can see that the Building Technologies sub-sector holds the most desirable position of high growth and large market. Recovery and Recycling, Water and Waste Water Treatment, Waste Management and Biomass are within the top 11 sub-sectors and have good export market and high growth. Markets that should be considered Export strengths include: Building Technologies, Recovery and Recycling, Water and Waste Water Treatment, Waste Management, Biomass and Photovoltaic and Wind and Alternative Fuels due to their large size.

Figure 48: Marches LEP's LCEGS Exports vs Marches LEP's Level 2 Growth for 2019/20

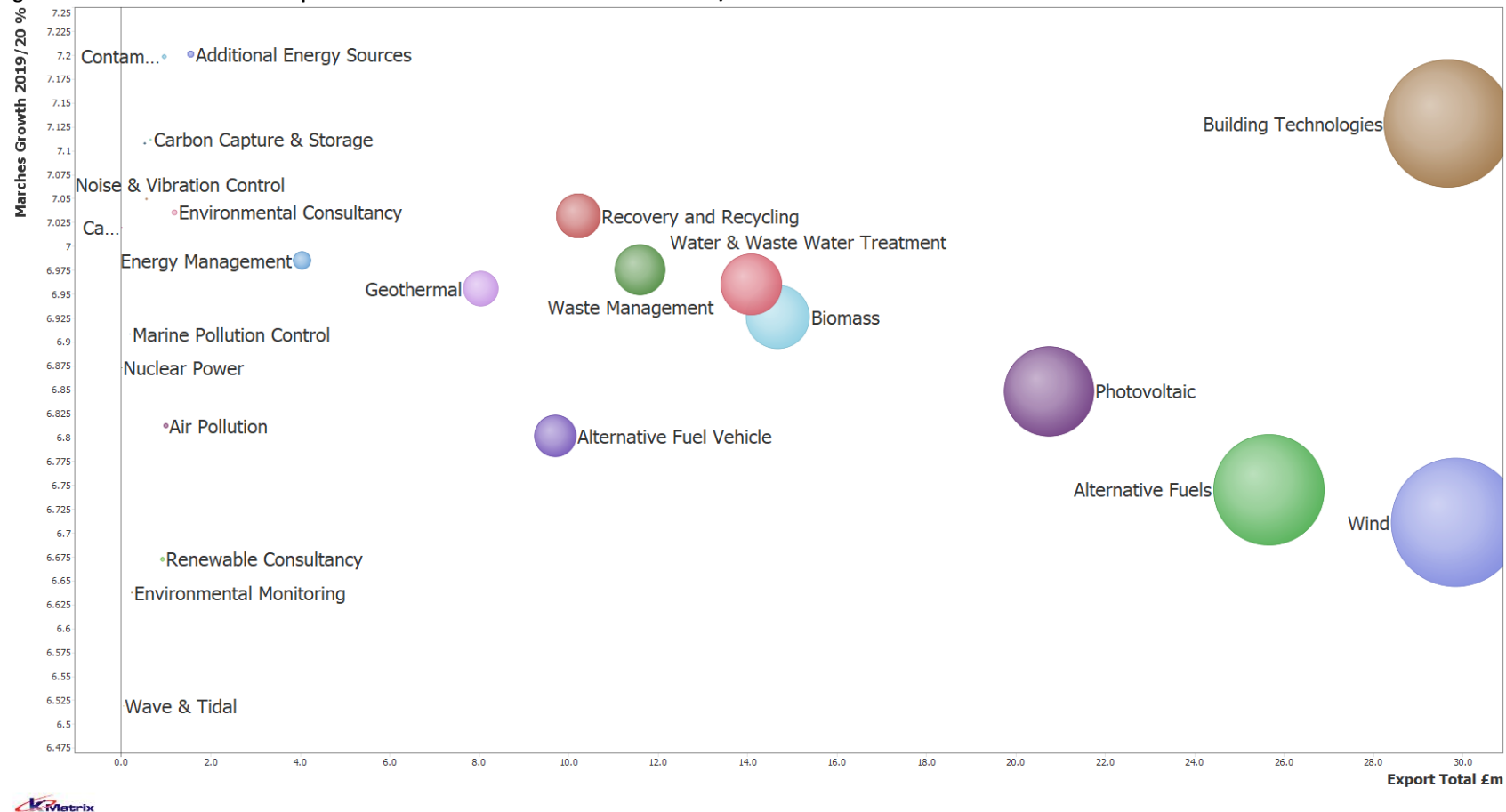
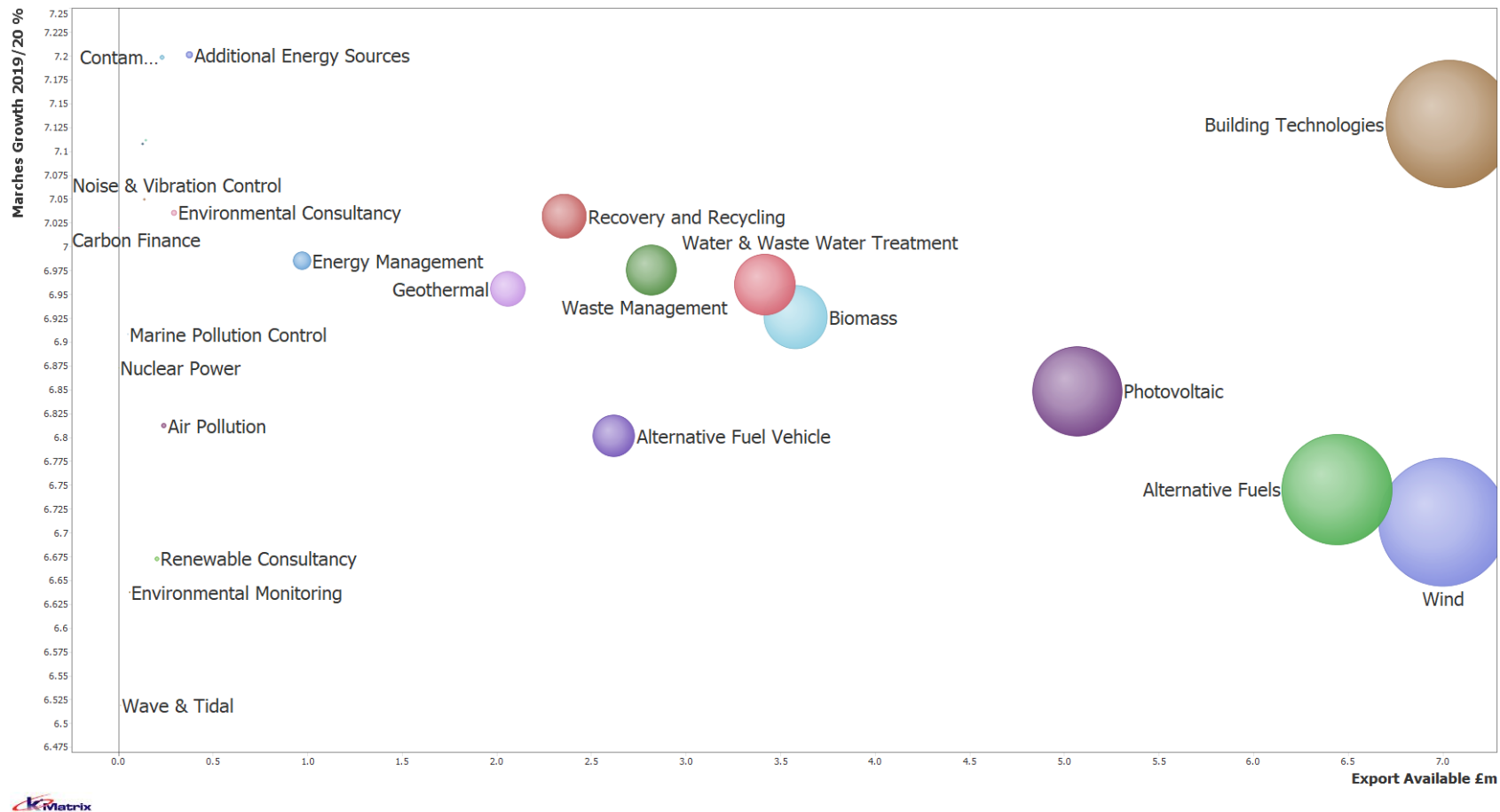


Figure 49 shows the Available Exports plotted against the Marches LEP's Growth from 2018/19 to 2019/20 for all Level 2 sub-sectors, with the bubbles sized according to the size of the Exports. Here we can see that the pattern is slightly different from the Export graph in figure 48, Alternative Fuels has moved to the right as there is good Export Market Available.

Figure 49: Marches LEP's LCEGS Available Exports vs Marches LEP's Level 2 Growth for 2019/20

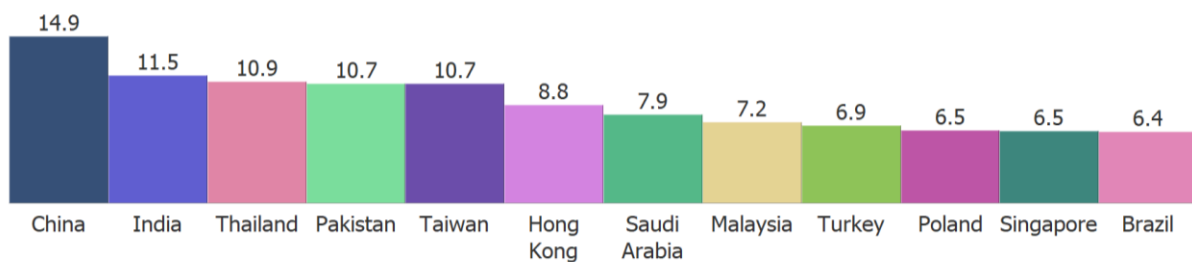


The Top 12 destinations for Marches LEP's LCEGS exports are shown in Figure 50. China is the top destination, followed by India, Thailand, Pakistan, Taiwan, Hong Kong, Saudi Arabia, Malaysia, Turkey, Poland, Singapore and Brazil.

The USA, Germany and France, who are three of the UK's largest trading partners, are conspicuously absent from the Top 12 destinations for LCEGS and this has been a feature of international trade in LCEGS since 2007/08 when the analysis first began.

The LCEGS sector has a very different trading pattern to other mainstream UK sectors, predominantly due to long term, historic trading relationships within this sector.

Figure 50: Top 12 Marches LEP's LCEGS Export Destinations 2019/20



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3.2 Marches LEP's LCEGS Priority Markets

Table 17 combines analysis of Marches LEP's LCEGS product and service exports with destination countries using a heat map. The table shows the value of exports in £m and then colour codes the values – dark green for higher values and white for lower values. The table has been simplified by excluding the lowest value destination countries and lowest value products/services. The results show the top 32 export destinations and the top 11 (out of 24) sub-sectors.

Table 17: Marches LEP's Level 2 Exports by Country for 2019/20 in £m

Level 1	Level 2	Australia	Brazil	Canada	Chile	China	Denmark	France	Germany	Hong Kong	Hungary	India	Indonesia	Italy	Japan	Malaysia	Mexico
Environmental	Recovery and Recycling	0.13	0.29	0.23	0.03	0.74	0.18	0.15	0.16	0.41	0.21	0.50	0.13	0.15	0.16	0.32	0.08
Environmental	Waste Management	0.19	0.39	0.31	0.04	0.96	0.21	0.19	0.20	0.52	0.30	0.69	0.17	0.20	0.20	0.43	0.11
Environmental	Water & Waste Water Treatment	0.21	0.49	0.37	0.05	1.04	0.29	0.25	0.29	0.65	0.37	0.87	0.22	0.24	0.28	0.55	0.13
Low Carbon	Alternative Fuel Vehicle	0.29	0.66	0.51	0.07	1.52	0.41	0.33	0.37	0.88	0.51	1.20	0.30	0.37	0.39	0.77	0.19
Low Carbon	Alternative Fuels	0.38	1.10	0.75	0.11	2.08	0.59	0.55	0.51	1.45	0.73	1.89	0.49	0.42	0.51	1.23	0.25
Low Carbon	Building Technologies	0.27	0.62	0.51	0.08	1.72	0.40	0.34	0.39	0.90	0.51	1.20	0.30	0.35	0.35	0.76	0.19
Low Carbon	Carbon Finance	0.08	0.18	0.16	0.02	0.42	0.10	0.08	0.11	0.24	0.14	0.25	0.07	0.10	0.08	0.22	0.05
Low Carbon	Energy Management	0.05	0.13	0.10	0.02	0.30	0.07	0.07	0.07	0.18	0.10	0.28	0.06	0.06	0.08	0.14	0.04
Renewable Energy	Biomass	0.13	0.30	0.24	0.03	0.77	0.17	0.17	0.18	0.48	0.25	0.51	0.14	0.15	0.15	0.35	0.08
Renewable Energy	Geothermal	0.36	0.76	0.60	0.09	1.93	0.45	0.36	0.43	1.09	0.58	1.37	0.34	0.36	0.41	0.85	0.21
Renewable Energy	Photovoltaic	0.22	0.44	0.37	0.05	1.10	0.25	0.23	0.25	0.63	0.38	0.92	0.22	0.24	0.26	0.50	0.12
Renewable Energy	Wind	0.29	0.65	0.53	0.07	1.53	0.35	0.29	0.35	0.88	0.49	1.11	0.28	0.31	0.35	0.69	0.18

