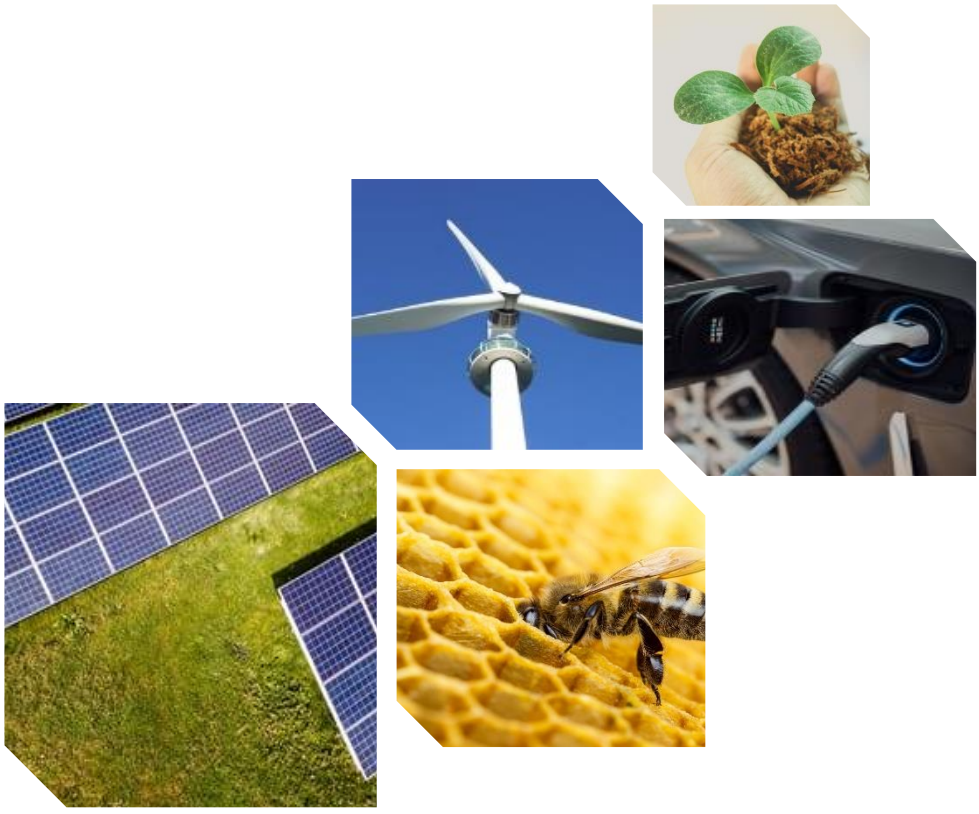
Derby, Derbyshire, Nottingham, Nottinghamshire (D2N2) LEP

Low Carbon Environmental Goods and Services Market Snapshot

Midlands Energy Hub
2017/18 to 2019/20

Final Report March 2021
kMatrix Data Services Ltd



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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 world[2].

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.

[1]https://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 Derby, Derbyshire, Nottingham, Nottinghamshire Local Enterprise Partnership (D2N2 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 D2N2 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 D2N2 LEP are listed below:

Formal name	Shortened label
Ashfield DC	Ashfield
Bassetlaw DC	Bassetlaw
Broxtowe DC	Broxtowe
Gedling DC	Gedling
Mansfield DC	Mansfield
Newark & Sherwood DC	Newark & Sherwood
Nottingham City Council	Nottingham
Rushcliffe BC	Rushcliffe
Amber Valley DC	Amber Valley
Bolsover DC	Bolsover
Chesterfield DC	Chesterfield
Derbyshire Dales DC	Derbyshire Dales
Erewash BC	Erewash
High Peak BC	High Peak
North East Derbyshire DC	North East Derbyshire
South Derbyshire DC	South Derbyshire
Derby City Council	Derby

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Executive Summary

D2N2 LEP's Low Carbon and Environmental Goods and Services (LCEGS) sector was worth £5.3bn to the D2N2 LEP's economy in 2019/20, as indicated by the value of sales in the sector. These sales were generated by over 1,800 businesses that employed 35,000 people in the sector in 2019/20.

Sales and growth

The Low Carbon and Environmental Goods and Services sector in the D2N2 LEP grew year on year since 2017/18. In 2017/18 total sales in the sector were worth £4.8bn and have now reached £5.3bn in 2019/20.

The sector in the D2N2 LEP grew by 4.1% during the financial year 2017/18 to 2018/19 and 4.6% during 2018/19 to 2019/20. This rate of growth is slower than both the MEH average (5.2% and 5.9% respectively) and 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 D2N2 LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was 35,172, up from 34,070 in 2017/18. Annual growth rate in employment was 0.5% between 2017/18 and 2018/19 and 2.7% 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 D2N2 LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was 1,899, up from 1,797 in 2017/18. Annual growth rate in the number of companies was 1.7% between 2017/18 and 2018/19 and 3.9% 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.

D2N2 LEP's sub-sectors

In 2019/20 D2N2 LEP's Low Carbon and Environmental Goods and Services sector was made up by the following proportions: Renewable Energy 40%, Low Carbon 38% and Environmental 22%.

D2N2 LEP's sub-sector strengths

The five largest sub-sectors in the Low Carbon and Environmental Goods and Services sector by sales account for 64% of the D2N2 LEP's total sales and are made up of:

- Wind (£874m) – 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.
- Building Technologies (£776m) - this includes head office functions, building systems design and consultancy and building systems providers and installers.
- Alternative Fuels (£770m) – this includes R&D functions, alternative fuel providers, designers and consultancy, process implementation, sales and accounting and application development specialists.
- Photovoltaic (£551m) - this includes head office functions, systems developers, providers and installers.

- Water & Waste Water Treatment (£411m) - development and implementation by utilities along with supply, consultancy and implementation by independent consulting engineers

The next six largest sub-sectors by sales account for a further 32% of D2N2 LEP's total sales and are made up of:

- Biomass (£388m) - this includes systems development, supply, implementation and R&D
- Waste Management (£348m) - 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 (£291m) – this includes waste collection, glass stock processing and paper feedstock processing.
- Alternative Fuel Vehicle (£290m) - include selling agencies, alternative fuel development companies and consulting and applications development for vehicle conversion specialists.
- Geothermal (£232m) - 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 (£113m) – this includes registered gas engineers, measurement and control systems and fitting and maintenance.

Sub-sector growth

D2N2 LEP's five 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:

- Wind – sales have grown from £804m to £874m (8.7%), number of employees by 3.1% and number of companies by 5.8%
- Building Technologies – sales have grown from £713m to £776m (8.9%), number of employees by 3.1% and number of companies by 5.3%
- Alternative Fuels – sales have grown from £707m to £770m (8.9% increase), number of employees by 3.1% and number of companies by 5.1%
- Photovoltaic – sales have grown from £505m to £551m (9.0% increase), number of employees by 3.4% and number of companies by 6.6%
- Water & Waste Water Treatment – sales have grown from £378m to £411m (8.7% increase), number of employees by 3.2% and number of companies also by 5.9%

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

- Alternative Fuel Vehicle with 8.9% (MEH 11.4%, UK 5.7%)
- Hydro with 8.9% (MEH 11.0%, UK 1.8%)
- Energy Management with 11.4% (MEH 11.4%, UK 5.7%)
- Contaminated Land Reclamation and Remediation with 8.8% (MEH 11.4%, UK 1.0%)
- Air Pollution with 8.7% (MEH 11.4%, UK 5.8%)

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

- Environmental Consultancy with 8.8% (MEH 11.3%, UK 16.8%)
- Environmental Monitoring with 8.8% (MEH 11.3%, UK12.2%)
- Marine Pollution Control with 9.1% (MEH 11.4%, UK 12.7%)
- Noise & Vibration Control with 8.8% (MEH 11.4%, UK 23.3%)
- Recovery & Recycling with 8.9% (MEH 11.3%, UK 13.7%)
- Waste Management with 8.7% (MEH 11.2%, UK 12.6%)
- Water & Waste Water Treatment with 8.7% (MEH 11.3%, UK 12.7%)
- Additional Energy Sources with 8.9% (MEH 11.3%, UK 15.9%)

- Alternative Fuels with 8.9% (MEH 11.4%, UK 13.8%)
- Building Technologies with 8.9% (MEH 11.5%, UK 13.7%)
- Carbon Capture & Storage with 8.7% (MEH 11.3%, UK 19.0%)
- Biomass with 8.7% (MEH 11.3%, UK 28.2%)
- Geothermal with 8.9% (MEH 11.3%, UK 18.8%)
- Photovoltaic with 9.0% (MEH 11.3%, UK 24.3%)
- Wave & Tidal with 9.6% (MEH 11.2%, UK 24.9%)
- Wind with 8.7% (MEH 11.3%, UK 42.2%)

Investment in R&D

Investment in R&D within D2N2 LEP grew in all three categories of investment between 2017/18 and 2019/20:

- Private Equity Investment in R&D grew 20.1% from £875m in 2017/18 to £1.1bn in 2019/20
- Venture capital Investment in R&D grew 16.6% from £1.2bn in 2017/18 to £1.4bn in 2019/20
- Other Investment in R&D grew 15.6% from £1.5bn in 2017/18 to £1.7bn in 2019/20

Sub-sector Strengths and Weaknesses

Sub-sector strengths include:

- Energy Management has stronger growth than the UK and above average market size.
- Alternative Fuel Vehicle has a stronger growth than the UK average and above average market size.
- Contaminated Land has a stronger growth than the UK average and above average market size.
- Hydro has a stronger growth than the UK average and above average market size.
- Waste Management has weaker growth than the UK, but significantly 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 significantly above average market size.
- Biomass has weaker growth than the UK, but significantly above average market size.
- Building Technologies has weaker growth than the UK, but significantly above average market size.
- Wind has weaker growth than the UK, but significantly above average market size.
- Alternative Fuels has weaker growth than the UK, but significantly above average market size.
- Nuclear 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.

Sub-Sector weaknesses include:

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

Scalability of sub-sectors

Scalability of the sub-sectors within the D2N2 LEP is variable and when combined with GVA, strengths include:

- Alternative Fuels with high GVA and high Scalability (stronger position than the MEH average)
- Wind with high GVA and high Scalability (stronger position than the MEH average)
- Renewable Energy General Consultancy with high Scalability but small GVA
- Waste Management with good Scalability and good GVA (stronger position than the MEH average)

- Energy Management with reasonable GVA and good 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 D2N2 LEP being 8.7% (MEH .87%).

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

- Production Engineers 35.7% (MEH 35.7%)
- Power Distribution Engineers 30.0% (MEH 29.8%)
- Technicians 22.2% (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 3.1% (MEH 3.3%)
- Administrative Workers 2.1% (MEH 2.1%)

Level 1 shortages

Skills shortages within the D2N2 LEP at Level 1:

- Low Carbon 10.7% (MEH 10.5%)
- Renewable Energy 7.2% (MEH 7.0%)
- Environmental 10.2% (MEH 10.3%)

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

Production Engineers:

- Low Carbon 46.4% (MEH 47.3%)
- Renewable Energy 27.6% (MEH 27.9%)
- Environmental 34.5% (MEH 34.9%)

Power Distribution Engineers:

- Low Carbon 34.2% (MEH 33.7%)
- Renewable Energy 28.7% (MEH 27.1%)
- Environmental 31.7% (MEH 32.6%)

Technicians:

- Low Carbon 27.9% (MEH 27.9%)
- Renewable Energy 17.4% (MEH 17.3%)
- Environmental 22.5% (22.9%)

Estimated Employment Requirements to Reach Net Zero by 2030 and 2050

Estimated growth in employees for the D2N2 LEP to reach zero by 2030:

- Worst-case scenario for the UK economy is 20.5% (MEH 20.3%)
- Best-case scenario for the UK economy is 58.0% (MEH 57.9%)

Estimated growth in employees for the D2N2LEP to reach zero by 2050:

- Worst-case scenario for the UK economy is 86.2% (MEH 86.0%)
- Best-case scenario for the UK economy is 342.5% (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 16.6% (MEH 17.0%)
- Renewable Energy 33.3% (MEH 34.5%)
- Environmental 27.4% (MEH 27.0%)

Power Distribution Engineers:

- Low Carbon 27.4% (MEH 28.1%)
- Renewable Energy 34.7% (MEH 35.1%)
- Environmental 30.0% (MEH 29.3%)

Technicians:

- Low Carbon 33.7% (MEH 34.2%)
- Renewable Energy 45.8% (MEH 45.9%)
- Environmental 39.6% (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 D2N2 LEP include:

- Contaminated Land has good training capacity and strong upskilling potential.
- Environmental Monitoring has very good training capacity, but lower upskilling potential
- Photovoltaic with good training capacity and lower potential for upskilling
- Geothermal with good training capacity and lower potential for upskilling
- Biomass with good training capacity and lower potential for upskilling
- Alternative Fuels Vehicle with below average training capacity but high upskilling potential
- Building Technologies with reasonable training capacity and good upskilling potential
- Recovery and Recycling with reasonable training capacity and good upskilling potential

Weaknesses in the current training provision compared with the potential upskilling of the workforce in the D2N2 LEP include:

- Alternative Fuels with very low training capacity but good upskilling potential

Potential of Level 2 sub-sectors to impact on CO_2 reduction.