Level 1	Level 2	Netherlands	Pakistan	Poland	Portugal	Romania	Russia	Saudi Arabia	Singapore	A Africa	S Korea	Sweden	Taiwan	Thailand	Turkey	UAE	US
Environmental	Recovery and Recycling	0.20	0.51	0.31	0.13	0.19	0.15	0.39	0.32	0.15	0.15	0.10	0.51	0.52	0.32	0.27	0.10
Environmental	Waste Management	0.24	0.65	0.39	0.16	0.27	0.18	0.46	0.39	0.18	0.20	0.12	0.67	0.71	0.40	0.37	0.13
Environmental	Water & Waste Water Treatment	0.33	0.80	0.51	0.21	0.30	0.23	0.61	0.47	0.24	0.27	0.15	0.83	0.84	0.49	0.46	0.16
Low Carbon	Alternative Fuel Vehicle	0.49	1.23	0.62	0.31	0.45	0.36	0.84	0.72	0.30	0.39	0.25	0.94	0.98	0.72	0.67	0.24
Low Carbon	Alternative Fuels	0.63	1.60	1.07	0.39	0.70	0.44	1.27	0.91	0.59	0.63	0.37	1.55	1.81	1.14	0.98	0.34
Low Carbon	Building Technologies	0.45	1.07	0.67	0.33	0.42	0.35	0.89	0.71	0.35	0.37	0.22	1.12	1.07	0.75	0.63	0.23
Low Carbon	Carbon Finance	0.11	0.33	0.20	0.09	0.12	0.08	0.21	0.20	0.08	0.11	0.07	0.27	0.34	0.18	0.15	0.07
Low Carbon	Energy Management	0.08	0.24	0.14	0.06	0.09	0.07	0.17	0.13	0.06	0.07	0.05	0.24	0.22	0.14	0.13	0.05
Renewable Energy	Biomass	0.21	0.47	0.34	0.13	0.22	0.16	0.40	0.34	0.18	0.17	0.11	0.55	0.56	0.34	0.28	0.11
Renewable Energy	Geothermal	0.48	1.29	0.77	0.36	0.51	0.41	0.91	0.82	0.36	0.40	0.26	1.39	1.28	0.84	0.73	0.28
Renewable Energy	Photovoltaic	0.32	0.76	0.49	0.23	0.34	0.25	0.59	0.48	0.25	0.27	0.16	0.86	0.80	0.52	0.43	0.16
Renewable Energy	Wind	0.42	1.09	0.68	0.26	0.41	0.34	0.73	0.58	0.32	0.35	0.21	1.11	1.13	0.71	0.55	0.22

Table 17 can be read horizontally to identify the strongest exporting sub-sectors i.e. Alternative Fuels, vertically to identify the strongest trading partners i.e. China, and using both vertical and horizontal you can identify strong niches like Geothermal to Taiwan and Alternative Fuels to India.

Tables 18a, 18b and 18c apply the same conventions as Table 13, but this time broken down to Level 3, which reveals Marches LEP's priority exports in more detail. The tables show the same 32 destination countries but for 30 out of a total of 126 Level 3 market activities.

Table 18a: Marches LEP's Level 3 Exports by Country for 2019/20 in £m

Level 2	Level 3	Australia	Brazil	Canada	Chile	China	Denmark	France	Germany	Hong Kong	Hungary	India
Recovery and Recycling	Consultancy, Training and Education	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Recovery and Recycling	Glass Stock Processing	0.02	0.04	0.03	0.01	0.11	0.03	0.02	0.02	0.05	0.03	0.07
Recovery and Recycling	Technologies, Research & Development	0.00	0.01	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.01
Recovery and Recycling	Waste Collection	0.06	0.12	0.10	0.01	0.31	0.08	0.07	0.07	0.17	0.10	0.21
Waste Management	Construction & Operation of Waste Treatment Facilities	0.06	0.12	0.09	0.01	0.27	0.07	0.07	0.06	0.18	0.09	0.19
Waste Management	Consultancy, Training and Education	0.02	0.05	0.04	0.01	0.12	0.03	0.03	0.03	0.05	0.03	0.10
Waste Management	Equipment For Waste Treatment	0.07	0.15	0.12	0.02	0.36	0.08	0.06	0.06	0.20	0.12	0.25
Waste Management	Technologies, Research & Development	0.04	0.07	0.05	0.01	0.20	0.04	0.03	0.04	0.08	0.06	0.14
Water & Waste Water Treatment	Engineering	0.05	0.09	0.07	0.01	0.22	0.07	0.06	0.06	0.15	0.07	0.17
Water & Waste Water Treatment	Water Treatment and Distribution	0.16	0.40	0.29	0.04	0.80	0.22	0.19	0.23	0.50	0.29	0.69
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	0.21	0.48	0.40	0.05	1.14	0.32	0.24	0.28	0.63	0.39	0.88
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.08	0.18	0.12	0.02	0.39	0.09	0.09	0.09	0.25	0.12	0.31
Alternative Fuels	Main Stream Bio Fuels	0.07	0.18	0.16	0.02	0.37	0.09	0.09	0.10	0.24	0.16	0.30
Alternative Fuels	Other Bio Fuels	0.27	0.78	0.51	0.07	1.35	0.44	0.41	0.34	1.02	0.49	1.37
Alternative Fuels	Other Fuels	0.03	0.09	0.05	0.01	0.24	0.03	0.03	0.04	0.12	0.04	0.14
Building Technologies	Doors	0.06	0.15	0.13	0.02	0.46	0.12	0.08	0.11	0.25	0.12	0.33
Building Technologies	Insulation and Heat Retention Materials	0.05	0.11	0.10	0.01	0.28	0.07	0.06	0.07	0.14	0.08	0.21
Building Technologies	Monitoring and Control Systems	0.05	0.11	0.08	0.01	0.25	0.07	0.05	0.06	0.16	0.09	0.20
Building Technologies	Windows	0.11	0.25	0.20	0.03	0.73	0.14	0.16	0.15	0.35	0.21	0.46
Energy Management	Technologies, Research & Development	0.00	0.01	0.01	0.00	0.02	0.01	0.00	0.01	0.01	0.01	0.02
Biomass	Biomass Energy Systems	0.05	0.13	0.10	0.02	0.35	0.08	0.08	0.08	0.23	0.11	0.22
Biomass	Biomass Furnace Systems	0.01	0.03	0.02	0.00	0.07	0.02	0.02	0.02	0.04	0.02	0.05
Biomass	Boilers and related Systems	0.04	0.10	0.08	0.01	0.26	0.06	0.05	0.06	0.15	0.08	0.18
Biomass	Manufacturing Of Boilers and Related Systems	0.02	0.04	0.04	0.01	0.09	0.02	0.02	0.02	0.06	0.04	0.06
Geothermal	Manufacture and Supply of Specialist Equipment	0.10	0.23	0.15	0.02	0.54	0.14	0.11	0.11	0.28	0.15	0.34
Geothermal	Suppliers of Systems	0.09	0.18	0.14	0.02	0.50	0.11	0.10	0.11	0.29	0.13	0.37
Geothermal	Whole Systems Manufacture	0.10	0.22	0.20	0.02	0.56	0.12	0.08	0.13	0.34	0.18	0.37
Photovoltaic	Other Related Equipment and Chemicals	0.05	0.09	0.07	0.01	0.26	0.06	0.05	0.06	0.15	0.08	0.20
Photovoltaic	Photovoltaic Cells	0.06	0.09	0.10	0.01	0.21	0.05	0.05	0.06	0.12	0.08	0.19
Photovoltaic	Systems & Equipment	0.11	0.24	0.18	0.03	0.58	0.13	0.13	0.12	0.33	0.21	0.49
Wind	Large Wind Turbine	0.12	0.30	0.20	0.03	0.63	0.15	0.10	0.13	0.38	0.22	0.44
Wind	Small Wind Turbine	0.07	0.15	0.16	0.02	0.38	0.10	0.09	0.11	0.25	0.14	0.33
Wind	Wind Farm Systems	0.10	0.20	0.18	0.02	0.52	0.10	0.10	0.12	0.25	0.13	0.34

At Level 3 greater levels of detail are created that reveal more niche export markets, i.e. Other Bio Fuels to India, Large Wind Turbine to Taiwan and Thailand, Alternative Fuels (Main Stream for Vehicles Only) to Pakistan and Water Treatment and Distribution to China.

Table 18b: Marches LEP's Level 3 Exports by Country for 2019/20 in £m

Level 2	Level 3	Indonesia	Italy	Japan	Malaysia	Mexico	Netherlands	Pakistan	Poland	Portugal	Romania	Russia
Recovery and Recycling	Consultancy, Training and Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovery and Recycling	Glass Stock Processing	0.02	0.02	0.02	0.04	0.01	0.03	0.08	0.05	0.01	0.02	0.02
Recovery and Recycling	Technologies, Research & Development	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.00
Recovery and Recycling	Waste Collection	0.06	0.06	0.07	0.14	0.04	0.09	0.22	0.13	0.06	0.08	0.06
Waste Management	Construction & Operation of Waste Treatment Facilities	0.05	0.07	0.06	0.14	0.03	0.08	0.21	0.12	0.05	0.09	0.05
Waste Management	Consultancy, Training and Education	0.03	0.02	0.02	0.06	0.01	0.03	0.09	0.05	0.02	0.03	0.03
Waste Management	Equipment For Waste Treatment	0.06	0.08	0.08	0.16	0.04	0.09	0.23	0.16	0.06	0.10	0.07
Waste Management	Technologies, Research & Development	0.03	0.03	0.04	0.08	0.02	0.03	0.12	0.07	0.03	0.04	0.03
Water & Waste Water Treatment	Engineering	0.05	0.05	0.06	0.11	0.03	0.06	0.18	0.10	0.04	0.06	0.04
Water & Waste Water Treatment	Water Treatment and Distribution	0.17	0.19	0.22	0.44	0.10	0.26	0.61	0.41	0.17	0.23	0.19
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	0.22	0.30	0.30	0.60	0.14	0.37	0.96	0.47	0.23	0.34	0.27
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.08	0.07	0.09	0.17	0.05	0.11	0.28	0.15	0.08	0.11	0.09
Alternative Fuels	Main Stream Bio Fuels	0.07	0.10	0.10	0.19	0.05	0.11	0.31	0.20	0.08	0.11	0.07
Alternative Fuels	Other Bio Fuels	0.35	0.27	0.35	0.91	0.16	0.45	1.10	0.73	0.26	0.53	0.31
Alternative Fuels	Other Fuels	0.04	0.03	0.04	0.08	0.02	0.04	0.11	0.08	0.03	0.03	0.04
Building Technologies	Doors	0.07	0.08	0.08	0.17	0.05	0.11	0.29	0.17	0.08	0.12	0.09
Building Technologies	Insulation and Heat Retention Materials	0.05	0.06	0.06	0.12	0.03	0.07	0.19	0.12	0.05	0.08	0.06
Building Technologies	Monitoring and Control Systems	0.05	0.06	0.06	0.12	0.03	0.08	0.20	0.11	0.05	0.06	0.05
Building Technologies	Windows	0.13	0.15	0.15	0.34	0.08	0.19	0.39	0.26	0.14	0.17	0.15
Energy Management	Technologies, Research & Development	0.00	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.01
Biomass	Biomass Energy Systems	0.06	0.07	0.06	0.16	0.04	0.09	0.21	0.14	0.06	0.09	0.07
Biomass	Biomass Furnace Systems	0.01	0.02	0.02	0.04	0.01	0.02	0.04	0.03	0.01	0.02	0.01
Biomass	Boilers and related Systems	0.05	0.05	0.05	0.11	0.03	0.06	0.16	0.12	0.04	0.08	0.06
Biomass	Manufacturing Of Boilers and Related Systems	0.02	0.02	0.02	0.05	0.01	0.03	0.06	0.05	0.02	0.03	0.02
Geothermal	Manufacture and Supply of Specialist Equipment	0.10	0.09	0.11	0.23	0.06	0.13	0.31	0.19	0.10	0.13	0.10
Geothermal	Suppliers of Systems	0.08	0.09	0.10	0.23	0.05	0.11	0.35	0.21	0.09	0.13	0.10
Geothermal	Whole Systems Manufacture	0.09	0.10	0.12	0.23	0.06	0.13	0.36	0.21	0.10	0.16	0.12
Photovoltaic	Other Related Equipment and Chemicals	0.05	0.06	0.06	0.10	0.03	0.07	0.18	0.12	0.05	0.07	0.06
Photovoltaic	Photovoltaic Cells	0.05	0.04	0.06	0.13	0.03	0.08	0.15	0.11	0.05	0.09	0.06
Photovoltaic	Systems & Equipment	0.12	0.13	0.14	0.26	0.06	0.16	0.40	0.24	0.12	0.17	0.12
Wind	Large Wind Turbine	0.12	0.12	0.14	0.28	0.08	0.17	0.46	0.26	0.11	0.16	0.14
Wind	Small Wind Turbine	0.07	0.08	0.09	0.20	0.05	0.12	0.28	0.18	0.08	0.11	0.09
Wind	Wind Farm Systems	0.09	0.10	0.12	0.21	0.05	0.13	0.35	0.23	0.08	0.14	0.11