Sub-sectors with a high estimated CO_2 reduction impact include:

- Wind with large market and high estimated potential impact
- Building Technologies with large market and good estimated potential impact
- Alternative Fuels with large market and good estimated potential impact
- Recovery and Recycling with high estimated potential impact and smaller market

Sub-sectors with a low estimated CO_2 reduction impact include:

- Environmental Consultancy with low estimated potential impact and small market

D2N2 LEP's Exports

The value of exports in D2N2 LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was £557m, an increase from £507m in 2017/18. This accounted for 19% of the MEH's LCEGS exports in 2019/20 and is lower than D2N2 LEP's 20% share of the overall MEH LCEGS market.

D2N2 LEP's LCEGS exports grew by 4.8% and 4.9% 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.

D2N2 LEP's top Export sub-sectors which saw large export market and strong growth include:

- Wind - £91m
- Alternative Fuels - £87m
- Waste Management - £36m
- Geothermal - £25m
- Photovoltaic - £60m
- Water & Waste Water Treatment – £43m

D2N2 LEP's Imports

The value of imports in D2N2 LEP's Low Carbon and Environmental Goods and Services sector in 2019/20 was £521, an increase from £482m in 2017/18. This accounted for 20% of the MEH's LCEGS imports in 2019/20 and is in line with the D2N2LEP's 20% share of the overall MEH LCEGS market.

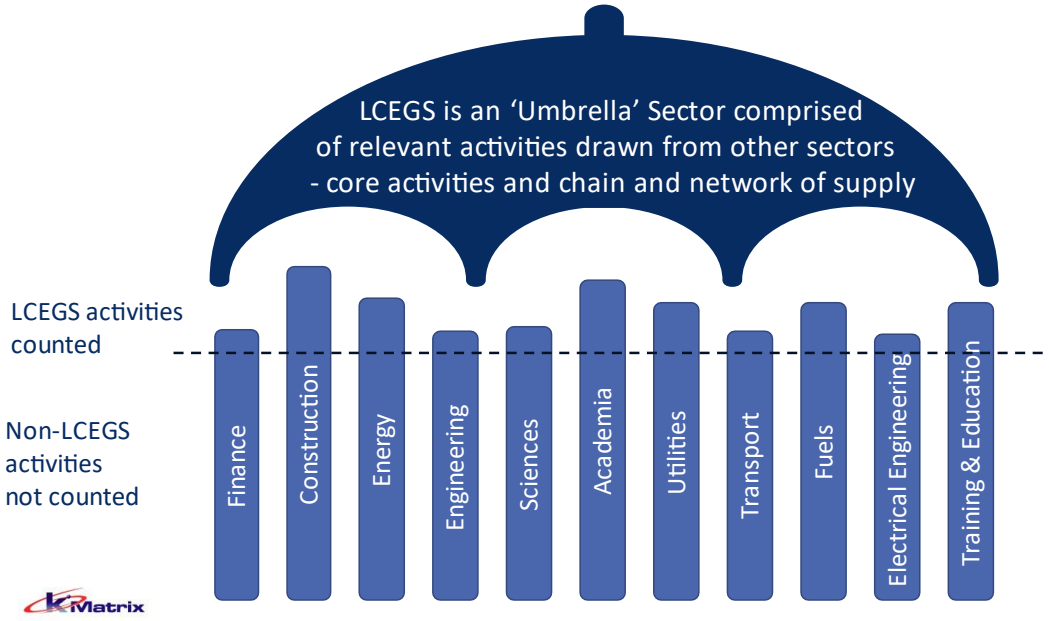
D2N2LEP's LCEGS imports grew by 3.8% and 4.1% over the last three years which compared with MEH growth of 5.8% and 5.9% and UK growth of approximately 10.0% and 7.4% respectively.

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:



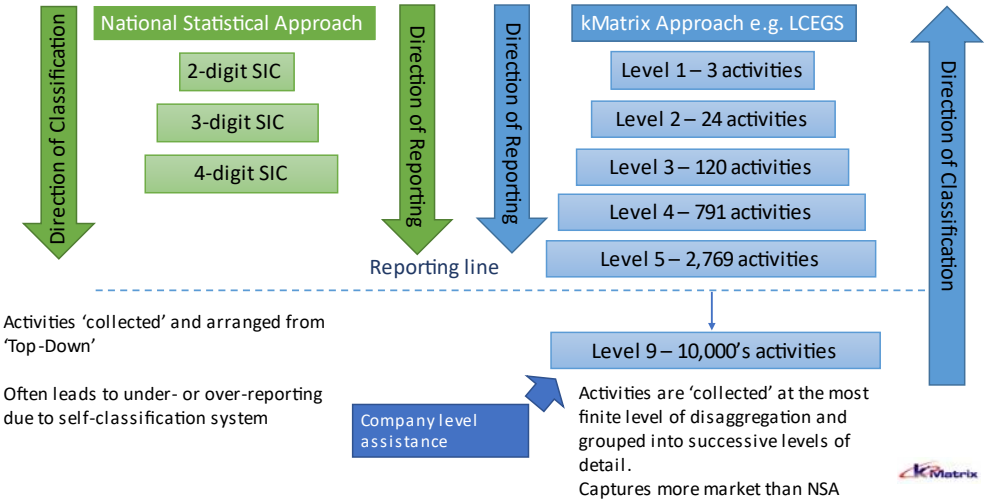
The sector is comprised of both core elements and those in the chain and network of supply, without whom the sector could not function.

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 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

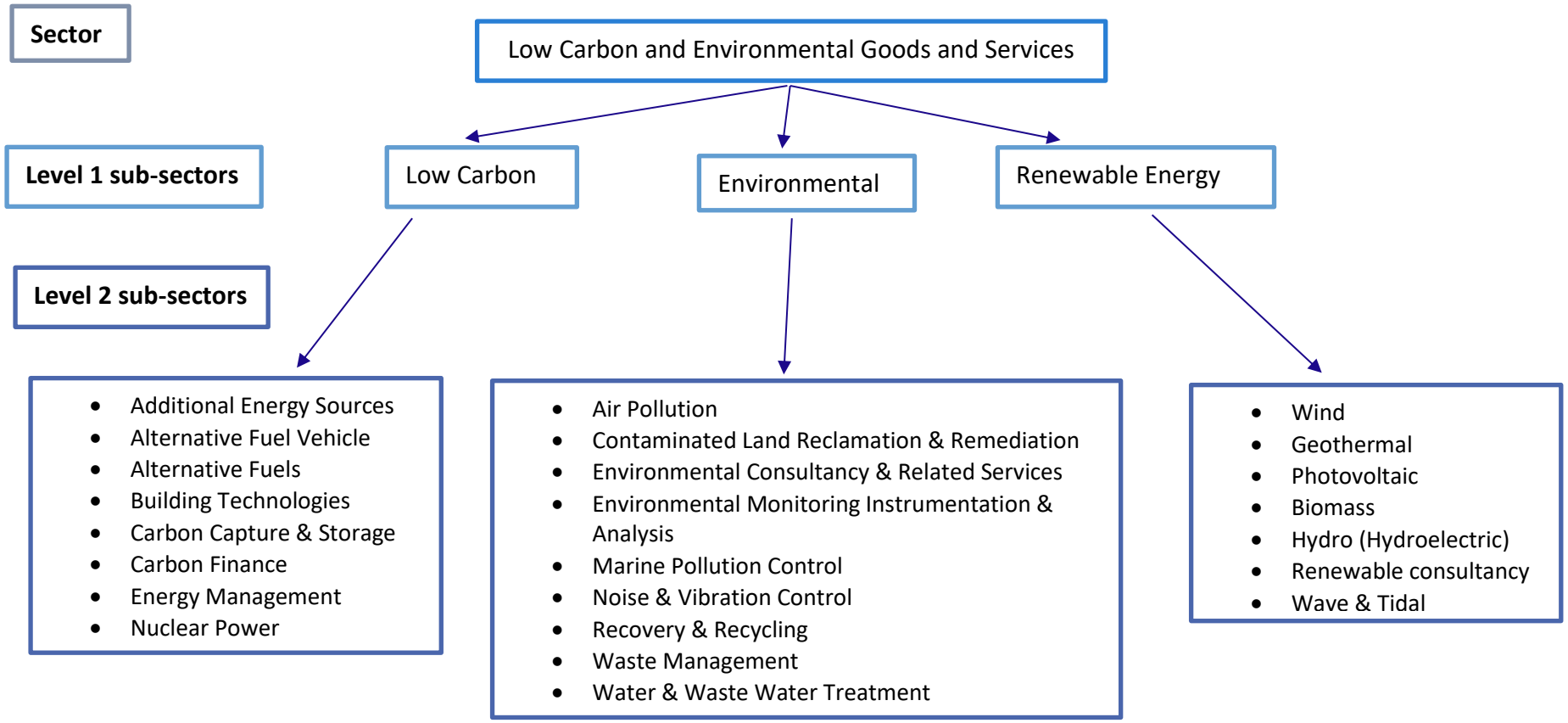
The data used in this report is based upon the work and methodology used by kMatrix to provide datasets on the UK's Low Carbon Environmental Goods and Services (LCEGS) sector for UK Government reported annually by the Department for Business, Innovation and Skills (BIS) from 2008/09 to 2011/12 and further 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 though 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?

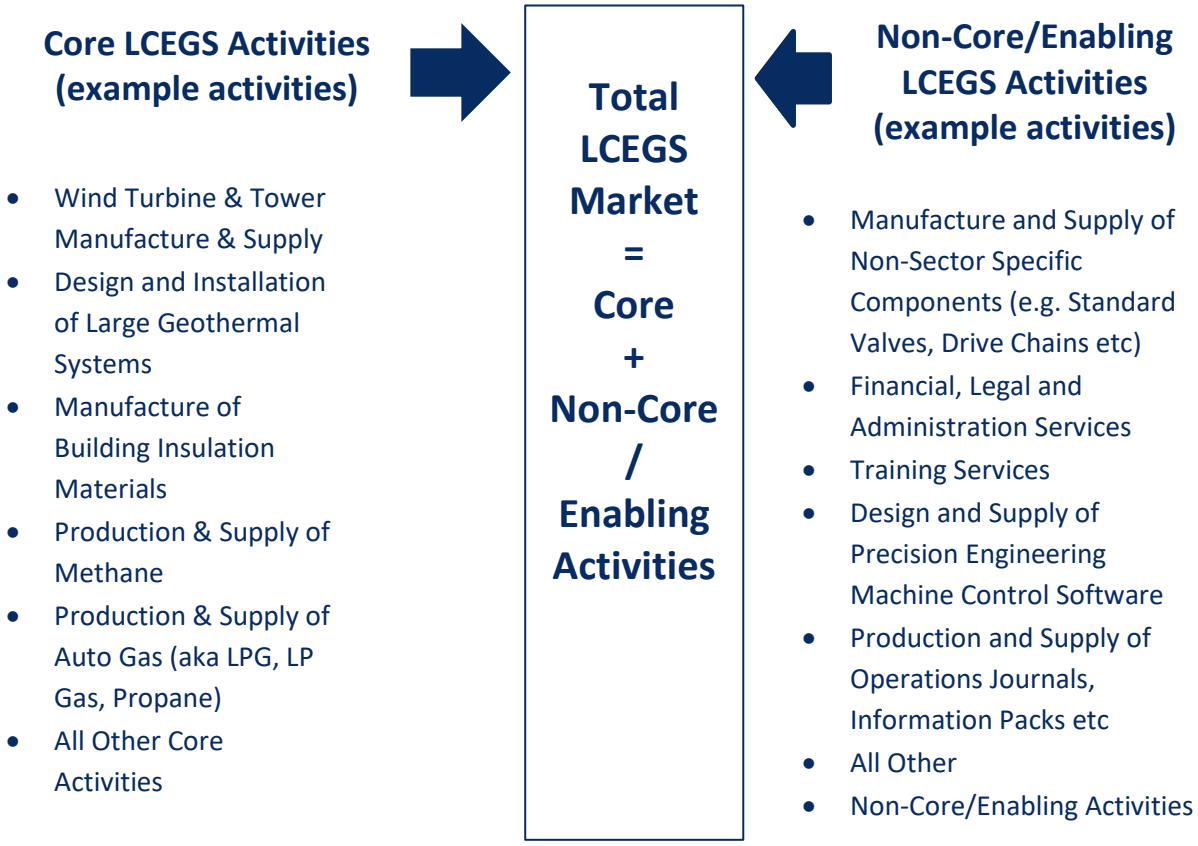
The dataset measures the core activities of the sector along with enabling activities in the supply chain, without whom the LCEGS sector could not operate. For example, the Wind sector includes those companies which develop the systems integration software enabling the power generated though turbines 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 considerations[3].