Table 18c: Marches LEP's Level 3 Exports by Country for 2019/20 in £m

Level 2	Level 3	Saudi Arabia	Singapore	South Africa	South Korea	Sweden	Taiwan	Thailand	Turkey	UAE	US
Recovery and Recycling	Consultancy, Training and Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovery and Recycling	Glass Stock Processing	0.05	0.04	0.02	0.02	0.01	0.08	0.07	0.05	0.03	0.01
Recovery and Recycling	Technologies, Research & Development	0.01	0.01	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00
Recovery and Recycling	Waste Collection	0.17	0.15	0.07	0.07	0.04	0.22	0.22	0.13	0.12	0.05
Waste Management	Construction & Operation of Waste Treatment Facilities	0.16	0.13	0.06	0.07	0.04	0.20	0.23	0.13	0.11	0.04
Waste Management	Consultancy, Training and Education	0.06	0.05	0.02	0.02	0.02	0.08	0.09	0.05	0.05	0.02
Waste Management	Equipment For Waste Treatment	0.17	0.14	0.07	0.08	0.05	0.26	0.26	0.14	0.15	0.05
Waste Management	Technologies, Research & Development	0.08	0.08	0.03	0.04	0.02	0.12	0.14	0.08	0.05	0.02
Water & Waste Water Treatment	Engineering	0.13	0.09	0.06	0.06	0.03	0.17	0.19	0.10	0.10	0.03
Water & Waste Water Treatment	Water Treatment and Distribution	0.47	0.36	0.18	0.21	0.12	0.65	0.64	0.39	0.36	0.13
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	0.65	0.56	0.22	0.31	0.20	0.65	0.71	0.57	0.52	0.18
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.19	0.16	0.08	0.08	0.05	0.28	0.27	0.16	0.15	0.06
Alternative Fuels	Main Stream Bio Fuels	0.20	0.17	0.10	0.08	0.06	0.27	0.30	0.16	0.17	0.06
Alternative Fuels	Other Bio Fuels	0.93	0.62	0.43	0.49	0.27	1.11	1.31	0.83	0.69	0.24
Alternative Fuels	Other Fuels	0.08	0.07	0.04	0.04	0.02	0.09	0.12	0.10	0.07	0.03
Building Technologies	Doors	0.26	0.17	0.08	0.10	0.06	0.31	0.29	0.20	0.15	0.06
Building Technologies	Insulation and Heat Retention Materials	0.13	0.11	0.06	0.07	0.04	0.20	0.16	0.13	0.12	0.04
Building Technologies	Monitoring and Control Systems	0.14	0.13	0.06	0.06	0.04	0.18	0.19	0.11	0.09	0.04
Building Technologies	Windows	0.36	0.30	0.15	0.15	0.08	0.43	0.44	0.31	0.28	0.09
Energy Management	Technologies, Research & Development	0.01	0.01	0.00	0.01	0.00	0.02	0.02	0.01	0.01	0.00
Biomass	Biomass Energy Systems	0.19	0.14	0.09	0.08	0.05	0.25	0.27	0.13	0.13	0.05
Biomass	Biomass Furnace Systems	0.03	0.03	0.01	0.01	0.01	0.05	0.05	0.03	0.03	0.01
Biomass	Boilers and related Systems	0.12	0.12	0.05	0.05	0.03	0.18	0.18	0.13	0.09	0.04
Biomass	Manufacturing Of Boilers and Related Systems	0.05	0.05	0.02	0.03	0.01	0.07	0.06	0.05	0.04	0.02
Geothermal	Manufacture and Supply of Specialist Equipment	0.29	0.23	0.10	0.11	0.07	0.34	0.40	0.21	0.17	0.08
Geothermal	Suppliers of Systems	0.23	0.21	0.10	0.11	0.07	0.32	0.33	0.19	0.18	0.07
Geothermal	Whole Systems Manufacture	0.20	0.23	0.08	0.11	0.08	0.44	0.29	0.26	0.23	0.07
Photovoltaic	Other Related Equipment and Chemicals	0.13	0.11	0.05	0.06	0.04	0.18	0.18	0.13	0.10	0.04
Photovoltaic	Photovoltaic Cells	0.12	0.12	0.07	0.06	0.04	0.21	0.16	0.10	0.09	0.03
Photovoltaic	Systems & Equipment	0.32	0.24	0.12	0.14	0.08	0.44	0.43	0.27	0.23	0.08
Wind	Large Wind Turbine	0.31	0.22	0.14	0.13	0.08	0.45	0.46	0.28	0.23	0.10
Wind	Small Wind Turbine	0.20	0.16	0.09	0.10	0.06	0.31	0.34	0.20	0.16	0.06
Wind	Wind Farm Systems	0.22	0.20	0.10	0.12	0.07	0.35	0.34	0.23	0.16	0.07

Appendix 1

LCEGS Sector Definition

The **Low Carbon and Environmental Goods and Services** (LCEGS) is divided into three Level 1 sub-sectors - Environmental, Renewable Energy and Low Carbon. These are in turn divided into 24 Level 2 sub-sectors:

- The Environmental sub-sector is made up of the following: Air Pollution Control, Contaminated Land Reclamation & Remediation, Environmental Consultancy, Environmental Monitoring, Marine Pollution Control, Noise & Vibration Control, Recovery & Recycling, Waste Management and Water Supply & Waste Water Treatment.
- The Renewable Energy sub-sector is made up of the following: Biomass, Geothermal, Hydro, Photovoltaic, Renewable Energy Consultancy, Wave & Tidal and Wind.
- The Low Carbon sub-sector is made up of the following: Additional Energy Sources, Alternative Fuels & Vehicles, Alternative Fuels, Building Technologies, Carbon Capture & Storage, Carbon Finance, Energy Management and Nuclear Power.

Environmental activities include 9 Level 2 sub-sectors, divided into 47 Level 3 activity groupings:

- Air Pollution includes indoor and industrial air quality and emissions control.
- Contaminated Land Reclamation/Remediation includes Decommissioning of Nuclear Sites.
- Environmental Consulting includes consulting, training & other services.
- Environmental Monitoring includes analysis, monitoring and instrumentation.
- Marine Pollution and Noise & Vibration Control both include abatement, consulting and R&D.
- Recovery & Recycling includes Waste Collection and various recycling processes
- Waste Management includes Waste Treatment Facilities & Equipment, consulting and R&D
- Water Supply and Waste Water Treatment includes treatment, distribution, consulting and R&D.

Low Carbon includes 8 Level 2 sub-sectors, divided into 49 Level 3 activity groupings:

- Carbon Finance includes Credits Finance, Fund Management, Trading and Research
- Carbon Capture & Storage includes Capture, Pipeline, Storage and Engineering.
- Energy Management includes Lighting, Heating & Ventilation and Engineering.
- Nuclear Power includes Construction, Commissioning, Operations, Engineering and Testing Services.
- Additional Energy Sources include Energy Storage Research, Fuel Cells & Hydrogen.
- Alternative Fuels & Vehicles includes main stream and other vehicle fuels.
- Alternative Fuels includes Main Stream and other Bio Fuels, Batteries and Other Fuels.
- Building Technologies includes Doors, Windows, Monitoring & Control Systems and Insulation/Heat Retention Materials.

Renewable Energy includes 7 Level 2 sub-sectors, divided into 30 Level 3 activity groupings:

- Wind includes Large Turbines, Small Turbines and Wind Farm Systems.
- Wave & Tidal includes Ebb & Flood, Pumps & Equipment, Turbine & Generation etc.
- Photovoltaic includes Systems & Equipment, Cells and Chemicals.
- Hydro includes Turbines, Pumps, Electricity Supply and Dams.
- Geothermal includes Whole Systems, Specialist Equipment, Consulting and R&D.
- Biomass includes Energy, Furnace, Boilers and Related Systems.
- Renewable Energy consulting includes specialist consulting and legal advice.

Further detail on the Level 2 sub-sectors are provided below in their Level 1 groupings:

Environmental

Air Pollution Control sub-sector includes a wide range of manufacturing, operations, consulting and engineering functions that relate to improving and maintaining air quality. It includes:

- Emission Control sensing and monitoring systems and technologies.
- Indoor Air Quality Control (domestic and industrial) through ventilation, cooling and purification systems.
- Dust & Particulate control through installed technologies like filters, towers, scrubbers, cyclones and eliminators.
- Process Engineering for odour control and other cleaner technologies.
- Industrial Emission Control technologies and equipment (manufacture, installation, operations and maintenance).
- Emission Control through manufacture, installation and operation of sampling, control and evaluation systems.

Contaminated Land Reclamation and Remediation sub-sector includes all activities that bring land back into agricultural, industrial, community or commercial use. This includes longer term activities like the decommissioning of nuclear sites.

Remediation and land reclamation include land forming, bunds, geotextiles, storage & containment, oil interceptors, drainage systems, monitoring systems, proprietary treatment processes, sampling & analysis, site investigation, specialist cleaning services, cleaner technology R&D, surface & ground water services, organic waste composting and other services.

Decommissioning includes equipment, consulting, project management, safety critical assessment, pollution control, enviro risk analysis & impact assessment, recycling & compaction, waste collection & containment, waste water treatment, site assessment, excavation, sampling & analysis and monitoring.

Environmental Consulting and Services sub-sector includes consulting, training and management services that are specific to the environmental sector. It includes:

- Specialist consulting - habitat assessment, regulations, compliance and management systems, audits and impact assessment, eco design, eco-investment, climate change modelling, insurance and bio-diversity advice & assessment.

- Manpower and executive recruitment, temporary and permanent recruitment, contracted and interim management services.
- Management services - general consulting, financial, IT, software and marketing services.
- Training and education - publications, online publications, teaching aids, newsletters and courses for waste management, waste water treatment etc.

Environmental Monitoring, Instrumentation and Analysis sub-sector includes activities that measure water, soil and air quality and that support wider pollution control activities in other land, water, marine or air- based environmental sub-sectors. It includes:

- Environmental monitoring- development of cleaner monitoring processes and technologies, vehicle testing, oil spill detection, food testing, nitrate levels, meteorological, water/soil/air quality testing and monitoring.
- Instrumentation equipment & control manufacture, supply, maintenance and development of instrumentation, laboratory equipment and software for environmental/ air/ water/ land/ marine analysis.
- Environmental analysis - laboratory testing, data logging & recording, quality reporting, collection & collation of samples, auto sampling systems, in-field measurement and reporting and R&D in water, soil and emissions analysis.

Marine Pollution Control sub-sector includes responses to pollution hazards at sea and also discharged from land-based sources. It includes the following products and services for deep sea, coastal waters and inland waterways. It includes:

- Marine pollution abatement - manufacture, supply and maintenance of booms, chemical discharge treatment equipment, solid & liquid waste/radioactive containment and treatment equipment and monitoring services, spillage clean-up services, shoreline & shallow water remediation and maintenance services and collection & containment services.
- R&D - cleaner processes and technologies, monitoring systems, oil absorbents, boom and containment systems, water containment and treatment technologies.
- Specialist consulting and training - chemical discharge prevention, education, policy & planning, training, publications, sewerage discharge management, radioactive waste management and solid and liquid waste management.

Noise & Vibration Control sub-sector includes all activities that prevent or control noise and vibration pollution. It includes:

- Noise abatement - manufacture, supply, installation and maintenance of barriers, acoustic management equipment, noise insulation, noise & vibration control and monitoring equipment, acoustic management equipment, noise insulation materials, monitoring services, large plant services and surface modifications.
- R&D - noise attenuation, noise sensing, vibration sensing, vibration control and noise & vibration abatement equipment and cleaner technologies and process by development.
- Consulting and training - consulting, publications, training and noise monitoring services.

Recovery & Recycling sub-sector includes all activities relating to the collection and processing of domestic and industrial waste products. It includes:

- Waste collection - manufacture, supply, installation and operation of equipment and services for collection of household, industrial and hazardous waste, treatment of waste prior to landfill and supply of pre-treated recyclates.

- Engineering & equipment - engineering services and process control for the complete range of recycling stock
- Consulting & training - collection and processing consultancy and training, publishing, legal & insurance advice.
- R&D - metals recovery, pyrolysis, bio-based systems, new recyclable materials, new collection & processing technologies.
- Recycling stock - recovery, recycling, processing, sorting, supply and packaging of rubber, plastics, paper, oil, electrical, electronics, glass, composting, construction & demolition, automotive, wood and textiles stocks.

Waste Management sub-sector includes the treatment/management of domestic and industrial waste that cannot otherwise be recycled. It includes:

- Construction & operation of waste treatment facilities for anaerobic digestion, composting, incineration, landfill, waste to energy conversion and the supporting engineering services.
- Equipment for Waste treatment, manufacture, supply, installation and maintenance of bio filters, bio reactors, collection equipment, grease traps, oil interceptors, materials processing equipment, monitoring & control equipment and nightsoil & landfill leachate treatment.
- R&D - incineration technologies, energy from waste systems, cleaner processing & treatment technologies, disposal of hazardous waste and other materials processing technologies.
- Consultancy and training - books, periodicals & publications, specialist consulting and training for asbestos, hazardous materials and other waste management systems.

Water Supply and Waste Water Treatment sub-sector includes activities relating to the treatment of pollutants in the water supply. It includes:

- Water treatment and distribution, manufacture, supply, installation and maintenance of systems for activated sludge, aerobic & anaerobic treatment, biological odour & corrosion control, demand management & leakage reduction, effluent treatment, filters, microbial treatment, screens, sequencing batch reactors, water disinfection and storm/grey water treatment.
- Engineering - field engineering, pipe & valve maintenance, fitting & construction, fabrication & welding and engineering design.
- R&D - water purification, water management, black/grey water treatment, biocides, bio reactors and aerobic/anaerobic treatment technologies.
- Consulting and training - engineering and water management training, publishing and specialist consulting for water systems treatment, management and engineering.

Renewable Energy

Biomass Energy sub-sector includes all activities that convert biomass into energy but excludes biomass materials (see Alternative Fuels). It includes:

- Biomass furnace systems - manufacture, supply, consulting, design, installation, engineering and other services for domestic, industrial and community applications.
- Biomass energy systems - manufacture, supply, consulting, design, installation, engineering and other services for domestic, industrial and community applications.
- Manufacture of biomass boilers and systems including boilers, cogeneration, heat exchange and packaged power systems for domestic, industrial and community applications.

- Biomass boilers and related systems including supply, consulting, design, engineering, installation and other services for boilers, cogeneration, heat exchange and packaged power systems for domestic, industrial and community applications.
- Technical and operational consulting.

Geothermal Energy sub-sector includes all activities relating to the extraction and use of heat generated from the earth. It includes:

- Manufacture and supply of specialist thermally enhanced equipment - grout, heat pumps, pipes, flow control valves, drilling equipment, installation rigs and ancillary equipment.
- Whole systems manufacture and supply for industrial, residential and community geothermal energy applications.
- Component design and research - design services, component research and component recycling.
- Consulting & related services - architectural, construction, systems design, consulting, engineering, installation and project development services.

Hydroelectric Energy sub-sector includes activities that help to extract energy from river and other water sources held in dams (as opposed to wave or tidal energy) that is used to drive turbines and generators. Large scale civil engineering/construction activities associated with dam building have not been included in this analysis. It includes:

- Turbines - manufacture, supply, installation and maintenance of turbine generators, control systems, spares and structural supports and fittings.
- Dams & structures - manufacture, supply, installation and maintenance of dam operational systems, control systems, maintenance services and sluice gates and actuators.
- Pumping & lubrication - manufacture, supply, installation and maintenance of pumps, spares, storage and lubrication systems and spares.
- Electricity supply - manufacture, supply, installation and maintenance of power factor, power distribution and grid connections and supporting structures.

Nuclear Power sub-sector includes all activities that relate to the generation of nuclear power, excluding decommissioning of nuclear sites. It includes:

- Nuclear safety engineering services, regulatory compliance, reactor management, fail-to-safety engineering.
- Nuclear power plant operations management, engineering and PR.
- Nuclear cooling equipment - manufacture, installation and maintenance.
- Construction of plant and equipment - site development, reactor and buildings and power plant/equipment construction.
- Commissioning engineering services - cooling & thermal control, engineering maintenance, instrumentation, power distribution, reactor & plant commissioning.
- Sampling & testing services - thermal control testing, remote monitoring, back-up plant monitoring and effluent discharge testing.
- Nuclear scientific services - research, laboratory testing and fuel management.

Photovoltaic Energy sub-sector includes all activities that help to convert solar radiation into useable energy. It includes:

- Chemicals - production and supply of solar chemicals and solar pond salt.

- Systems & equipment - manufacture, supply, installation and maintenance of active and batch systems, clerestory windows, light shelves and tubes, solar box cookers, solar combi-systems and solar lighting design.
- R&D - solar power and solar car research.
- Photovoltaic cells - manufacture, supply, installation and maintenance of photovoltaic modules, mounting systems, ancillary components, cells and cell materials.
- Other equipment & chemicals - manufacture, supply, installation and maintenance of glass houses, convection towers, heliostats, parabolic collectors, turbines, trough collectors, towers and solar trackers.

Renewable Energy Consulting sub-sector includes consulting and legal services specific to Renewables i.e. not included in general or specific environmental consulting. It includes:

- Legal services - wind farm location and other renewable energies.
- Consulting - turbines, solar and photovoltaic applications, public sector and corporate Renewables policies, nuclear energy, insulation technologies and alternative fuel technologies.

Wave & Tidal Energy sub-sector includes all activities that help to convert the energy from waves and tides into usable power (also known as marine renewable energy). It includes:

- Turbines & generators - the manufacture, supply, installation and maintenance of tidal turbines, structural supports and fittings, spares and turbine control systems.
- Pumps & equipment - the manufacture, supply, installation and maintenance of pumps and pump spares.
- Two basin schemes - provision of structural engineering and field maintenance services.
- Ebb & flow systems - manufacture, supply, installation and maintenance of ebb and flood generation systems.
- Assessment & Measurement - waves, water levels, turbidity, tidal energy, sediment, salinity pollutants, fish stocks monitoring and local/ global environmental impact assessment.
- Other general services - financial planning, operational and maintenance services.

Wind Energy sub-sector includes all activities that convert wind power into usable energy. This includes wind farm systems, large and small wind turbines. The sub-sector is divided by size of turbine rather than location (onshore and offshore) because it is easier to differentiate and map supply chain activities in this way. It includes:

- Wind farm systems - manufacture, supply, installation, operation and maintenance of integration, power plant, power control, grid entry equipment and systems and electrical and mechanical componentry.
- Small wind turbines - manufacture, supply, installation, operation and maintenance of small turbine systems (blades, towers, fixing structures, cowlings, enclosures, gear boxes and drive trains), componentry and research.
- Large Wind Turbines - manufacture, supply, installation, operation and maintenance of large turbine systems (blades, towers, fixing structures, cowlings, enclosures, gear boxes and drive trains), componentry and research.

Low Carbon

Additional Energy Sources sub-sector groups together R&D, Design and Prototyping activities relating to a range of new Low Carbon energy sources.

These energy sources include: Fuel Cells, Hydraulic Accumulators, Hydrogen, Molten Salt, Thermal Mass, Compressed Air, Superconducting Magnets and more general energy storage research.

This is a small sub-sector (in value and impact) because only energy sources that have a current economic footprint (i.e. trading) are included. This excludes a number of promising energy sources that are still in development and for which economic evidence is not yet available.

Alternative Fuel and Vehicles sub-sector includes Low Carbon Fuel and technology activities that relate to (predominantly) automotive transport. It is divided into Alternative Fuels (main stream) and Other Fuels and Vehicles. This sub-sector does not include bio diesel (see Alternative Fuels). It includes:

- Alternative Fuels includes the production, supply and distribution of Natural Gas (Compressed or Liquefied), Synthetic Fuel and Auto Gas (LPG, LP Gas or Propane).
- Other Fuels and Vehicles includes vehicle technologies and fuel sources that are still at an early stage.
- Research, Design, Development and Prototyping activities are included for: Hydrogen fuel cells and hydrogen internal combustion, Electric, Hybrid Electric, Steam powered, Organic waste fuel, Wood gas, Solar powered and Air, Spring & Wind powered vehicles.

Alternative Fuels sub-sector includes a wide range of Low(er) carbon fuel sources that are not included under Renewable Energy. It includes the manufacture, production, supply and distribution of:

- Batteries - chemicals, chargers, controllers, cables, connectors, containers, suppliers and testing equipment.
- Bio fuels for Vehicles - bio diesel, butanol, ethanol and vegetable oils.
- Mainstream Bio fuel applications (non-transport) - bio diesel, butanol and ethanol.
- Other Bio fuels - biomass, methane, peanut oil, vegetable oil, wood and woodgas.
- Other fuels - Hydrogen.

Building Technologies sub-sector includes main stream building materials and systems that contribute to reduced energy use and to lowering the carbon footprint of buildings. It includes:

- Windows - the manufacture, supply, distribution, installation and development of double glazed, electro chromatic, insulated alloy, honeycomb and triple glazed units.
- Doors - the manufacture, supply, distribution, installation and development of insulated alloy and plastic doors.
- Insulation and heat retention materials - the manufacture, supply, distribution, installation and development of insulation materials, heat retention surfaces & ceramics, electronic control systems and controlled venting and ducting systems.
- Monitoring and control systems - the manufacture, supply, distribution, installation and development of energy and distributed energy control, monitoring, management and analysis systems.

Carbon Capture & Storage sub-sector includes activities that store carbon emissions - from locations like power plants and prevent them entering the atmosphere. It includes manufacturing, supply, distribution, installation, maintenance, development and design of:

- Pre combustion capture systems
- Post combustion capture systems
- Oxy-Fuel combustion systems
- Pipeline systems and services
- Ship storage and discharge systems
- Ocean storage equipment and services
- Mineral storage equipment and services
- Geological storage equipment and services
- Engineering, project management and consulting services.

Carbon Finance sub-sector includes investment activities and financial instruments for emission reduction projects and carbon trading. This includes:

- Carbon credits finance and fund management - land, project or general trading services from finance houses and investment funds.
- Carbon credits trading - development and supply of trading systems, land/project/general trading houses and transactions.
- Carbon market intelligence - carbon markets analysis & reporting and carbon trading by forecasting and reporting from journals, online, data providers or other publishing sources.
- Projects and verification - data collection, verification, legal, project development, capacity development and carbon declaration services.
- Press and journalism - financial press and periodicals, other journals, data providers and online services.

Energy Management sub-sector includes energy saving and power management activities for industrial and domestic use. It includes:

- R&D into high efficiency lighting, heating & ventilation, power, lighting, equipment & pumps and advance management systems.
- Gas Supply - monitoring, meterage, leak detection & maintenance, gas supply control and manufacture of high efficiency consumer equipment and devices.
- Lighting - manufacture, supply, distribution and installation of energy saving light bulbs & tubes, lighting and control systems.
- Heating & Ventilation - manufacture, supply, distribution and installation of energy saving equipment and systems.
- Electrical - manufacture, supply and installation of energy saving power control, building control, power consumption control & monitoring systems.
- Consulting and other services - advice & consultancy, publication, training and design of management systems.

Appendix 2

The kMatrix Methodology

2.1 Introduction

This sector (until 2015) has not been well documented by government statistics, so the methodology works beyond standard industrial and market classifications and looks for multiple sources of industrial-based evidence to quantify market values. kMatrix is unique in how it identifies, assembles, evaluates, monitors and develops rules for the use of those sources to quantify ‘difficult-to-measure’ markets.

Market activities are only included when there are multiple data sources. These sources are screened to remove duplicate references to any single source and then shortlisted by removing outliers and unreliable sources. This shortlist is then screened again until some consistency in value is achieved.

Market values created in this way are then “reality tested” by comparing these values within and across sectors, against known national/regional industrial specialism, across nations, against known trade flows and recognised industry benchmarks.

This methodology is quantitative and data intensive. Its uniqueness resides in the ability to manage and select reliable sources that are specific to each market activity. The data sources are global in nature and derive from government, private sector, institutional, industrial, trade, advertising, HR, financial, investor, academic and other (unpublished) sources. Up to 900 sources are used to compile the national LCEGS data set.

Sources are carefully managed. kMatrix measure and rate their sources’ accuracy and reliability over time and exclude sources that are outdated or without a measurable track record. They use no less than seven qualified sources showing some consistency in results for deriving any values that they print. They create a mean value from these selected values and then assign a confidence level (generally of about 85%) based upon the spread of selected values around the mean

In contrast to most research or consulting reports kMatrix do not identify, copy and then acknowledge single data sources for specific tables or analytical comments. This is impossible for them to do because they multi-source every aspect of their data and then “transform” it into a new value. This makes single source attribution meaningless.

2.2 Measures

Throughout this dataset the focus is on a small number of key measures. To summarise, these are:

- **Sales** – This is the estimate (in £m) of economic activity by identified companies in a defined region within the supply/value chain for market products and services. The estimate is based upon where sales activity takes place rather than where it is reported.
- **Companies** – This is a measure of the total number of companies in a defined region that match, or fit within, the market activity headings.

- **Employment** – This is a measure of the estimated employment numbers across all aspects of the supply/value chain. National, regional and other economic data sources have been used to estimate current employment levels for each area of market activity.
- **Growth** – This is a multi-year measure that includes historical AND forecast growth. The growth measure is derived from live, rapidly changing and multi-sourced data links and is specifically based upon growth in Sales. Growth is generally a measure of increased market opportunity and can be used for trend analysis, comparison across different markets or as a moving indicator of market confidence (growth time series).
- **Exports** – This is a measure of products and services sold overseas and is calculated using in-country/out-of-country data and additional data from the logistics and freight forwarding industry.

2.3 kMatrix's Methodology

The methodology for sector analysis is definition and source-driven. The definition determines WHAT gets measured and the source model determines HOW it gets measured.

All of the data measures are multi-sourced, and the process starts by defining the financial value of the sector (based upon our inclusive definition) from a wide variety of sources.

When kMatrix create a sector definition they always check that multiple sources of economic data exist for each included activity. This financial value is checked against existing sector values and also against the value of other economic sectors.

This is an iterative process that continues until they arrive at robust values and comparisons for all activities within the sector (comparative values of Wind vs. Photovoltaic vs. Biomass) that can then be meaningfully compared across global economies (UK vs. US vs. China etc.) and across different sectors (environmental consultancy vs. other specialist consulting activities). It is important that the methodology triangulates economic values in this way so that they:

- a) Can exclude the research bias that often occurs from focusing on a single sector in a single country and
- b) Ensure that they are effectively monitoring a sector that is still evolving by absorbing activities often included in other sectors.