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 gCO_2eq/kWh[4]. 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 heat[6], 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.climatexchange.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 treatment[7].

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 UK[8], 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

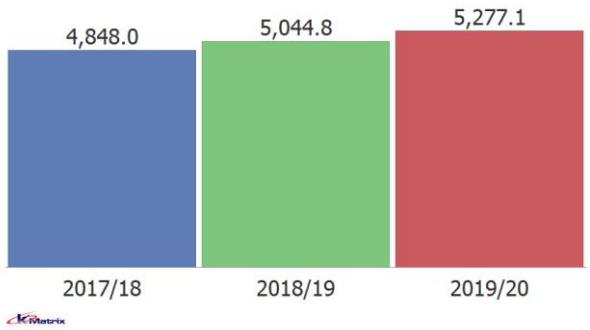
1. D2N2 LEP's Low Carbon and Environmental Goods and Services (LCEGS) Analysis

This section of the report analyses the D2N2 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 D2N2 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

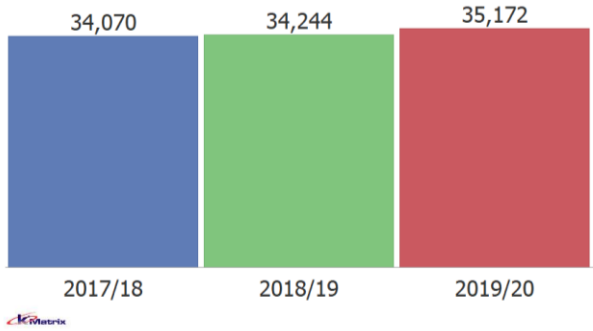


D2N2 LEP's LCEGS sales in 2019/20 were £5.3bn, up from £4.8bn in 2017/18.

Annual sales growth in D2N2 LEP's LCEGS was 4.1% from 2017/18 to 2018/19 and 4.6% 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

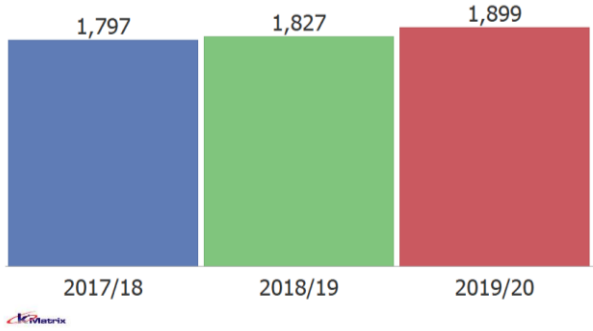


D2N2 LEP's LCEGS employment in 2019/20 was 35,172, up from 34,070 in 2017/18.

Annual employment growth in D2N2 LEP's LCEGS was 0.5% from 2017/18 to 2018/19 and 2.7% 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



D2N2 LEP's LCEGS company count in 2019/20 was 1,876, up from 1,779 in 2017/18.

Annual company growth in D2N2 LEP's LCEGS was 1.7% from 2017/18 to 2018/19 and 3.9% from 2018/19 to 2019/20.

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

Growth in the D2N2 LEP has been lower across each of the three parameters between 2017/18 and 2019/20 when compared with the MEH Region as a whole.

1.2 D2N2 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 D2N2 LEP for each of the last three years.

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

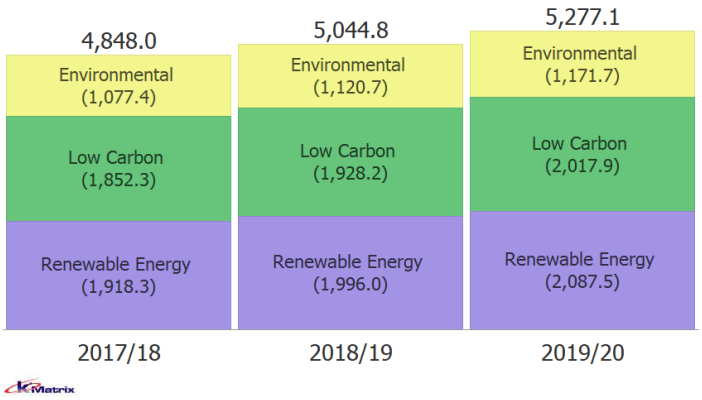


Figure 4 shows the three-year LCEGS sales split by Level 1.

In 2017/18 the split was 40% Renewable Energy, 38% Low Carbon and 22% Environmental. The split had not changed in 2019/20.

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

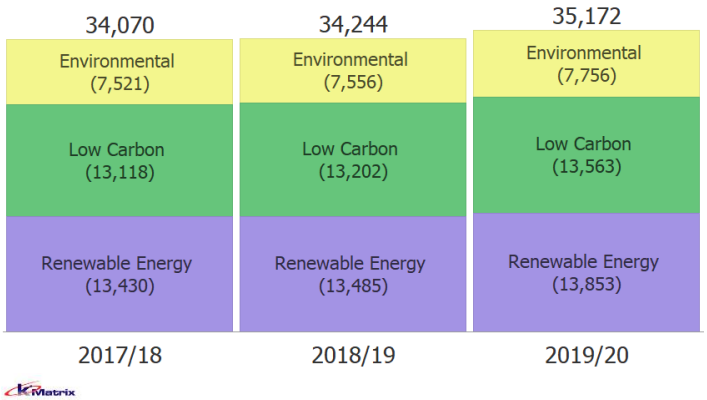


Figure 5 shows the three-year employment split by Level 1.

In 2017/18 the split was 39% Renewable Energy, 39% Low Carbon and 22% Environmental. The split had not changed in 2019/20.

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

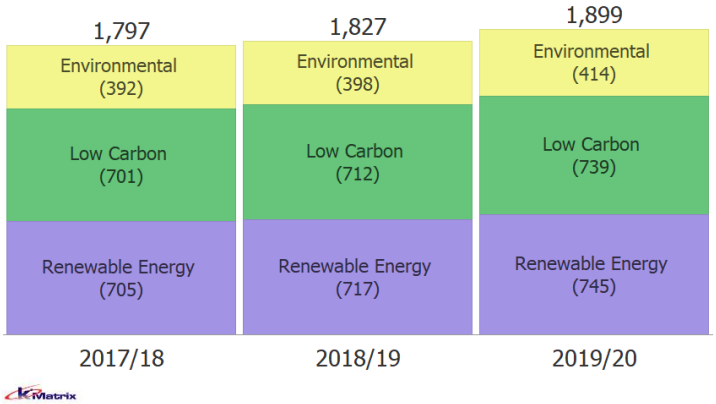


Figure 6 shows the three-year company split by Level 1.

In 2017/18 the split was 39% Renewable Energy, 39% Low Carbon and 22% Environmental. The split had not changed in 2019/20.

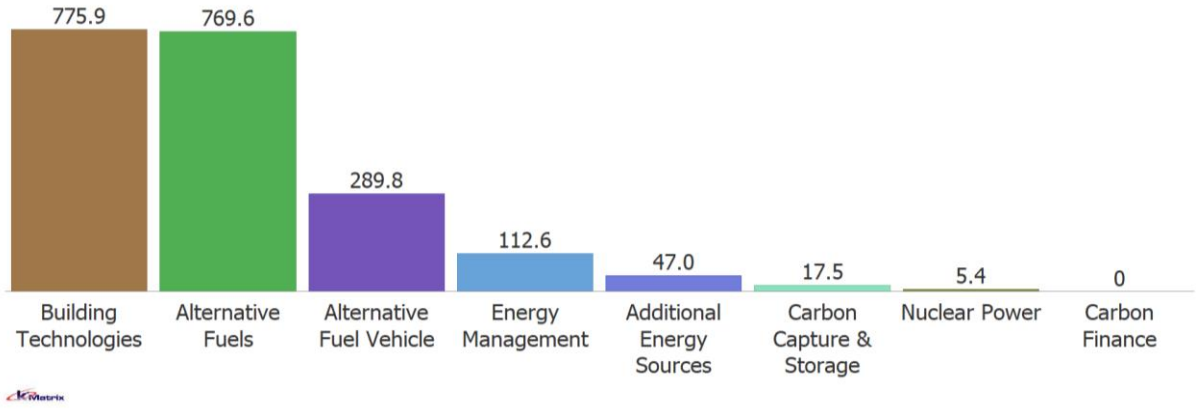
In 2019/20 MEH Regional LCEGS sales was split - Renewable Energy 39%, Low Carbon 39% and Environmental 22%.

1.3 D2N2 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)

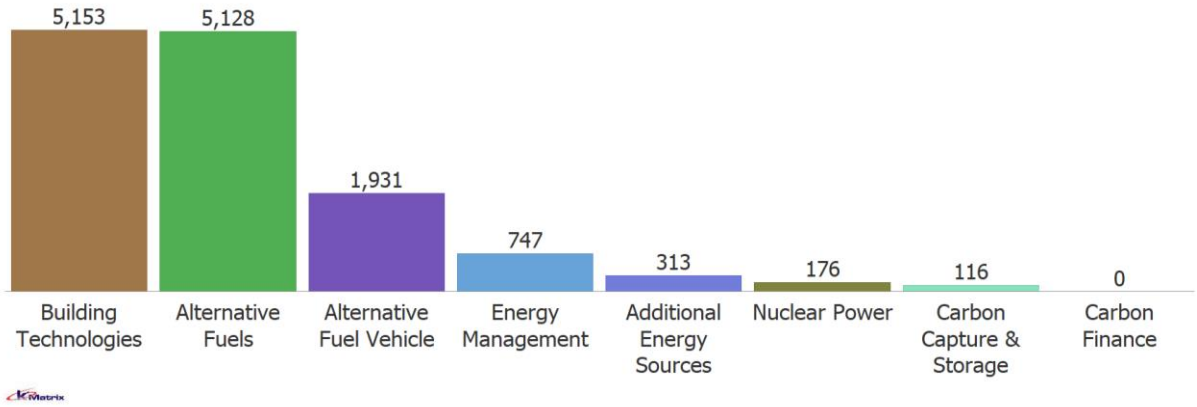
Figure 7: Sales 2019/20 in £m (Level 2)



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 38%, Alternative Fuels 38%, Alternative Fuel Vehicle 14% and Energy Management 6%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from £712.5m to £775.9m; Alternative Fuels from £706.9m to £769.6m; Alternative Fuel Vehicle from £266.0m to £289.8m and Energy Management from £103.4m to £112.6m.

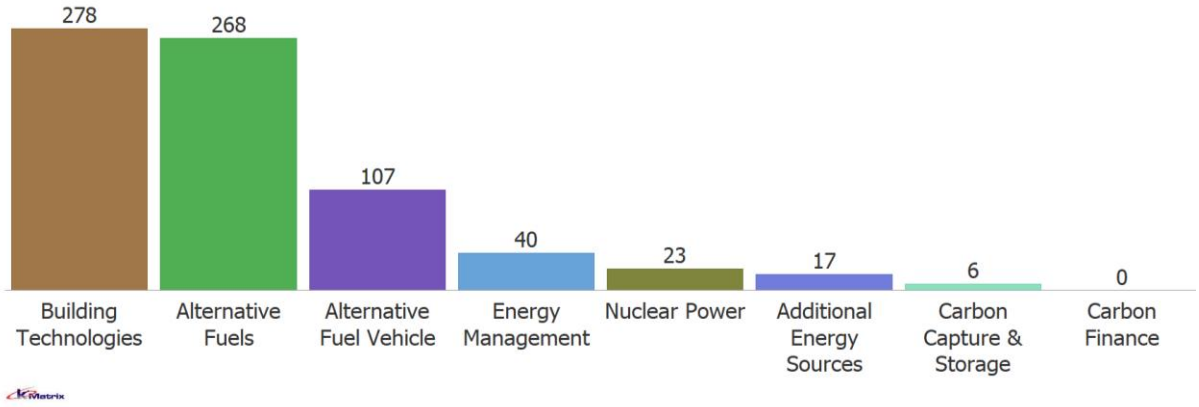
Figure 8: Employment 2019/20 (Level 2)



The same four sub-sectors account for 96% of employment (Figure 8). They are Building Technologies 38%, Alternative Fuels 38%, Alternative Fuel Vehicle 14% and Energy Management 6%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from 4,998 to 5,153; Alternative Fuels from 4,972 to 5,128; Alternative Fuel Vehicle from 1,876 to 1,931 and Energy Management from 726 to 747.