Sales

The key measure that is used for financial value is Sales i.e., the value of sector products and services sold either to other businesses or directly to consumers from the geographically located company base, whether it be national, regional, sub-regional or Local Authority. This means that the analysis only includes activities where there is a measurable economic footprint. It does not include publicly-funded research or pre-commercial consumption of funds, except where those activities result in the purchase of product and services from third parties

As they derive the financial value for the sector they also assemble and assess the UK company base that is contributing to this value. In the first case they identify all “significant” or “specialist” companies, these are companies where LCEGS account for over 80% of company sales, and then the supply/value chain companies where LCEGS sales is an

important and measurable component of their overall sales - (over 20%). These percentages are indicative and vary for different LCEGS activities.

Companies

The company count acts as a further reality check on the financial value of the sector by comparing company turnover values in this and other sectors and also assists in the geographical analysis of where LCEGS value is created. For company counts and company listings we use standard data sources (FAME, Companies House etc), international sources, industry/trade sources, the advertising industry (YELL etc.) and, with caution, company-published information.

One important fact about the methodology is that in a typical SIC approach to sector analysis, a company is counted once and the value of its activities are very often assigned to a single category (which may or may not reflect what a company actually sells now), within a single sector and from a single geographical location.

This approach is to identify and assign value to different activities within a company that may fall within the same sector and to exclude values associated with different sectors. Where possible, they also break the reported activity down within larger multi-site companies so that only the value created within a region/LA is reported for that region/LA.

By analysing a sector in this way, they are able to capture the economic value generated by all “specialist” and supply/value chain companies, without any double counting of value. However, the methodology does mean that a single company may contribute value to multiple activities, and we have to be careful not to double-count companies. To avoid this we assign a company, for counting purposes, to the activity that accounts for most of its sector sales. This does mean that on some occasions some of the smaller activities in our analysis may have a financial value in the sales column but a zero in the company column.

Employment

When financial values and company numbers have been calculated the methodology then looks at the employment base for the sector. The analysis of employment includes HR/Recruitment industry data, trade/industry data, government statistics, company reported employment levels and a variety of industry benchmarks that show employee input ratios into different products and processes. They do not survey companies directly for this information.

From these different sources we calculate employment numbers for LCEGS sector activities, taking into account how staff can operate processes that produce products for different markets. We, therefore, measure our employment numbers in Whole Time Equivalents (WTE).

Growth

Sales Growth is both an historical and a forecast measure and the methodology applies the same multi-source rigour to assessing growth that has already occurred as to growth that may occur. Growth forecasting shows the importance of both multi sourcing AND tracking the historical reliability/accuracy of sources used. It is based upon continuous monitoring of forecast “opinions” that are constantly being updated and re-evaluated, as a result “in-year” measurements of predicted growth can vary depending on when the sample is taken and change as sources respond to events like recession.

For this reason, we measure annual growth as a) a value frozen at a point in time and b) a time series (monthly or quarterly) measured throughout the year. In this file we include only the single

(frozen) forecast. Separate files with detailed time series forecasts and trend analysis for the LCEGS sector are available.

Annual growth figures are useful in calculating and comparing the future contribution of sector activities beyond the current baseline. The percentage growth shows the RATE of change, the application of growth rates to the current sales baseline shows the IMPACT of change. Measuring the impact of change in financial terms shows how the ranking and importance of existing activities to the region/local authority may change over time and suggests when and where action may need to be taken to accommodate changes in the employment and company base.

The quoted growth rates in this dataset apply specifically to sales value. A growth in sales is indicative of changes in company numbers/employment but 5% sales growth does not necessarily equate to 5% employment growth. Companies can achieve growth in different ways and the recession has shown that companies will consume any “slack” before creating new jobs.

Geography

The methodology is designed to locate and measure economic activity at various geographical levels. The smallest unit of measurement is the Local Authority, but it can analyse data at county, sub-regional, LEP, regional and UK level.

When the methodology calculates and measures economic activity at the local authority level it takes into account existing local government boundaries, local GDP calculations and demographics, the postcode location of companies in the sector and any other local data that is available and relevant to the sector. When we measure sales and employment, therefore, our numbers are based upon where the business is located, rather than where people live.

There are some limits to what economic measures can be meaningfully or accurately applied at the local level. This is due to the range and specificity of data sources. Most of the economic development measures within this dataset can be accurately represented at a local level. Growth is an exception because rates cannot meaningfully be differentiated at a local level, therefore we apply regional growth rates throughout.

Appendix 3

LCEGS and Office of National Statistics Environmental Goods and Services Sector Comparison

The purpose of this appendix is to provide a brief description of some of the differences between the Office of National Statistics (ONS) Environmental Goods and Services Sector (EGSS) data and the LCEGS data provided by kMatrix. The two methodologies differ in the way data is collected, their methodologies, and in terms of their sector definitions.

kMatrix is a data house that specialises in providing evidential data for business modelling and analysis on a multi-sectoral basis. We provide back room services to the likes of Deloitte and PWC amongst others in the UK, New Zealand, Australia, US and the EU for sectoral analysis and due diligence for sectoral development and investment. We also provide our business and technology profiling services through these channels to market, as well as direct to universities for technology spinouts and individual businesses for development purposes. Further customers include government departments such as BEIS, Home Office and various local and regional government departments.

The ONS EGSS data is produced primarily for the purpose of national accounting. It is sector-specific, using narrow sector definitions and takes no account of the value or supply chains in a sector. In contrast, the kMatrix methodology was originally designed to help companies by measuring technologies or activities using small taxonomies, to assist with investment and developmental planning. This capability was expanded to provide market data for a number of economic sectors, by creating larger taxonomies to capture as much of the market as possible, including the supply and value chains. Each taxonomy for a sector will draw relevant activities from many other sectors, to fully capture all activity. In this way, the LCEGS taxonomy captures activities across multiple sectors and down the value and supply chains. This difference in *what* is being measured is the fundamental reason why the definitions used by ONS and LCEGS do not align.

The kMatrix methodology uses a unique process of ‘triangulation’ to measure metrics such as employment and other characteristics of a sector at varying levels of detail. This process has been developed over 30 years and has been adopted by various governments, universities and major corporates to provide economic industry data for hard to measure sectors. It is similar in concept to the triangulation of satellites to work GPS satellite navigation systems. The methodology uses multiple data points which can be economic or non-economic in origin, from a number of different sources to ‘triangulate’ the value of a product or service in question.

This process is different to the methodology used by the ONS to produce the EGSS data, predominantly because the ONS data relies on self-certification of companies into SIC codes, whereas the kMatrix methodology calculates values based on multiple sources of data. The ONS data is based on where companies choose to classify themselves. kMatrix data looks at the activities of companies and attributes those activities to different sub-sectors. In effect, the ONS system is limited to the ability or willingness of companies to list which sectors their products or services are used in, this method is likely to produce both over and underestimates of market size as companies will attribute more or less of their activities to relevant SIC codes. The kMatrix methodology does not rely on company cooperation but looks at their activities and breaks them down into the levels or sub-sectors they are relevant to.

The kMatrix process operates on a 'bottom up' basis, meaning we look at products and services delivered, rather than company classifications and turnover, which is classed as 'top down' (SIC system). The bottom up process was developed to assist individual companies based on sectoral analysis findings and provide evidential data and advice. By looking at the sector from the bottom up (by each activity, product or service), the sector can be determined in accordance with the relevant sector definition, whilst allowing the flexibility to 'add in' or 'opt out' of various activities depending on the purpose of the reporting. ONS data itself is not used to produce kMatrix figures, but the kMatrix values can be reported out through the ONS classification system if required.

Table 1 shows a comparison between employment analysis for the London region using the SIC classification methodology and the kMatrix methodology for the Manufacturing sector and the Construction sector.

Table 1: Comparison of 2011 - 2016 Employment Data for SIC and kMatrix in London

Methodology	Sector	2011 Jobs	2012 Jobs	2013 Jobs	2014 Jobs	2015 Jobs	2016 Jobs
SIC based	Manufacturing	106,750	108,250	106,750	112,000	108,000	105,250
SIC based	Construction	133,250	150,500	146,500	146,250	145,250	155,750
kMatrix	Manufacturing	137,351	135,943	138,951	141,873	140,308	131,230
kMatrix	Construction	166,629	195,334	177,915	184,022	184,317	199,038
<i>Indexed numbers for the rows above show that growth in the manufacturing and construction sectors is similar for both the SIC and kMatrix definitions</i>		100	101.4	100.0	104.9	101.2	98.6
		100	112.9	109.9	109.8	109.0	116.9
		100	99.0	101.2	103.3	102.2	95.5
		100	117.2	106.8	110.4	110.6	119.4

Sector - LCEGS is made up of elements from many different traditional sectors (including manufacturing, finance, construction, consulting and energy) therefore as a grouping it includes products and services from those sectors that together amount to the total value of the LCEGS grouping.

Scale - The ONS system only produces estimates of the sector size at the country level, whereas the LCEGS data can be provided by Country, Region, City, Local Authority etc.

Table 2 shows a summary of the main differences between the kMatrix data and the ONS EGSS data.

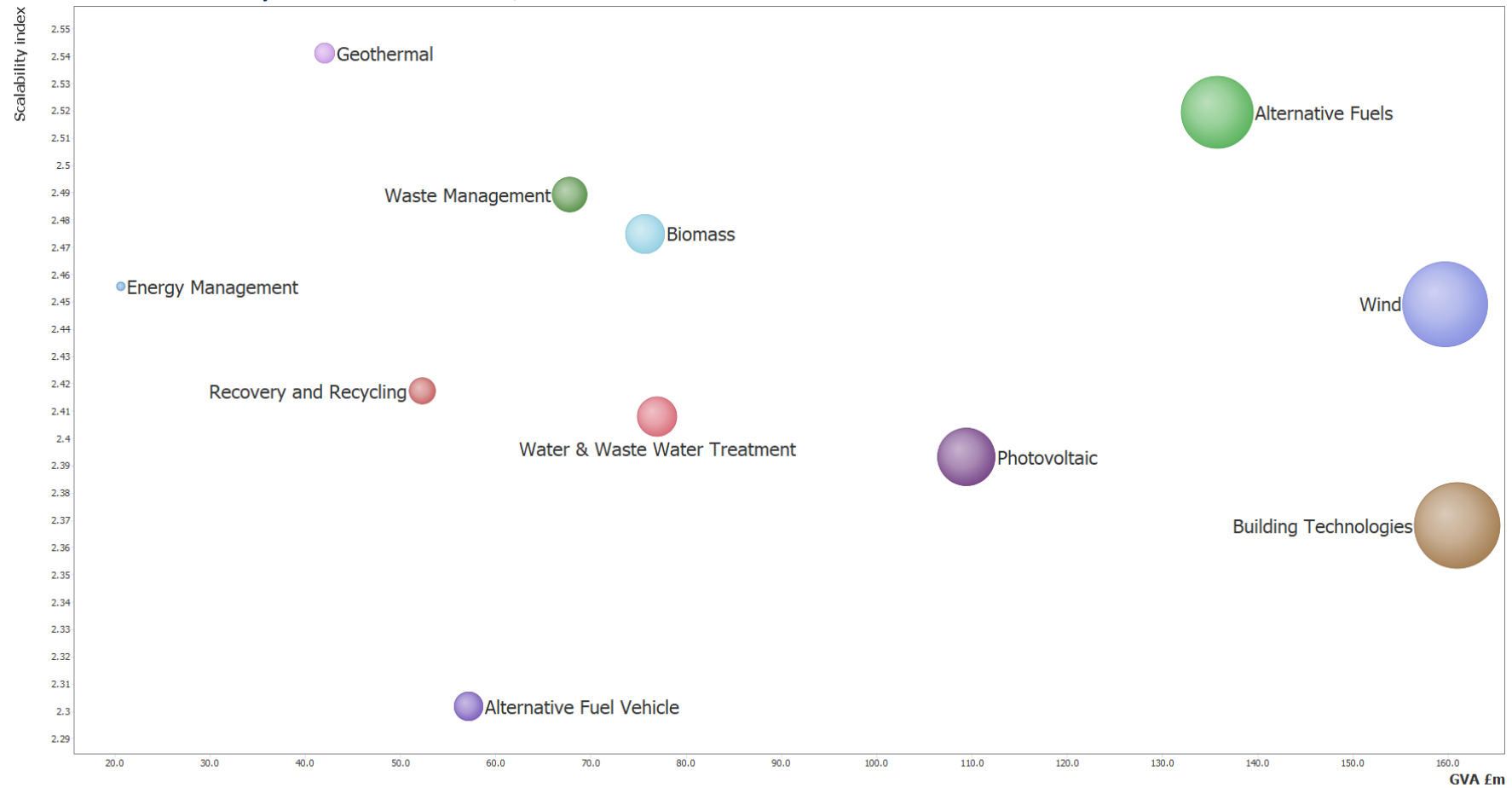
Table 2: kMatrix and ONS – EGSS Comparison Summary Table

	kMatrix - LCEGS	ONS - EGSS
Sector definition	The LCEGS sector includes the EGSS definition but expands it to include all activities that contribute and enable growth in the sector. Those elements which are excluded from EGSS which are produced for purposes that, while beneficial to the environment, primarily satisfy technical, human and economic needs or that are requirements for health and safety are included in LCEGS if they contribute to the sector. For more information please see Appendix 3 and Appendix 4 of this report.	The environmental goods and services sector is made up of areas of the economy engaged in producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources. Excluded from the scope of EGSS are goods and services produced for purposes that, while beneficial to the environment, primarily satisfy technical, human and economic needs or that are requirements for health and safety.
Sector size measurement	Triangulation of data from multiple sources	Company surveys via company self-certification
Sector sales coverage	Full value of sales for the sector, including supply and value chain	Only sector sales, not including supply or value chains
Geographic range of coverage	Global, Country, Regional, City & Local Authority	Country
Available data includes	Sales, number of employees, number of companies, exports, growth rates (historical and forecast) & 60+ more metrics	Output, GVA, employee count and exports
For further information and detail on the ONS – EGSS definition: https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/ukenvironmentalaccounts/2010to2015		

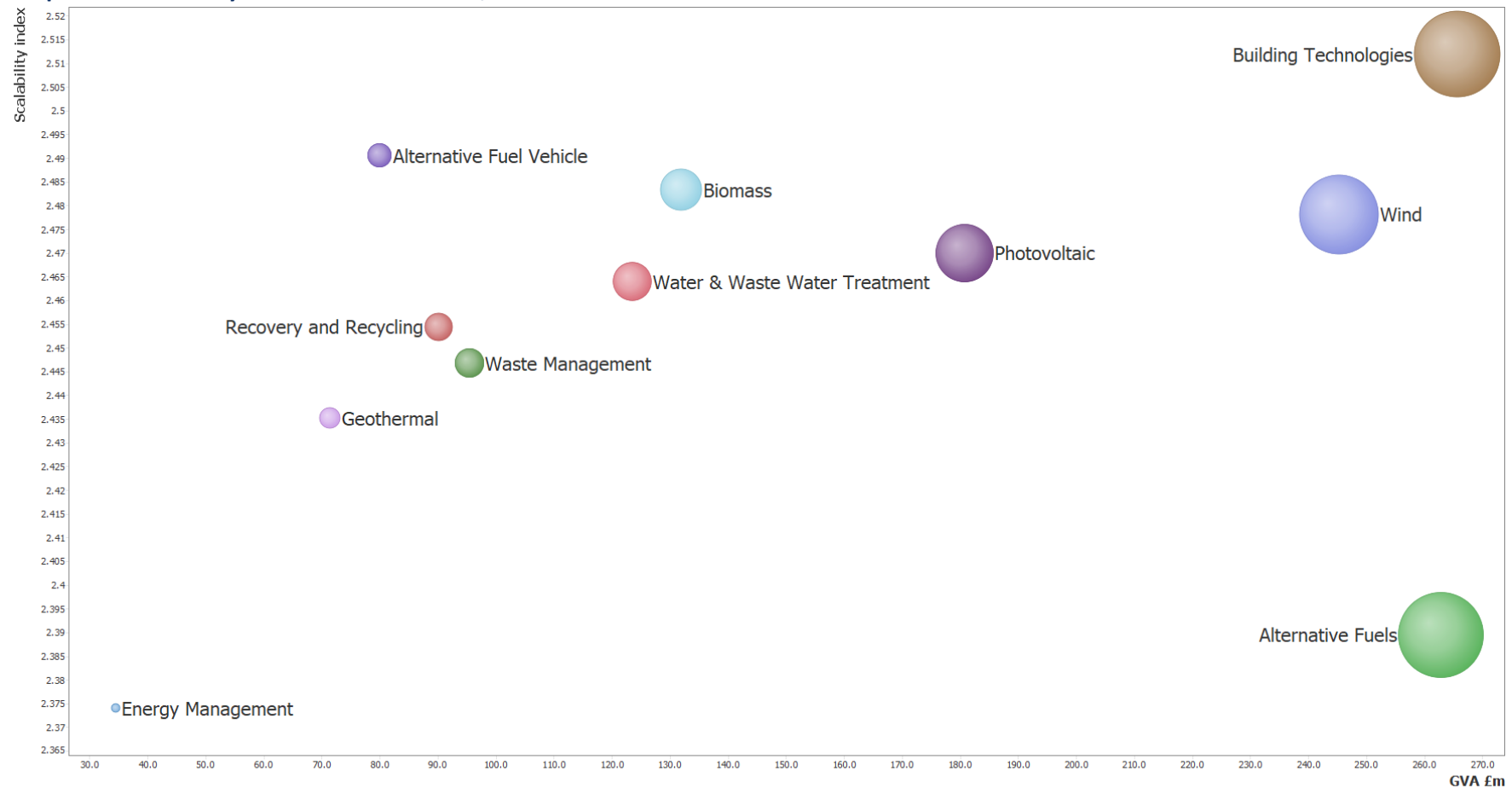
Appendix 4

LCEGS Scalability vs. GVA by Local Authority for Level 2

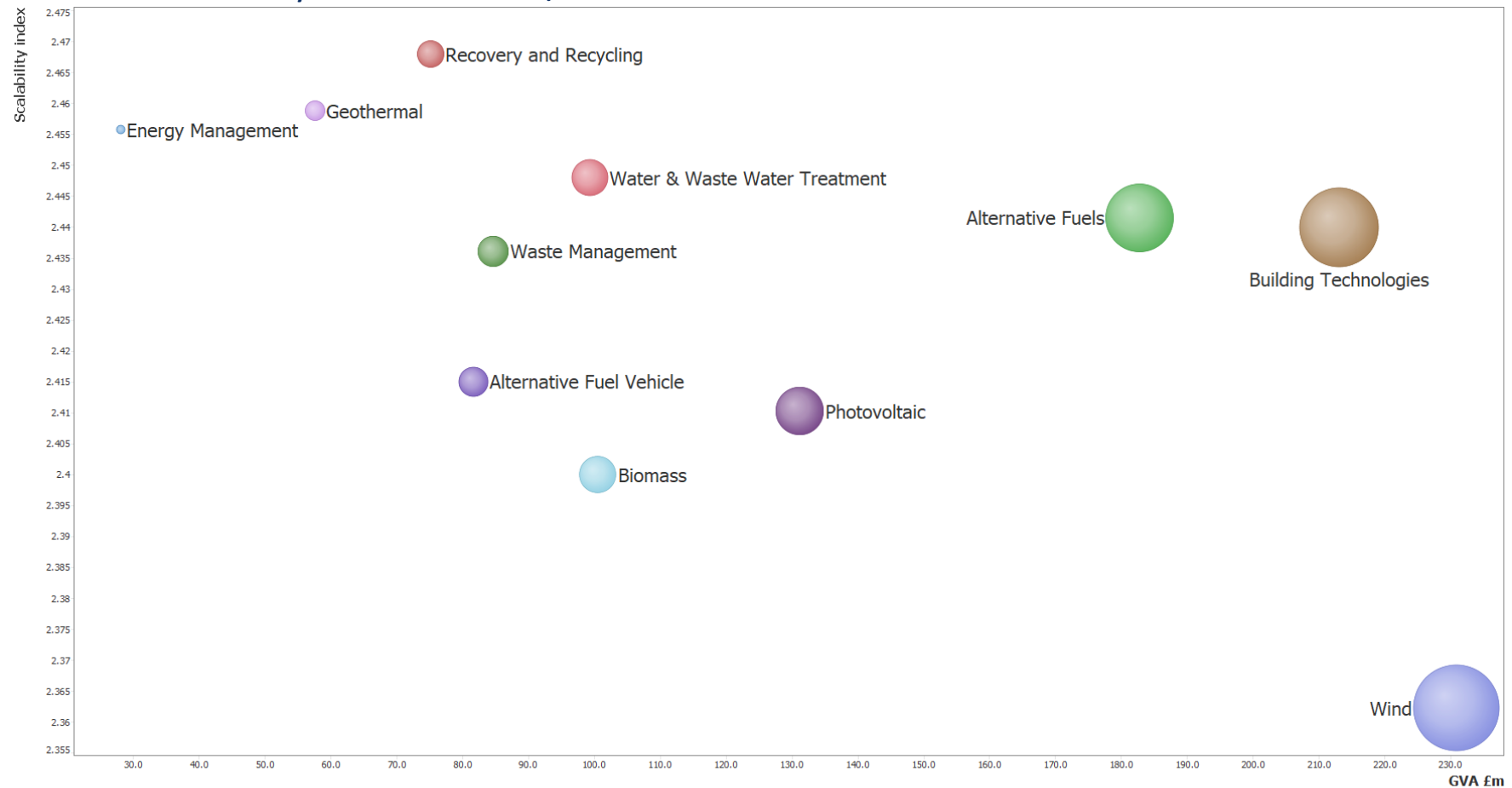
Herefordshire – Scalability Index vs. GVA for 2019/20



Shropshire – Scalability Index vs. GVA for 2019/20



Telford & Wrekin – Scalability Index vs. GVA for 2019/20



Appendix 5

LCEGS Current Employment, Skills Gaps and Forecasts for Net Zero 2030 and 2050 Scenarios for Top Level 2 Sub-sectors

Alternative Fuel Vehicle

SOC	Alternative Fuel Vehicle				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees		# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
		2019/20	Shortage as a % of Total Employees									
Technicians	5	2	45.7%	8	7	-10.8%	9	19.4%	11	39.1%	25	227.3%
Snr Management SME	10	3	25.2%	13	13	2.0%	17	39.2%	21	63.9%	47	278.3%
Supervisory	12	3	24.1%	15	16	6.2%	21	35.6%	25	64.2%	58	283.6%
Middle / Junior Management	11	3	24.3%	14	15	5.0%	19	36.6%	23	63.3%	54	288.6%
Designer / Developer	1	1	50.3%	2	2	-12.5%	2	15.4%	3	36.0%	6	224.7%
Clerical	8	0	0.5%	8	10	29.3%	13	71.9%	15	100.3%	37	379.9%
Self Employed	7	2	24.2%	9	10	6.2%	13	41.3%	15	61.2%	35	283.2%
Advisor or Agent	13	3	25.6%	16	16	4.8%	22	37.6%	25	59.0%	60	282.7%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	2	0	7.5%	2	3	28.0%	3	65.0%	4	80.0%	9	352.1%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	21	3	11.8%	24	28	19.1%	36	51.8%	43	82.3%	103	335.6%
Scientist	2	1	46.4%	3	3	-10.2%	3	18.0%	4	39.5%	9	230.2%
Maintenance Engineer	19	3	15.7%	22	25	13.9%	33	51.8%	39	77.0%	93	325.0%
Civil Engineer	2	1	45.3%	3	3	-9.3%	4	19.5%	5	39.7%	11	230.4%
Production Engineer	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Power distribution Engineer	2	2	66.9%	4	3	-23.0%	4	3.4%	5	21.2%	11	181.3%
Construction Engineer	3	1	36.5%	4	4	-3.4%	5	25.5%	6	50.8%	14	251.7%
Sales Exec	14	4	24.7%	18	19	6.2%	24	36.4%	28	58.0%	70	288.9%
Marketing Personnel	15	4	25.4%	19	19	4.5%	26	38.4%	30	62.7%	70	275.8%
General Semi Skilled Worker	12	1	5.0%	12	16	26.5%	20	60.1%	24	92.9%	57	362.9%
General Labour	20	0	0.0%	20	26	29.5%	34	69.6%	40	99.4%	98	385.6%
Other Employees	9	1	12.4%	10	11	14.3%	15	54.6%	17	79.4%	40	321.1%
Administrative workers	9	0	5.2%	9	11	25.6%	15	59.5%	17	87.4%	42	355.9%
Total	197	36	18.2%	233	259	11.0%	339	45.2%	399	70.8%	951	307.6%

Alternative Fuels

SOC	Alternative Fuels				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	45	19	42.6%	64	59	-8.4%	76	18.3%	91	42.1%	208	222.5%
Snr Management SME	40	7	17.3%	47	53	14.2%	70	50.2%	80	70.2%	193	312.1%
Supervisory	45	9	19.5%	54	59	9.8%	76	41.1%	91	70.2%	213	295.7%
Middle / Junior Management	43	8	17.7%	51	57	12.3%	75	48.7%	87	71.8%	205	304.5%
Designer / Developer	9	3	38.0%	12	11	-9.1%	15	22.2%	17	41.6%	42	241.3%
Clerical	24	0	0.4%	24	32	32.1%	40	66.3%	48	102.1%	113	371.0%
Self Employed	12	2	17.5%	14	16	12.7%	20	38.5%	24	70.9%	59	311.4%
Advisor or Agent	1	0	22.1%	1	1	10.5%	2	37.9%	2	68.2%	4	282.1%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	41	2	5.5%	44	53	22.0%	69	58.8%	86	96.6%	203	364.2%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	19	2	11.0%	21	24	13.2%	33	52.9%	38	78.4%	97	351.4%
Scientist	32	13	39.3%	45	43	-3.8%	54	21.3%	61	37.3%	154	245.1%
Maintenance Engineer	64	7	10.9%	71	84	18.5%	109	53.4%	132	85.2%	307	331.0%
Civil Engineer	0	0	37.3%	0	0	-4.0%	0	26.0%	0	45.3%	1	257.9%
Production Engineer	35	25	69.2%	60	47	-21.0%	59	-0.8%	71	19.1%	171	185.2%
Power distribution Engineer	10	6	56.0%	16	13	-19.5%	18	12.1%	21	27.6%	50	212.4%
Construction Engineer	0	0	27.9%	0	0	1.0%	0	30.7%	0	61.2%	1	274.5%
Sales Exec	47	8	18.0%	55	61	11.2%	79	44.3%	92	67.9%	223	304.6%
Marketing Personnel	51	9	18.2%	60	67	11.2%	87	44.5%	104	74.1%	242	303.2%
General Semi Skilled Worker	63	2	3.7%	66	85	29.8%	109	65.5%	130	97.9%	307	366.2%
General Labour	88	0	0.0%	88	113	29.4%	149	70.5%	177	101.9%	435	396.8%
Other Employees	32	3	9.4%	35	42	20.2%	54	56.2%	64	84.9%	158	355.4%
Administrative workers	27	1	4.2%	28	36	25.1%	48	69.1%	55	92.7%	132	364.4%
Total	730	127	17.4%	856	958	11.9%	1,244	45.3%	1,475	72.2%	3,516	310.6%