Figure 9: Companies 2019/20 (Level 2)

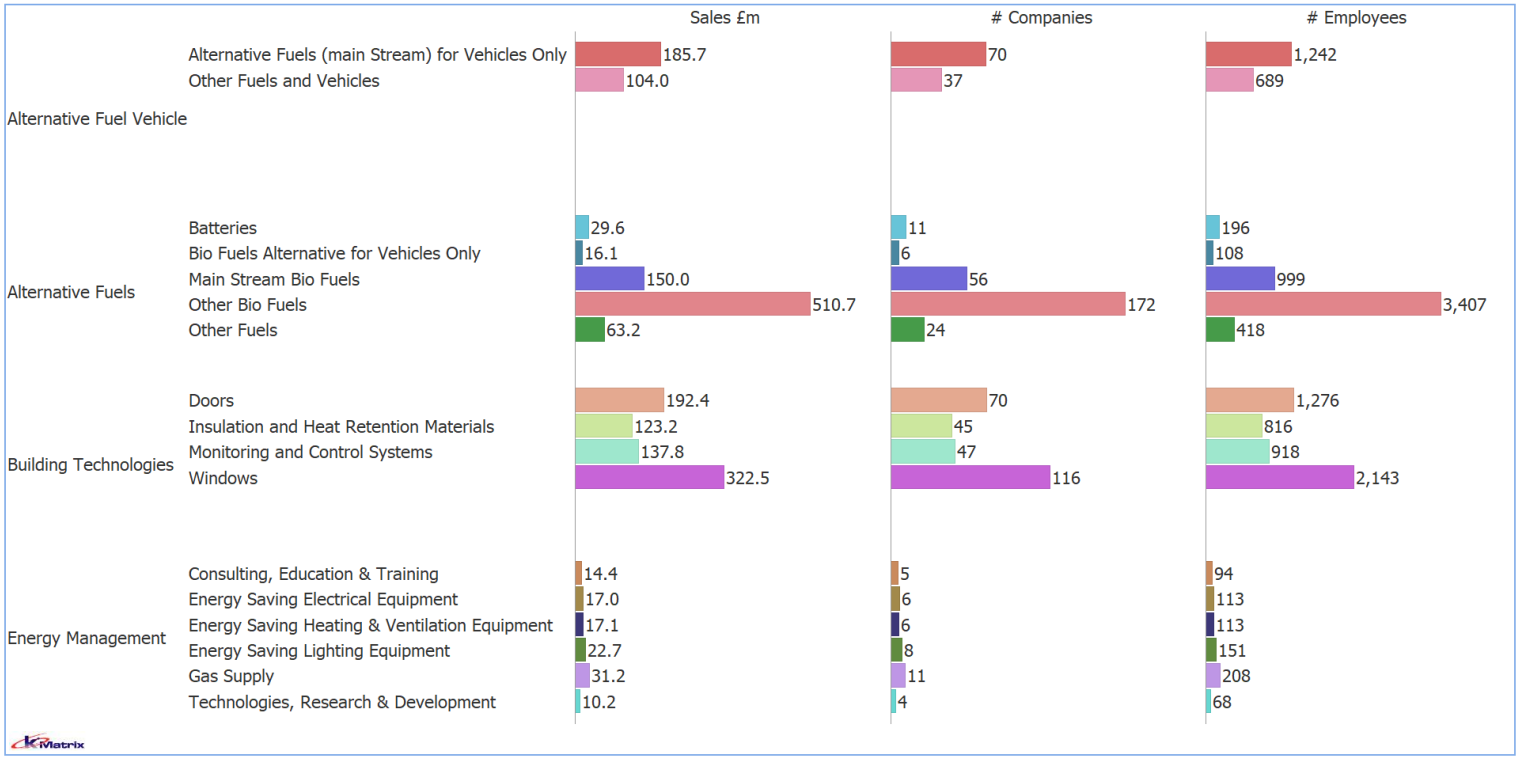


The same four sub-sectors again account for 94% of companies (Figure 9). They are Building Technologies 38%, Alternative Fuels 36%, Alternative Fuel Vehicle 14% and Energy Management 5%.

Each of these four sub-sectors grew between 2017/18 and 2019/20: Building Technologies from 264 to 278; Alternative Fuels from 255 to 268; Alternative Fuel Vehicle from 102 to 107 and Energy Management from 38 to 40.

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 D2N2 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 42% 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 66% 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.

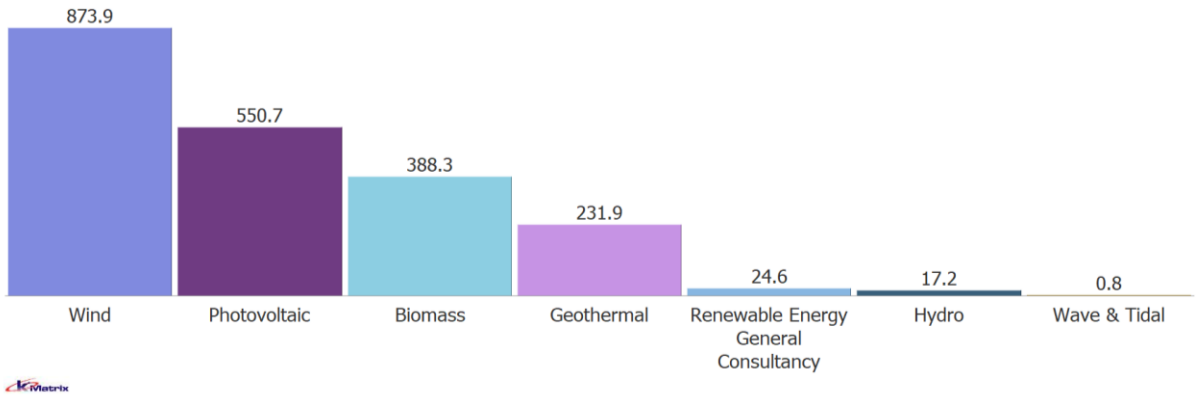
Energy Management has six sub-sectors at level 3, with Gas Supply holding 28% of the market share. Example companies in this sub-sector would include registered gas engineers, measurement and control systems and fitting and maintenance.

1.4 D2N2 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

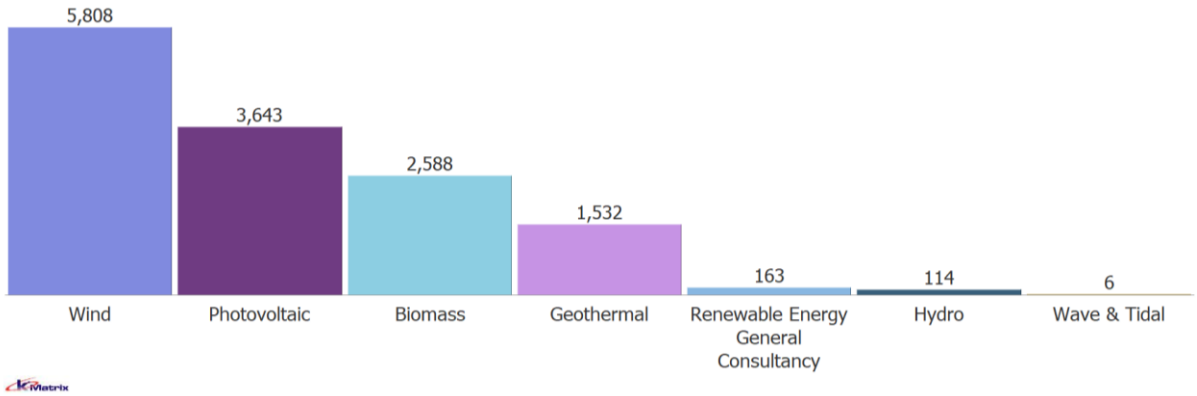
Figure 11: Sales 2019/20 in £m (Level 2)



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 42%, Photovoltaic 26%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from £803.7m to £873.9m; Photovoltaic from £505.4m to £550.7m; Biomass from £357.1m to £388.3m and Geothermal from £213.1m to £231.9m.

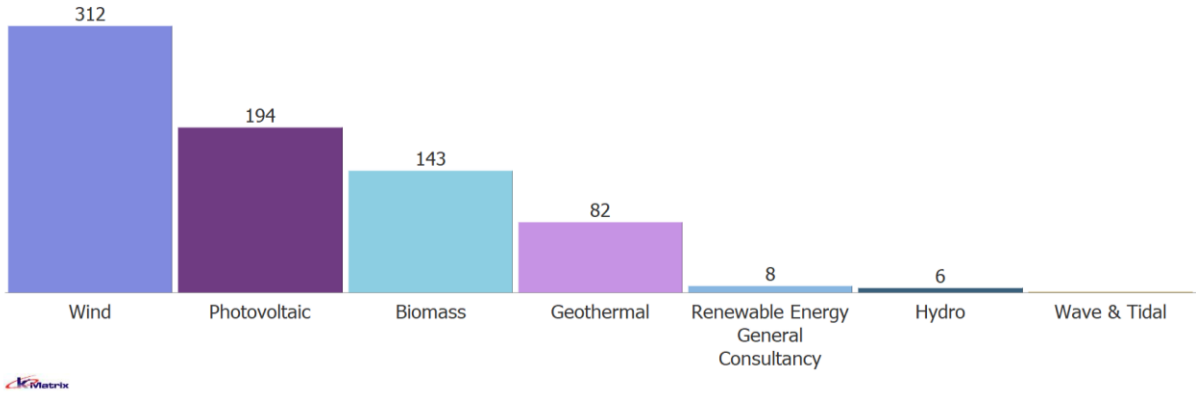
Figure 12: Employment 2019/20 (Level 2)



The same four sub-sectors account for 98% of employment (Figure 12). They are made up of Wind 42%, Photovoltaic 26%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from 5,636 to 5,808; Photovoltaic from 3,524 to 3,643; Biomass from 2,510 to 2,588 and Geothermal from 1,486 to 1,532.

Figure 13: Companies 2019/20 (Level 2)



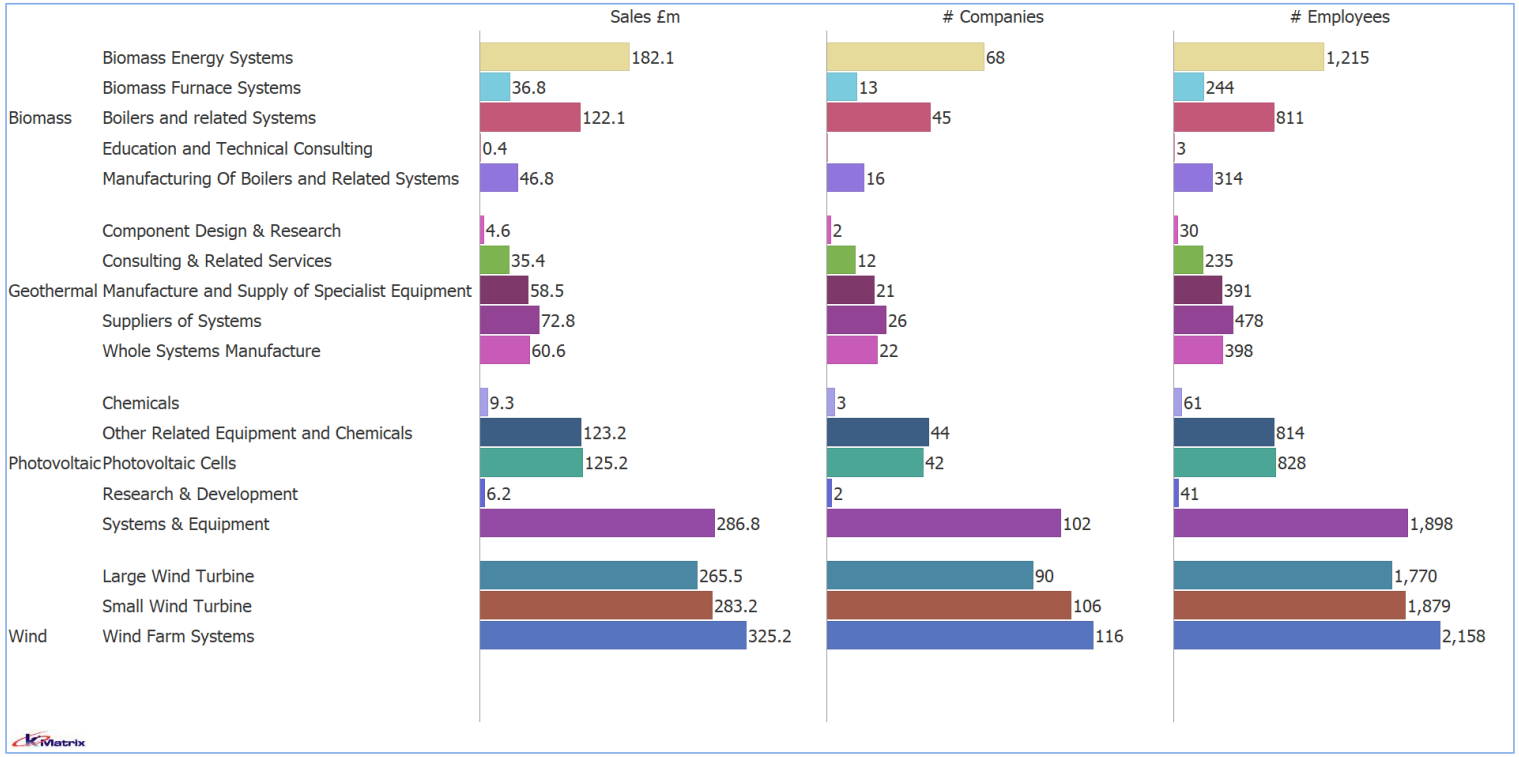
The same four sub-sectors also account for 98% of companies (Figure 13). They are made up of Wind 42%, Photovoltaic 26%, Biomass 19% and Geothermal 11%.

Each of these four sub-sectors have grown between 2017/18 and 2019/20: Wind from 295 to 312; Photovoltaic from 182 to 194; Biomass from 135 to 143 and Geothermal from 78 to 82.

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 6 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 D2N2 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 42% of sales and has three sub-sectors at Level 3, the largest being Wind Farm Systems which makes up 37% 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.

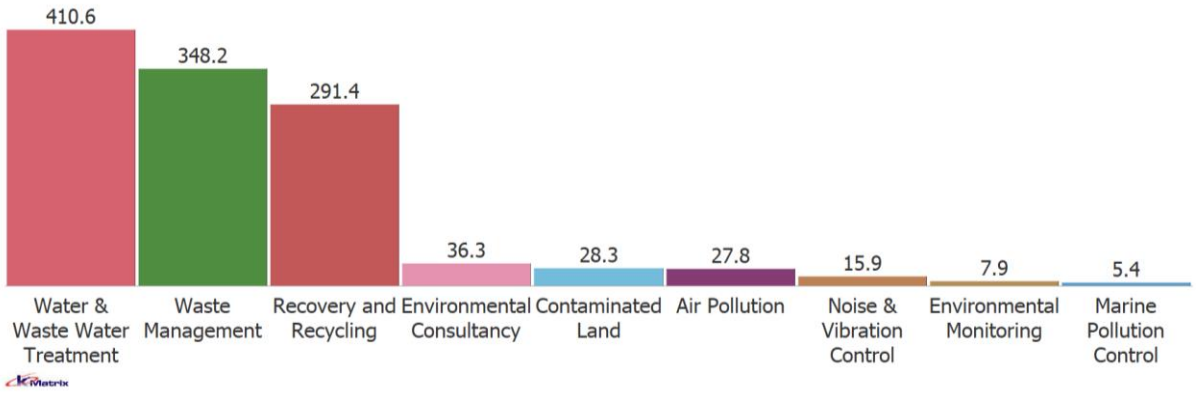
Geothermal has five sub-sectors at Level 3, the largest being Suppliers of Systems which makes up 31% of the sales in this market. Example companies include lateral geothermal systems providers and installers at the domestic and small commercial level and vertical control systems developers and suppliers.

1.5 D2N2 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

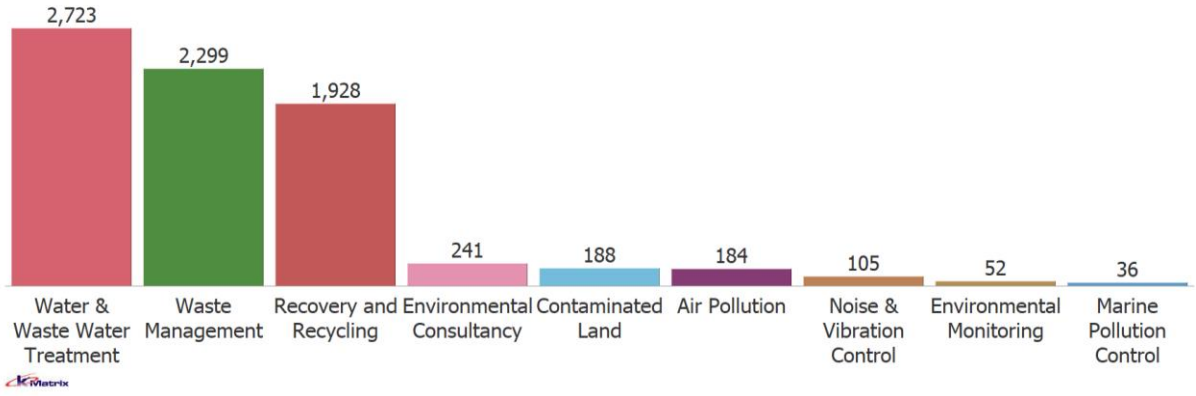
Figure 15: Sales 2019/20 in £m (Level 2)



Environmental is split into nine sub-sectors, of which three account for 89% of sales (Figure 15). These three are made up of Water Supply & Waste Water Treatment 35%, Waste Management 30% and Recovery & Recycling 25%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water Supply and Waste Water Treatment from £377.6m to £410.6m; Waste Management from £320.4m to £348.2m and Recovery and Recycling from £267.7m to £291.4m.

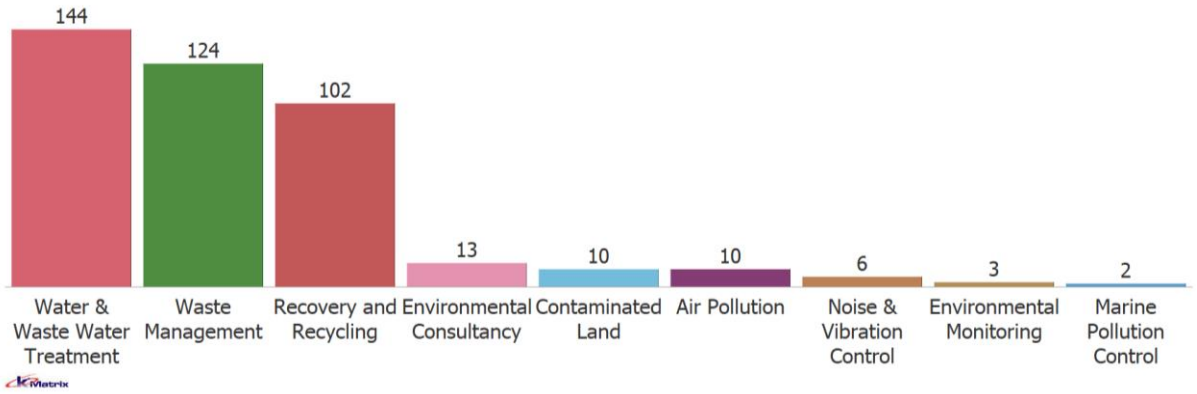
Figure 16: Employment 2019/20 (Level 2)



The same three sub-sectors account for 90% of employment (Figure 16). They are made up of Water Supply & Waste Water Treatment 35%, Waste Management 30% and Recovery & Recycling 25%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water & Waste Water Treatment from 2,638 to 2,723; Waste Management from 2,232 to 2,299 and Recovery and Recycling from 1,870 to 1,928.

Figure 17: Companies 2019/20 (Level 2)



The same three sub-sectors also account for 89% of companies (Figure 17). They are made up of Water Supply & Waste Water Treatment 35%, Waste Management 30% and Recovery & Recycling 25%.

Each of these three sub-sectors have grown between 2017/18 and 2019/20: Water & Waste Water Treatment from 136 to 144; Waste Management from 118 to 124 and Recovery and Recycling from 97 to 102.

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

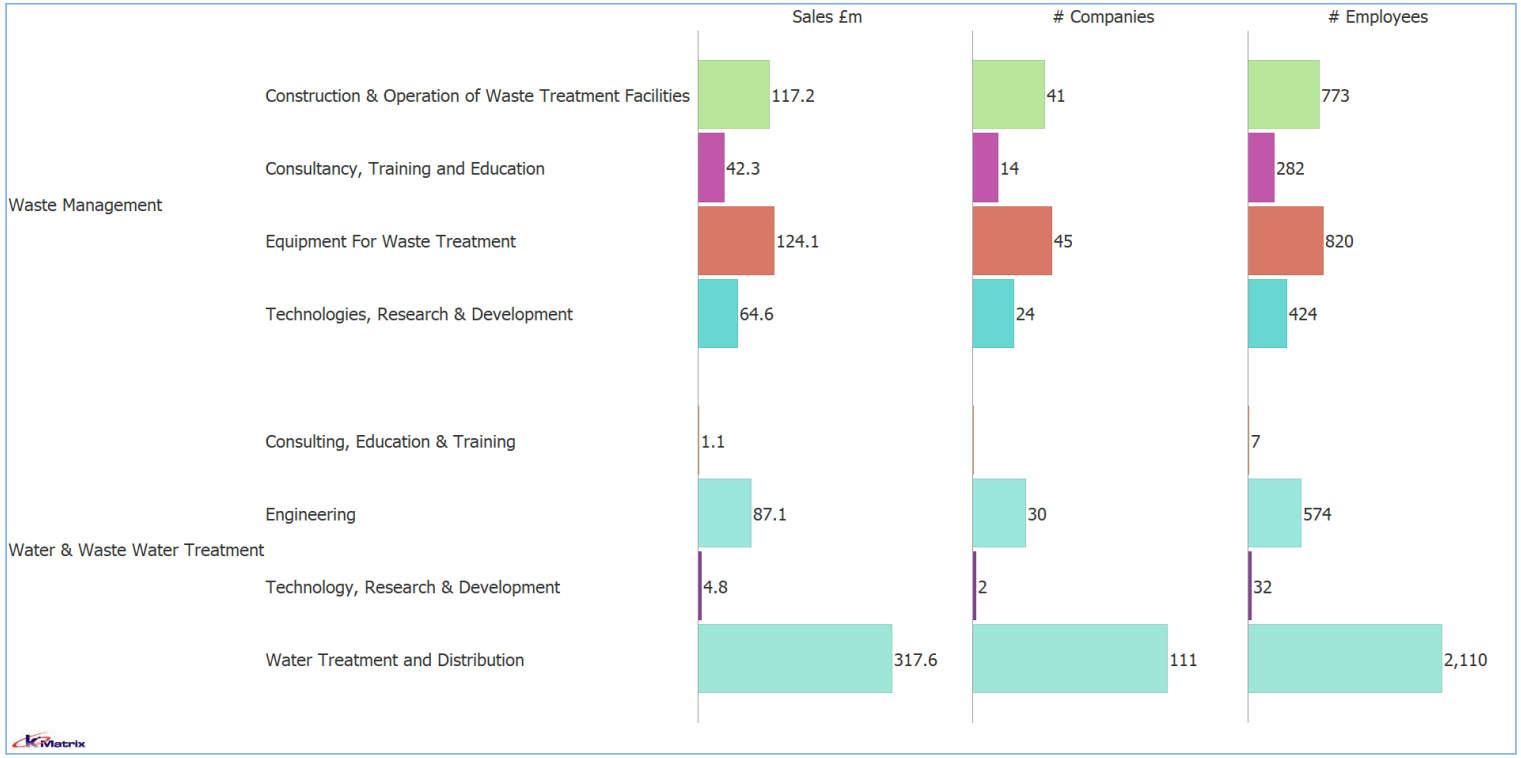


Figure 18 shows the Sales, Companies and Employees for the Waste Management and Water & Waste Water Treatment Level 2 sub-sectors broken down into their Level 3 sub-sectors.

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 36% 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.