Biomass

SOC	Biomass				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees		# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
		2019/20	Shortage as a % of Total Employees									
Technicians	24	5	21.8%	29	31	5.3%	41	39.4%	49	67.2%	115	294.9%
Snr Management SME	107	12	11.0%	119	139	17.2%	182	53.0%	216	81.8%	515	333.5%
Supervisory	98	11	10.8%	109	130	19.6%	170	56.3%	197	81.4%	470	332.7%
Middle / Junior Management	91	11	11.8%	102	122	19.7%	154	51.8%	181	78.2%	428	320.9%
Designer / Developer	12	3	22.1%	14	15	4.8%	21	42.7%	24	64.1%	58	296.7%
Clerical	51	0	0.2%	52	67	30.3%	88	71.1%	105	104.1%	245	376.0%
Self Employed	5	1	10.0%	6	7	18.6%	9	56.2%	10	81.8%	24	328.5%
Advisor or Agent	2	0	11.0%	2	2	18.0%	3	54.2%	3	84.0%	7	332.1%
Educator	0	0	9.5%	0	0	12.6%	0	56.8%	0	82.5%	0	372.7%
Specialist or Consultant	59	2	3.5%	61	78	28.1%	98	60.9%	118	93.4%	289	372.4%
Editor	2	0	2.1%	2	2	26.7%	3	72.9%	3	97.9%	8	364.5%
Industrial Researchers	2	0	5.9%	2	3	22.3%	4	65.5%	4	87.9%	10	356.9%
Scientist	3	1	20.7%	4	4	14.2%	5	39.2%	6	73.5%	14	292.2%
Maintenance Engineer	112	7	6.4%	119	145	22.0%	188	58.0%	224	87.9%	541	354.1%
Civil Engineer	2	0	22.9%	2	2	7.4%	3	39.5%	3	63.3%	7	295.2%
Production Engineer	16	5	34.5%	21	21	-4.1%	27	24.0%	32	50.5%	76	255.5%
Power distribution Engineer	45	15	32.8%	60	59	-1.9%	78	30.2%	89	49.1%	215	258.3%
Construction Engineer	2	0	17.6%	2	2	11.8%	3	46.3%	3	71.3%	8	311.7%
Sales Exec	50	6	11.3%	55	64	15.9%	85	52.9%	100	81.5%	240	334.5%
Marketing Personnel	53	6	11.5%	59	70	18.2%	92	54.2%	107	80.3%	257	331.7%
General Semi Skilled Worker	100	2	2.2%	103	128	24.9%	173	69.0%	207	101.8%	488	375.5%
General Labour	111	0	0.0%	111	147	32.3%	190	71.4%	226	103.0%	534	379.9%
Other Employees	111	6	5.5%	117	144	22.9%	192	64.5%	225	92.3%	523	347.0%
Administrative workers	45	1	2.2%	46	59	28.6%	77	67.0%	91	98.7%	215	367.7%
Total	1,102	94	8.5%	1,196	1,441	20.5%	1,884	57.5%	2,226	86.1%	5,287	342.0%

Building Technologies

SOC	Building Technologies				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	47	7	14.6%	54	62	14.4%	80	47.4%	95	75.3%	225	315.0%
Snr Management SME	132	9	6.6%	140	169	20.6%	225	59.9%	269	91.8%	632	350.2%
Supervisory	118	8	7.1%	126	153	21.1%	201	59.2%	238	88.0%	564	346.4%
Middle / Junior Management	111	7	6.5%	118	146	23.0%	193	63.3%	222	87.8%	540	356.3%
Designer / Developer	15	2	13.3%	17	19	16.5%	25	50.5%	29	78.2%	70	323.1%
Clerical	65	0	0.1%	65	85	31.1%	109	68.2%	130	99.9%	308	374.1%
Self Employed	14	1	7.2%	15	19	21.2%	25	60.7%	29	88.7%	70	357.3%
Advisor or Agent	16	1	7.1%	17	21	22.6%	27	57.7%	32	88.7%	78	357.3%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	72	1	2.0%	74	95	29.5%	125	70.1%	148	101.3%	346	369.9%
Editor	1	0	1.5%	1	1	29.1%	1	67.5%	1	102.1%	3	373.3%
Industrial Researchers	31	1	3.7%	33	41	25.8%	53	63.2%	65	99.1%	150	360.5%
Scientist	4	1	13.8%	4	5	14.8%	7	52.9%	8	78.1%	19	325.4%
Maintenance Engineer	137	6	4.0%	142	175	23.1%	236	66.3%	278	96.0%	644	353.0%
Civil Engineer	7	1	14.3%	8	9	14.2%	12	50.8%	14	79.0%	33	327.3%
Production Engineer	17	4	22.0%	20	21	6.0%	29	43.5%	33	64.8%	79	292.1%
Power distribution Engineer	59	13	21.2%	72	77	7.7%	102	41.7%	120	67.5%	286	298.0%
Construction Engineer	12	1	10.6%	14	16	18.5%	21	53.7%	25	83.3%	60	337.4%
Sales Exec	58	4	6.9%	62	76	22.5%	100	61.0%	118	90.1%	280	350.5%
Marketing Personnel	62	4	6.8%	66	82	24.0%	107	61.2%	125	88.0%	303	356.4%
General Semi Skilled Worker	125	2	1.4%	127	164	28.7%	217	70.4%	255	100.9%	611	380.9%
General Labour	249	0	0.0%	249	324	30.2%	427	71.3%	498	99.9%	1,213	386.9%
Other Employees	123	4	3.2%	127	161	26.7%	207	63.3%	256	102.0%	592	366.6%
Administrative workers	61	1	1.4%	62	82	32.4%	103	67.2%	121	96.4%	292	372.8%
Total	1,536	77	5.0%	1,614	2,004	24.2%	2,632	63.1%	3,112	92.8%	7,400	358.5%

Energy Management

SOC	Energy Management				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	7	3	47.2%	11	9	-10.7%	12	16.6%	14	36.1%	35	226.4%
Snr Management SME	15	3	22.0%	18	20	8.4%	26	40.1%	30	66.3%	72	293.2%
Supervisory	15	3	22.4%	18	19	5.7%	26	40.3%	30	64.4%	71	289.8%
Middle / Junior Management	14	3	23.0%	17	18	5.6%	23	38.8%	27	60.3%	66	289.9%
Designer / Developer	4	2	42.5%	6	5	-7.6%	7	17.0%	8	44.4%	19	243.6%
Clerical	8	0	0.4%	8	10	29.3%	13	67.6%	16	100.2%	38	376.4%
Self Employed	4	1	23.3%	4	5	7.5%	6	41.2%	7	65.2%	18	295.4%
Advisor or Agent	3	1	21.6%	4	4	7.6%	5	40.9%	6	65.2%	15	288.7%
Educator	0	0	26.3%	0	0	4.3%	0	29.4%	0	59.9%	0	282.9%
Specialist or Consultant	9	1	7.2%	10	12	23.8%	16	61.7%	19	87.1%	45	353.0%
Editor	1	0	4.8%	2	2	25.8%	2	61.3%	3	90.1%	7	370.5%
Industrial Researchers	3	0	11.6%	3	4	16.5%	5	52.7%	6	82.3%	15	330.1%
Scientist	2	1	46.2%	2	2	-10.3%	3	18.3%	3	36.7%	7	235.3%
Maintenance Engineer	20	3	14.2%	23	26	15.1%	35	50.4%	41	78.1%	97	321.3%
Civil Engineer	3	1	48.1%	4	3	-12.2%	4	16.1%	5	38.7%	12	218.9%
Production Engineer	3	3	73.9%	6	4	-25.8%	6	-1.3%	7	15.9%	17	176.6%
Power distribution Engineer	8	5	69.6%	13	10	-21.6%	14	2.7%	16	17.7%	38	185.5%
Construction Engineer	3	1	34.2%	4	4	-4.7%	6	25.8%	7	51.5%	16	258.8%
Sales Exec	9	2	23.7%	11	11	3.4%	16	40.2%	18	63.4%	43	292.0%
Marketing Personnel	9	2	22.4%	11	12	6.2%	16	39.6%	18	64.8%	44	298.3%
General Semi Skilled Worker	17	1	4.6%	18	22	25.0%	29	62.5%	35	98.0%	81	361.4%
General Labour	27	0	0.0%	27	36	31.7%	46	70.4%	55	103.4%	130	376.9%
Other Employees	15	2	10.8%	17	20	19.0%	26	54.3%	31	82.5%	72	332.1%
Administrative workers	8	0	4.9%	8	10	24.7%	14	65.0%	16	91.8%	38	354.8%
Total	207	38	18.5%	246	272	10.5%	355	44.4%	419	70.7%	997	305.6%

Geothermal

SOC	Geothermal				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	11	5	47.7%	16	15	-9.7%	19	17.3%	22	36.8%	53	222.0%
Snr Management SME	48	11	22.8%	59	62	5.6%	80	37.0%	96	64.3%	234	299.6%
Supervisory	44	11	25.0%	54	57	4.1%	75	37.5%	88	62.1%	211	286.3%
Middle / Junior Management	40	9	23.3%	50	53	5.8%	69	39.0%	83	65.5%	193	286.8%
Designer / Developer	5	2	46.7%	8	7	-10.6%	9	17.7%	10	36.8%	25	225.7%
Clerical	23	0	0.5%	23	30	29.7%	39	70.4%	46	100.2%	111	379.9%
Self Employed	3	1	23.1%	3	3	4.4%	5	39.5%	6	65.2%	13	292.9%
Advisor or Agent	2	1	22.6%	3	3	7.7%	4	39.0%	5	65.2%	12	295.8%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	25	2	7.0%	26	32	22.4%	42	59.7%	49	88.6%	120	356.5%
Editor	1	0	4.6%	1	2	26.6%	2	61.0%	3	92.5%	6	348.9%
Industrial Researchers	2	0	11.4%	2	2	18.1%	3	52.5%	4	79.9%	9	329.4%
Scientist	1	1	43.4%	2	2	-7.9%	2	21.2%	3	40.5%	6	238.3%
Maintenance Engineer	52	7	13.7%	59	67	14.5%	87	48.7%	103	76.2%	247	322.1%
Civil Engineer	2	1	47.8%	3	3	-10.5%	4	14.2%	4	34.4%	10	224.8%
Production Engineer	8	5	65.9%	13	11	-20.3%	14	2.6%	16	22.9%	38	185.1%
Power distribution Engineer	21	15	70.6%	36	27	-23.4%	36	1.2%	42	16.2%	101	180.8%
Construction Engineer	2	1	34.4%	3	3	-1.7%	4	26.9%	4	50.8%	10	259.5%
Sales Exec	24	6	23.8%	29	31	5.8%	40	36.9%	48	63.4%	115	294.5%
Marketing Personnel	25	6	24.8%	31	33	5.1%	42	35.2%	50	60.7%	120	283.9%
General Semi Skilled Worker	46	2	4.7%	48	59	23.0%	81	68.0%	93	91.9%	218	351.9%
General Labour	74	0	0.0%	74	97	31.7%	127	71.6%	148	100.5%	355	380.6%
Other Employees	47	6	11.9%	53	62	16.6%	81	53.6%	94	77.5%	229	333.2%
Administrative workers	20	1	4.6%	21	26	24.1%	34	64.6%	40	92.8%	97	365.8%
Total	526	92	17.5%	618	686	11.1%	900	45.7%	1,057	71.1%	2,531	309.9%

Photovoltaic

SOC	Photovoltaic				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	39	3	8.6%	43	51	19.5%	67	56.4%	79	84.5%	188	338.9%
Snr Management SME	132	5	4.0%	138	176	28.1%	222	61.4%	263	91.6%	628	356.8%
Supervisory	121	5	3.9%	126	157	24.7%	212	68.4%	243	93.2%	588	368.3%
Middle / Junior Management	114	5	4.1%	118	146	23.6%	198	66.7%	232	95.8%	541	357.0%
Designer / Developer	9	1	8.0%	10	12	21.8%	15	54.1%	18	85.4%	45	352.5%
Clerical	64	0	0.1%	64	82	28.3%	109	71.4%	129	102.3%	303	375.1%
Self Employed	6	0	4.7%	6	8	24.5%	11	65.9%	13	95.4%	29	350.8%
Advisor or Agent	1	0	4.2%	1	1	28.3%	1	63.2%	2	99.0%	4	356.1%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	62	1	1.2%	63	80	27.4%	105	67.5%	127	102.7%	297	374.4%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	4	0	2.2%	5	6	29.0%	8	71.6%	9	99.2%	21	374.4%
Scientist	0	0	8.3%	0	0	25.9%	0	57.7%	0	92.8%	1	345.7%
Maintenance Engineer	139	4	2.6%	143	188	31.9%	238	67.3%	284	98.9%	661	363.5%
Civil Engineer	3	0	8.2%	3	4	22.8%	5	59.3%	6	85.7%	14	346.6%
Production Engineer	18	2	13.3%	21	24	15.4%	32	55.5%	36	77.3%	88	328.0%
Power distribution Engineer	58	7	12.4%	66	76	15.3%	101	53.4%	118	79.9%	279	325.6%
Construction Engineer	7	0	6.6%	7	9	23.0%	11	60.2%	13	87.1%	32	350.1%
Sales Exec	61	2	3.8%	63	78	22.5%	108	70.3%	123	94.8%	295	365.5%
Marketing Personnel	66	3	3.8%	68	86	25.5%	113	65.3%	130	90.3%	316	363.8%
General Semi Skilled Worker	128	1	0.9%	129	167	29.1%	222	71.2%	260	100.7%	592	357.6%
General Labour	172	0	0.0%	172	224	30.1%	296	72.3%	343	99.9%	819	376.7%
Other Employees	134	3	2.0%	136	176	28.8%	223	63.4%	262	91.8%	649	376.0%
Administrative workers	56	0	0.9%	56	72	28.9%	97	72.3%	110	95.1%	262	366.2%
Total	1,394	43	3.1%	1,437	1,821	26.7%	2,392	66.5%	2,799	94.8%	6,652	363.0%

Recovery and Recycling

SOC	Recovery and Recycling				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	27	10	37.8%	37	35	-4.4%	46	26.0%	54	47.5%	129	250.0%
Snr Management SME	34	6	19.0%	40	44	10.1%	59	47.3%	68	70.7%	162	302.5%
Supervisory	32	7	20.8%	39	43	11.6%	54	39.8%	65	68.7%	153	295.9%
Middle / Junior Management	30	6	20.5%	36	39	9.7%	50	40.6%	61	70.4%	140	293.3%
Designer / Developer	24	9	37.2%	34	32	-4.9%	42	24.9%	49	46.7%	118	252.4%
Clerical	17	0	0.4%	17	23	30.3%	31	75.1%	35	102.2%	84	382.6%
Self Employed	8	1	17.7%	10	11	11.4%	14	45.0%	17	69.8%	41	312.5%
Advisor or Agent	3	1	18.7%	3	4	8.3%	5	47.0%	6	70.2%	14	297.5%
Educator	0	0	17.8%	0	0	9.2%	0	43.1%	0	66.8%	0	328.0%
Specialist or Consultant	30	2	5.8%	32	38	21.9%	52	64.0%	60	91.4%	146	360.9%
Editor	1	0	3.5%	1	2	23.7%	2	62.8%	3	92.1%	6	364.4%
Industrial Researchers	8	1	8.9%	8	10	19.8%	13	55.7%	15	86.4%	37	343.3%
Scientist	6	2	37.0%	8	8	-4.8%	10	25.4%	12	49.0%	29	249.4%
Maintenance Engineer	46	5	11.5%	51	60	17.3%	78	52.0%	93	80.4%	223	335.1%
Civil Engineer	11	4	36.5%	15	15	-4.0%	19	25.1%	23	46.0%	54	249.8%
Production Engineer	15	9	57.2%	24	20	-16.6%	26	9.0%	31	28.4%	74	208.8%
Power distribution Engineer	20	12	58.7%	33	27	-17.7%	35	8.5%	41	26.8%	98	202.2%
Construction Engineer	14	4	27.3%	17	18	2.9%	23	35.6%	28	59.0%	66	279.7%
Sales Exec	28	5	19.3%	33	36	8.1%	48	44.1%	57	68.7%	135	302.5%
Marketing Personnel	24	4	18.5%	29	33	13.3%	41	44.0%	49	69.0%	118	310.1%
General Semi Skilled Worker	54	2	3.6%	56	70	25.0%	92	65.8%	109	96.2%	256	359.7%
General Labour	59	0	0.0%	59	77	31.1%	101	70.2%	119	102.2%	281	376.2%
Other Employees	27	3	11.0%	29	35	18.8%	45	54.1%	55	87.4%	130	340.9%
Administrative workers	20	1	4.0%	20	26	26.8%	34	65.1%	39	91.7%	94	359.2%
Total	538	95	17.6%	633	706	11.5%	923	45.9%	1,090	72.3%	2,588	309.0%

Waste Management

SOC	Waste Management				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	21	3	13.5%	24	28	15.4%	36	51.8%	43	77.6%	100	316.5%
Snr Management SME	42	3	7.3%	45	54	22.0%	72	60.9%	83	85.5%	201	350.5%
Supervisory	42	3	7.0%	45	55	22.2%	72	61.0%	86	93.1%	198	343.0%
Middle / Junior Management	39	2	6.2%	41	51	22.8%	66	58.9%	78	89.7%	187	351.2%
Designer / Developer	9	1	13.6%	11	12	13.8%	16	50.6%	19	76.8%	44	321.7%
Clerical	24	0	0.1%	24	31	29.2%	40	69.6%	48	103.2%	114	380.3%
Self Employed	11	1	6.9%	12	15	21.5%	19	61.5%	23	91.0%	54	347.4%
Advisor or Agent	15	1	7.0%	16	20	24.4%	26	59.0%	30	83.2%	72	347.3%
Educator	1	0	6.1%	1	1	25.6%	1	56.4%	2	88.8%	4	381.8%
Specialist or Consultant	25	0	1.9%	25	32	28.3%	42	67.9%	49	98.1%	117	367.3%
Editor	3	0	1.3%	3	3	28.0%	4	69.5%	5	101.6%	12	369.2%
Industrial Researchers	22	1	3.2%	23	28	25.2%	38	66.3%	44	96.1%	107	374.0%
Scientist	4	0	13.4%	4	5	15.8%	6	50.8%	7	77.7%	18	328.4%
Maintenance Engineer	59	2	3.9%	61	77	26.4%	100	62.5%	122	99.9%	286	366.5%
Civil Engineer	8	1	13.5%	9	10	14.4%	13	48.8%	15	77.7%	36	322.4%
Production Engineer	10	2	20.9%	12	13	7.8%	17	40.0%	20	65.7%	47	299.5%
Power distribution Engineer	25	5	19.9%	29	32	9.6%	42	41.2%	49	65.7%	119	303.8%
Construction Engineer	11	1	10.0%	12	15	20.8%	20	57.0%	23	84.6%	54	332.5%
Sales Exec	22	1	6.4%	24	29	23.2%	38	62.8%	45	90.4%	107	354.5%
Marketing Personnel	22	1	6.2%	23	29	24.9%	37	60.3%	45	94.6%	104	353.3%
General Semi Skilled Worker	48	1	1.3%	49	64	31.1%	81	66.9%	96	97.6%	232	375.6%
General Labour	32	0	0.0%	32	42	32.3%	54	70.9%	63	99.4%	152	382.3%
Other Employees	50	2	3.4%	52	65	24.1%	85	64.3%	102	96.0%	243	367.6%
Administrative workers	25	0	1.3%	25	33	31.8%	44	72.3%	50	99.1%	119	371.9%
Total	567	33	5.8%	600	743	23.8%	968	61.4%	1,148	91.3%	2,729	354.6%

Water and Waste Water Treatment

SOC	Water & Waste Water Treatment				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	33	3	9.0%	36	44	20.6%	57	57.5%	68	85.4%	159	334.8%
Snr Management SME	62	3	4.6%	65	80	23.6%	107	66.0%	124	92.3%	296	358.0%
Supervisory	57	3	4.4%	60	74	23.2%	100	68.1%	115	92.7%	273	357.2%
Middle / Junior Management	54	2	4.4%	57	71	26.2%	92	61.8%	107	89.7%	256	352.0%
Designer / Developer	14	1	9.1%	15	18	19.0%	24	59.6%	28	86.2%	66	337.1%
Clerical	31	0	0.1%	32	43	35.0%	55	74.4%	63	101.2%	156	394.0%
Self Employed	16	1	4.5%	16	21	26.7%	27	63.8%	31	92.7%	74	355.5%
Advisor or Agent	2	0	4.7%	2	3	26.3%	4	64.1%	4	93.4%	10	358.2%
Educator	0	0	5.5%	0	0	23.3%	0	62.0%	0	97.9%	0	353.9%
Specialist or Consultant	36	0	1.4%	36	47	27.9%	61	69.1%	72	97.1%	175	380.9%
Editor	1	0	0.9%	1	1	27.2%	2	68.1%	2	101.4%	5	362.2%
Industrial Researchers	3	0	2.3%	3	3	25.7%	5	67.3%	5	97.2%	13	374.6%
Scientist	1	0	8.9%	1	1	23.7%	2	53.2%	2	86.1%	5	337.3%
Maintenance Engineer	88	2	2.8%	90	115	27.2%	149	64.5%	179	98.6%	419	363.2%
Civil Engineer	9	1	8.9%	10	12	21.1%	15	55.7%	18	87.5%	42	337.1%
Production Engineer	19	3	14.0%	21	25	15.2%	32	49.5%	38	77.2%	92	327.1%
Power distribution Engineer	35	5	13.4%	40	46	14.8%	59	49.1%	70	75.5%	167	319.7%
Construction Engineer	15	1	6.3%	16	19	21.3%	26	62.4%	30	90.6%	72	354.9%
Sales Exec	27	1	4.8%	29	37	29.1%	47	65.3%	56	95.4%	137	378.8%
Marketing Personnel	28	1	4.4%	30	37	26.1%	49	65.2%	56	88.7%	139	369.6%
General Semi Skilled Worker	70	1	0.9%	71	93	31.3%	119	68.4%	140	98.4%	340	381.7%
General Labour	37	0	0.0%	37	49	30.7%	64	70.9%	75	101.4%	180	380.0%
Other Employees	68	2	2.2%	70	90	29.4%	117	67.8%	142	103.1%	332	375.8%
Administrative workers	31	0	0.9%	31	40	29.6%	54	72.6%	62	100.0%	151	385.6%
Total	738	30	4.1%	768	968	26.1%	1,266	64.9%	1,489	93.9%	3,557	363.2%

Wind

SOC	Wind				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
	# Employees 2019/20	Shortage of Employees 2019/20	Shortage as a % of Total Employees	# Employees if Skills Gap Filled	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2030	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)	Estimated # Employees Needed to Reach Net Zero by 2050	Growth in Employees Required (assumes no skills gap)
Technicians	55	7	12.6%	62	72	17.1%	95	53.4%	111	80.4%	260	321.1%
Snr Management SME	181	13	7.3%	194	235	20.8%	308	58.6%	360	85.2%	854	339.2%
Supervisory	174	12	6.9%	186	223	20.2%	298	60.2%	348	87.4%	844	354.3%
Middle / Junior Management	161	11	6.8%	171	209	21.7%	277	61.3%	327	90.6%	777	353.3%
Designer / Developer	8	1	14.1%	10	11	13.5%	14	47.7%	17	77.9%	41	330.4%
Clerical	93	0	0.1%	93	122	31.7%	158	70.4%	185	98.9%	448	382.5%
Self Employed	13	1	6.2%	14	18	26.0%	22	60.9%	27	91.2%	61	342.3%
Advisor or Agent	1	0	5.3%	1	2	21.7%	2	56.9%	3	89.2%	6	331.5%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	88	2	2.2%	90	114	26.2%	150	66.3%	181	100.5%	419	364.6%
Editor	0	0	1.5%	0	0	27.5%	0	74.1%	0	95.3%	1	334.8%
Industrial Researchers	2	0	3.5%	2	3	36.6%	3	70.2%	4	99.8%	10	391.3%
Scientist	0	0	12.9%	0	0	21.7%	1	60.3%	1	76.9%	2	315.9%
Maintenance Engineer	218	9	4.3%	228	283	24.4%	379	66.5%	451	98.1%	1,067	368.4%
Civil Engineer	6	1	12.1%	7	8	16.8%	10	53.1%	12	79.9%	29	328.1%
Production Engineer	31	7	21.3%	38	41	6.7%	55	43.8%	63	65.9%	153	300.2%
Power distribution Engineer	84	18	21.0%	101	109	7.2%	143	41.6%	174	71.8%	407	301.6%
Construction Engineer	21	2	9.4%	23	27	20.5%	36	57.9%	42	87.0%	98	334.0%
Sales Exec	82	6	7.0%	88	106	20.9%	143	62.0%	167	89.5%	402	356.4%
Marketing Personnel	88	6	6.7%	94	117	24.6%	151	60.7%	171	81.8%	428	355.5%
General Semi Skilled Worker	182	3	1.4%	185	239	29.4%	316	70.9%	372	101.1%	874	372.6%
General Labour	225	0	0.0%	225	290	28.7%	386	71.2%	455	101.9%	1,067	373.8%
Other Employees	207	7	3.5%	215	271	26.4%	354	64.8%	418	94.6%	1,012	371.2%
Administrative workers	80	1	1.3%	81	102	26.2%	138	69.7%	161	98.1%	395	386.7%
Total	2,002	106	5.3%	2,108	2,603	23.4%	3,439	63.1%	4,049	92.0%	9,653	357.9%