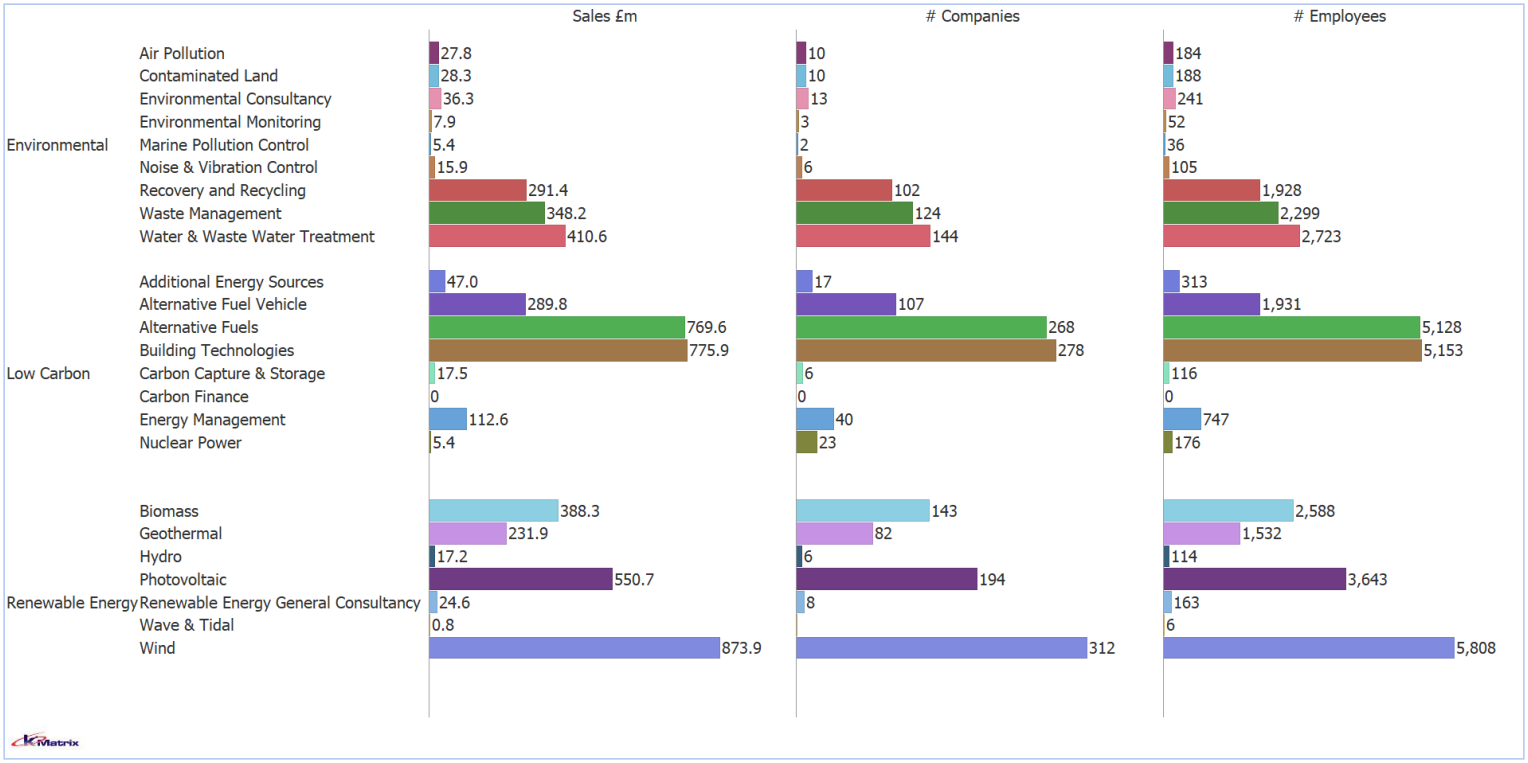
1.6 D2N2 LEP's LCEGS Level 2 Summary

Figure 20 compares all 24 sub-sectors of LCEGS and shows that the five leading sub-sectors: Wind (17%), Building Technologies (15%), Alternative Fuels (15%), Photovoltaic (10%) and Water & Waste Water Treatment (8%) have the largest share in terms of sales, company numbers and employment and accounted for 64% of D2N2's LCEGS sector activity in 2019/20.

There is then a second grouping of six sub-sectors that are: Biomass 7%, Waste Management 7%, Recovery and Recycling 6%, Alternative Fuel Vehicle 5%, Geothermal 4% and Energy Management 2%, and that make up a further 31% 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 D2N2 LEP and the MEH's LCEGS compared

The D2N2 LEP accounts for 20% of the Midlands Energy Hub Region's LCEGS sector.

Figure 21: D2N2 LEP Measures 2019/20 by Level 1

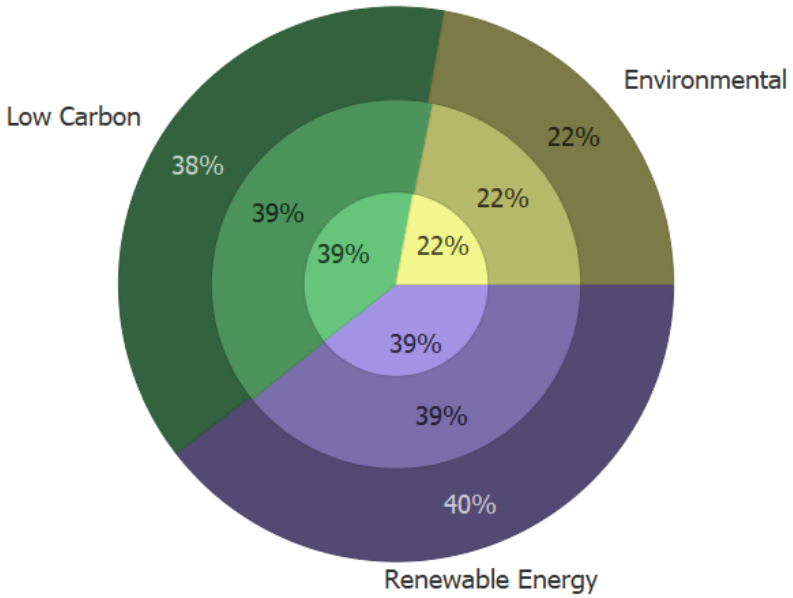
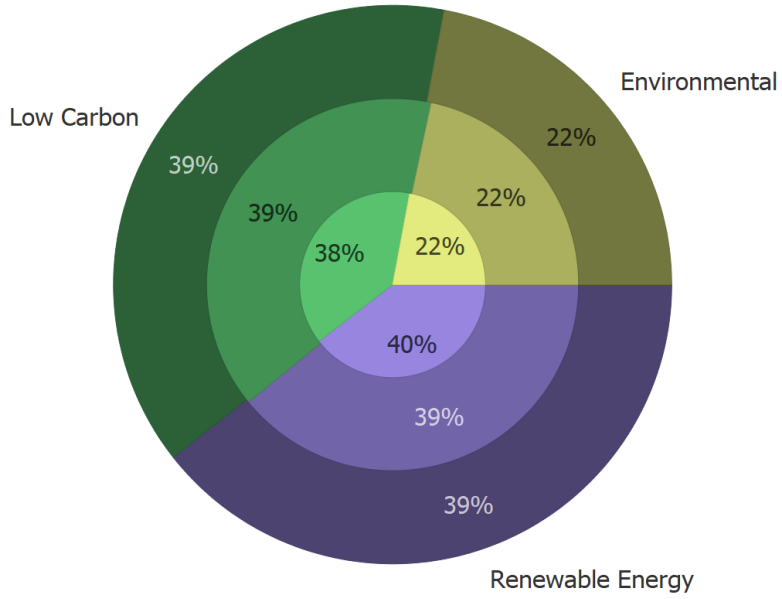


Figure 22: MEH Measures 2019/20 by Level 1



Figures 21 and 22 compare the profile of the D2N2 LEP and the MEH region's LCEGS activities at Level 1 for sales (outer circle), companies (middle circle) and employment (inner circle). D2N2 LEP is broadly in line with the MEH LCEGS sector, with slightly more market within the Renewable Energy sub-sector than the regional average.

Figure 23: D2N2 LEP's LCEGS sub-sectors for 2019/20 at Level 2

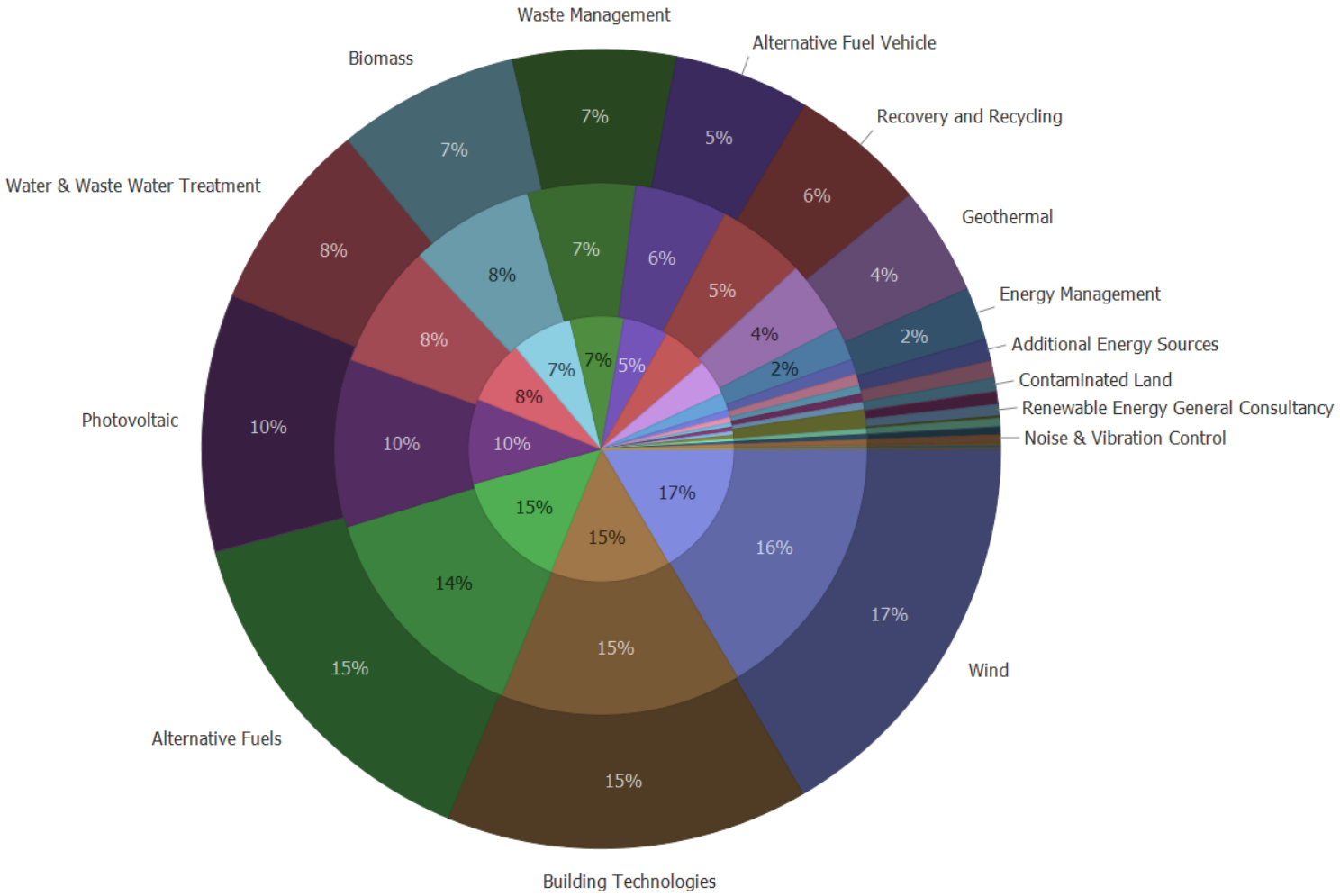
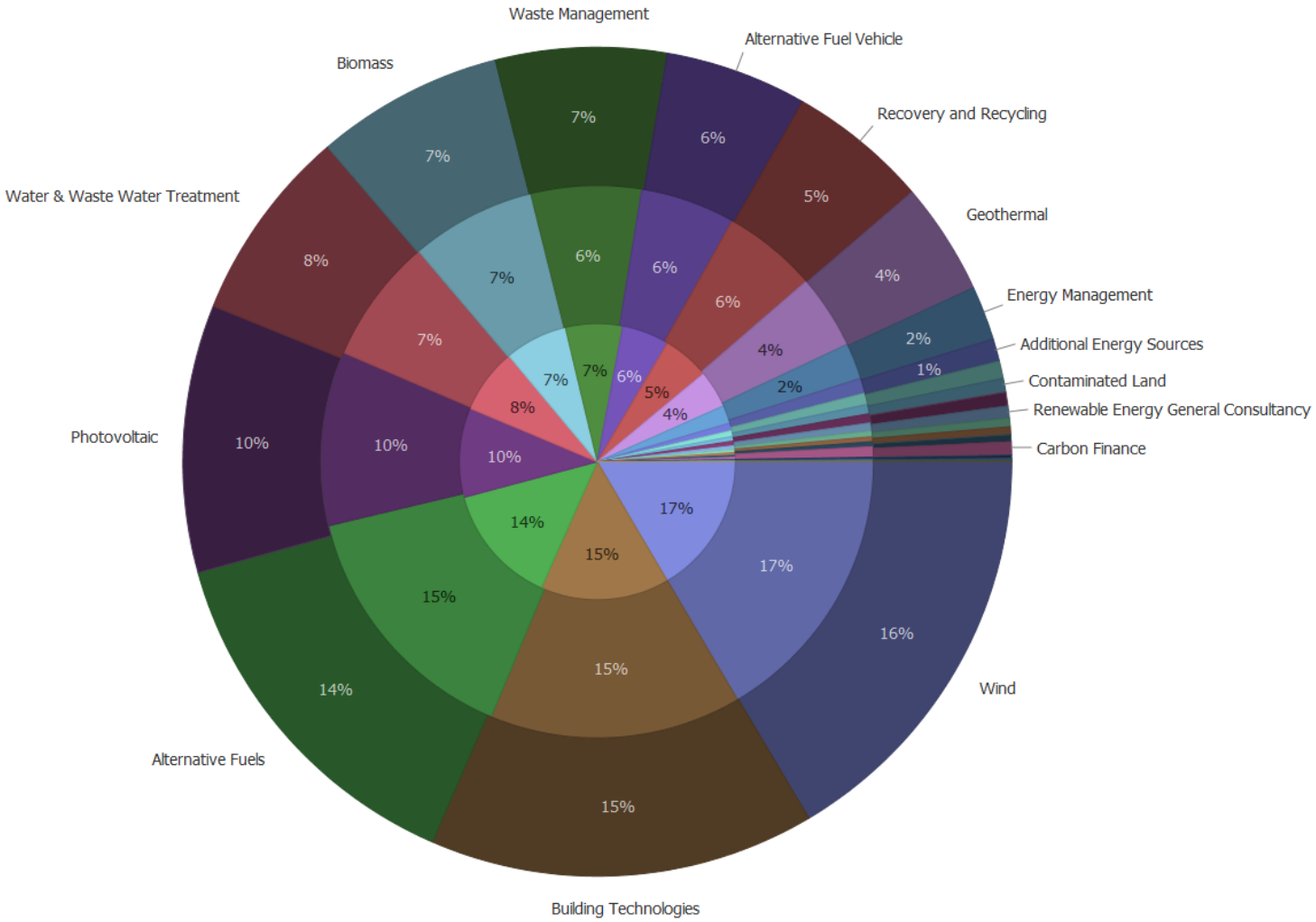


Figure 24: MEH's LCEGS sub-sectors for 2019/20 at Level 2



Figures 23 and 24 extends the analysis by comparing the profile of the D2N2 LEP and MEH's LCEGS activities at Level 2 for sales (outer circle), companies (middle circle) and employment (inner circle).

There are only subtle differences between the two, such as slightly stronger Wind and Alternative Fuels in the D2N2 LEP than the regional average.

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

The relative strengths of the sub-sectors, in terms of market share, are in line with the regional average, as would be expected in a LEP holding 18% of the regional LCEGS sector.

1.8 D2N2 LEP's LCEGS Investment in R&D

This section examines the investment profile of the D2N2 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: D2N2 LEP's LCEGS Investment in R&D by Fiscal Year

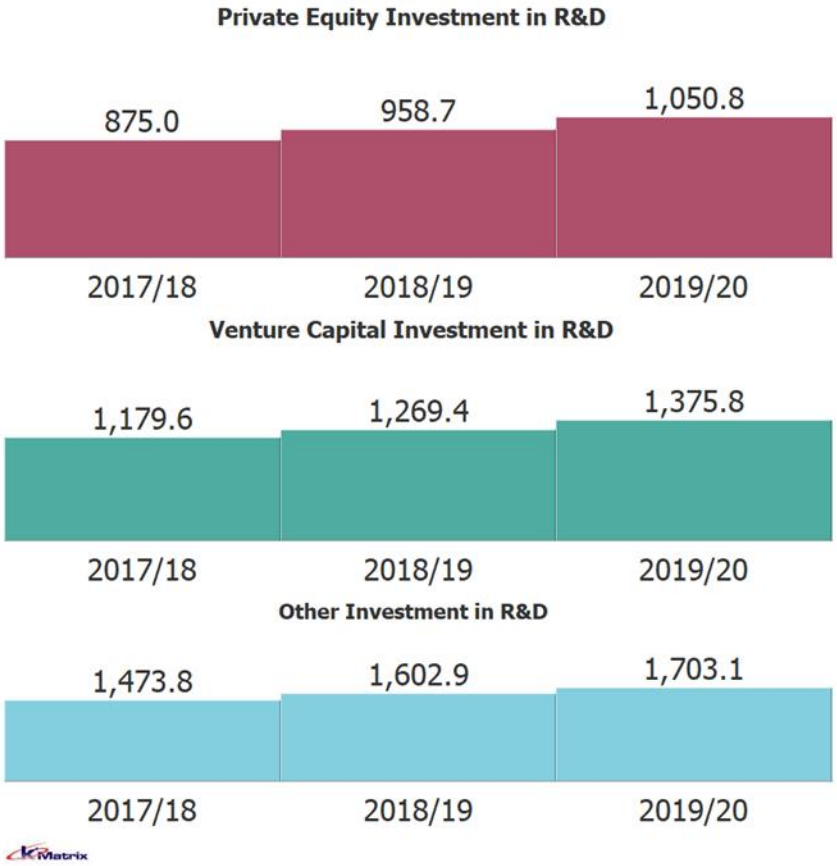


Figure 25 shows the investment for the three financial years of the sector study, made into the whole LCEGS sector.

Private Equity Investment has grown from £875m in 2017/18 to £1.1bn in 2019/20, representing 9.6% growth between 2017/18 and 2018/19 and 9.6% growth between 2018/19 and 2019/20.

By comparison, the MEH region's growth rates were 7.6% and 7.9%.

Venture Capital Investment has grown from £1.2bn in 2017/18 to £1.4bn in 2019/20, representing 7.6% growth between 2017/18 and 2018/19 and 8.4% growth between 2018/19 and 2019/20.

By comparison, the MEH region's growth rates were 6.7% and 7.4%.

Other Investment has grown from £1.5bn in 2017/18 to £1.7bn in 2019/20, representing 8.8% 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 7.0% and 6.6%.

Figure 26: D2N2 LEP's LCEGS Investment in R&D by Fiscal Year – Level 1

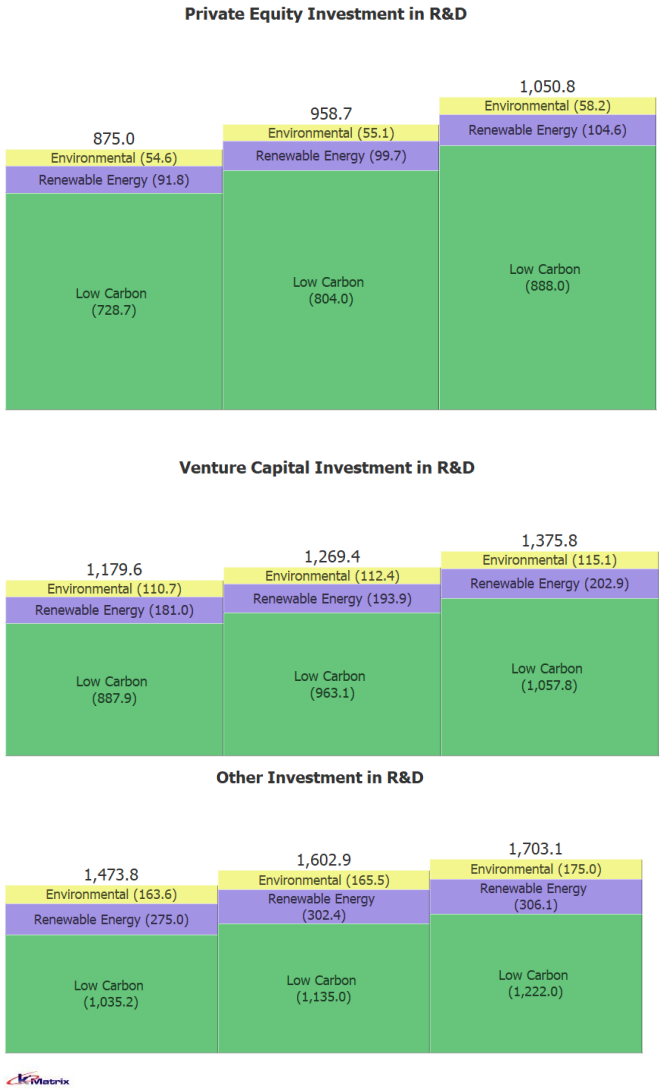


Figure 26 shows the investment for the three financial years of the sector study, made into the LCEGS sector, split into Level 1.

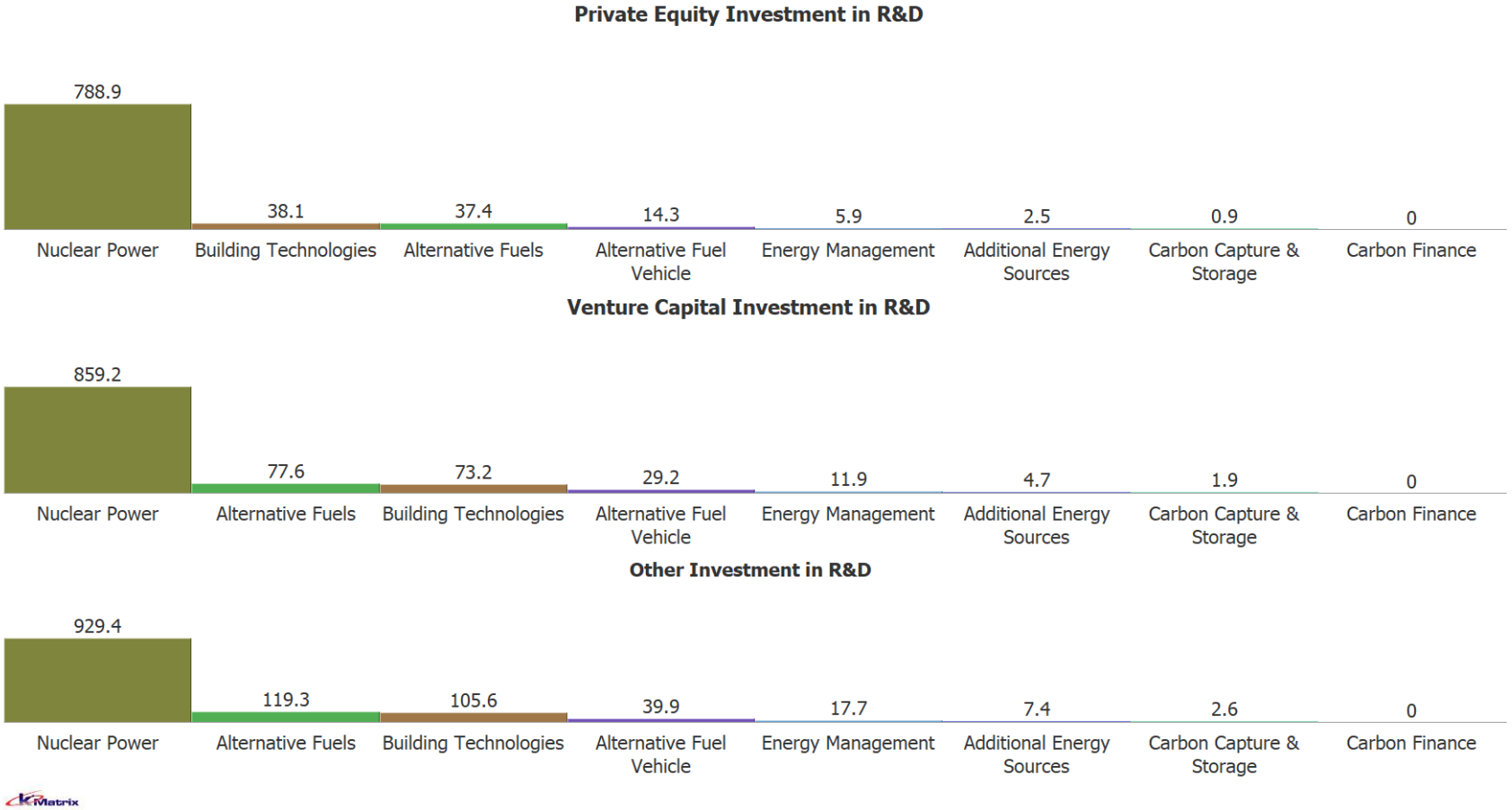
Private Equity Investment was split in 2019/20 Renewable Energy 10%, Low Carbon 85% and Environmental 6%. This is markedly different to the sales split of 40%, 38% and 22%.

Venture Capital Investment was split in 2019/20 Renewable Energy 15%, Low Carbon 77% and Environmental 8%. This is markedly different to the sales split of 40%, 38% and 22%.

Other Investment was split in 2019/20 Renewable Energy 18%, Low Carbon 72% and Environmental 10%. This is markedly different to the sales split of 40%, 38% and 22%.

The large investment within the Low Carbon sub-sector is due to high investment in Nuclear, which is not in the top 11 sub-sectors with regards to sales. As such, we will include the Level 2 Nuclear sub-sector within the Low carbon investment analysis.

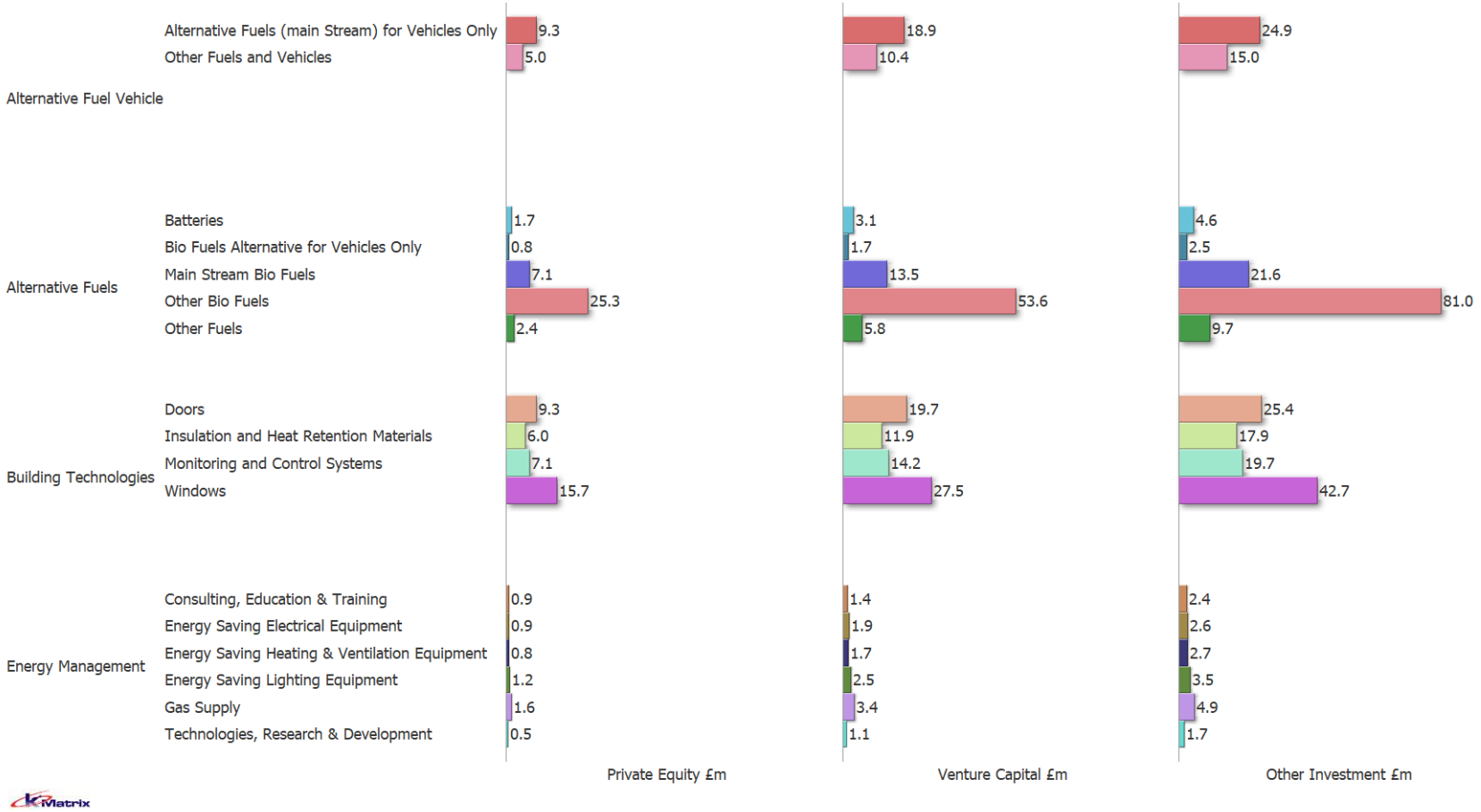
Figure 27: D2N2 LEP's LCEGS Investment in R&D 2019/20 – Level 2 Low Carbon



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

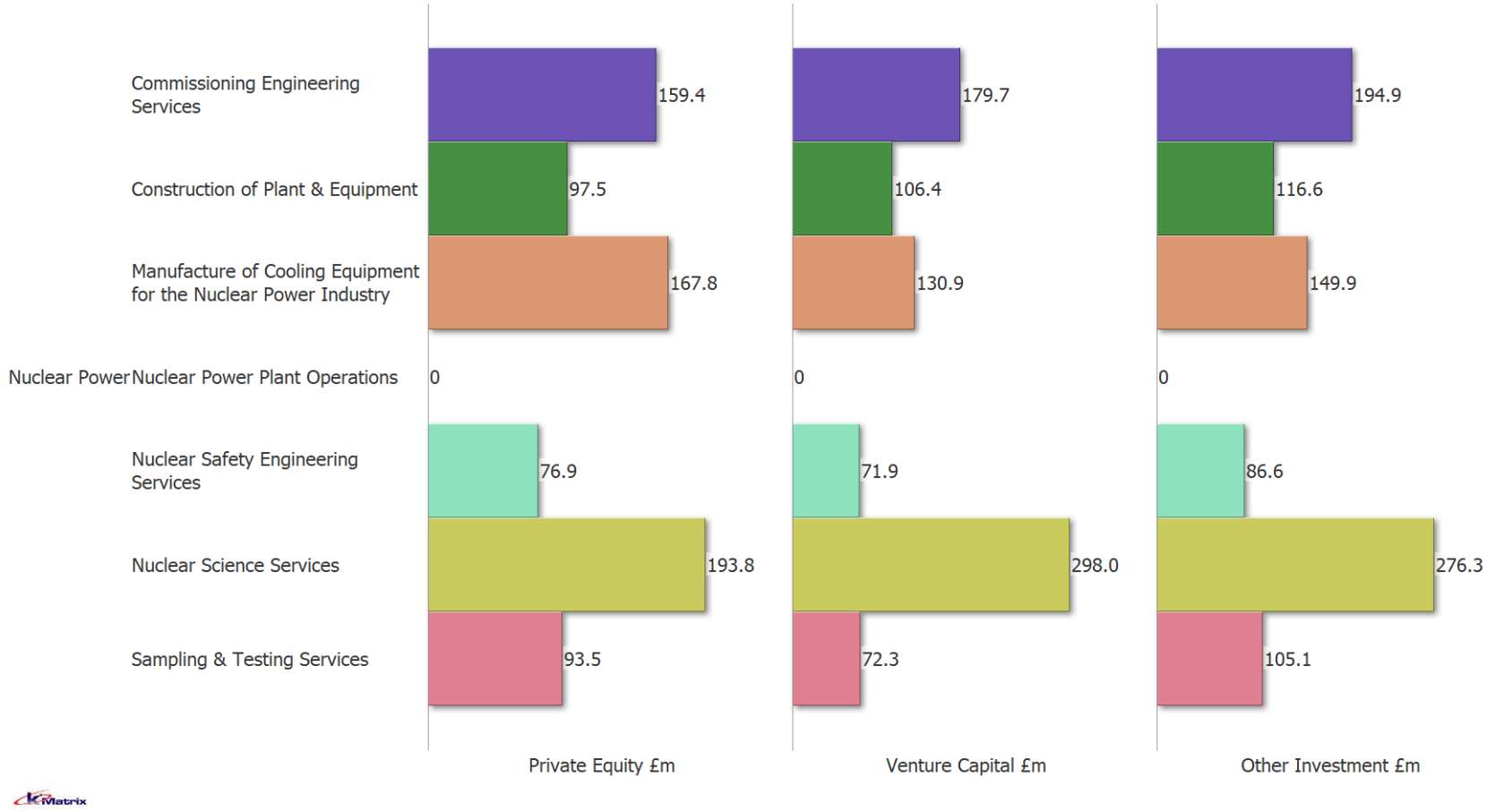
- Nuclear from £639m to £789m for Private Equity, £696m to £859m for Venture Capital and £753m to £929m for Other Investment
- Building Technologies from £34m to £38m for Private Equity, £71m to £73m for Venture Capital and £107m to £106m for Other Investment
- Alternative Fuels from £34m to £37m for Private Equity, £71m to £73m for Venture Capital and £111m to £119m for Other Investment
- Alternative Fuel Vehicle from £13m to £14m for Private Equity, £30m to £29m for Venture Capital and staying at £40m to £40m for Other Investment.
- Energy Management from £5m to £6m for Private Equity, £10m to £12m for Venture Capital and £15m to £18m for Other Investment

Figure 28a: D2N2 LEP's LCEGS Investment in R&D 2019/20 – Low Carbon top Level 3 sub-sectors – Alternative Fuel Vehicle, Alternative Fuels, Building Technologies and Energy Management



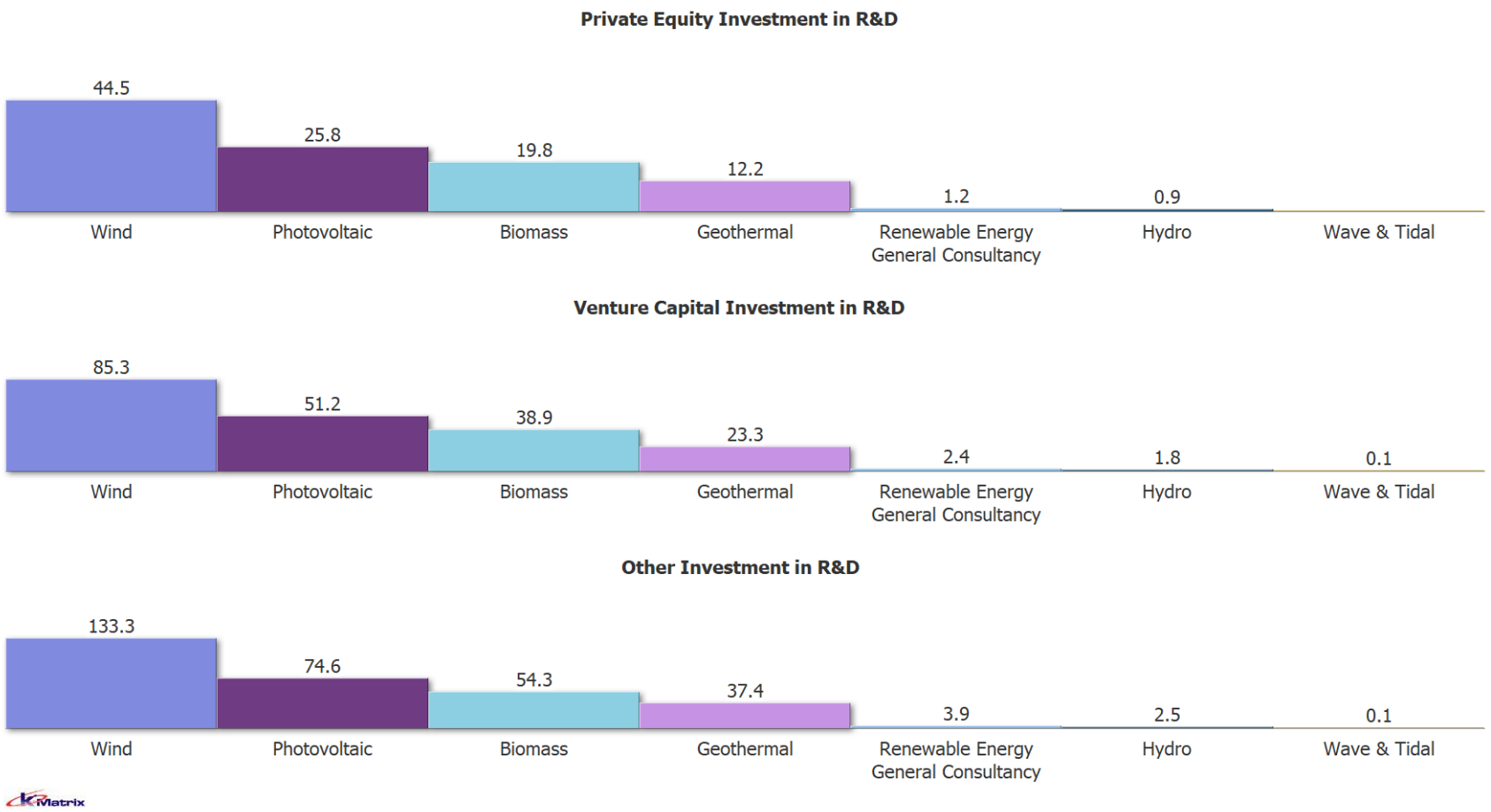
Investment for the Level 3 sub-sectors of the top Level 2 sub-sectors within Low Carbon have grown between 2017/18 and 2019/20. The pattern of investment for Private Equity, Venture Capital and Other Investment is similar to the Sales pattern in section 2.3.

Figure 28b: D2N2 LEP's LCEGS Investment in R&D 2019/20 – Low Carbon top Level 3 sub-sector - Nuclear



Investment for the Level 3 sub-sectors of the Nuclear Level 2 sub-sector 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.

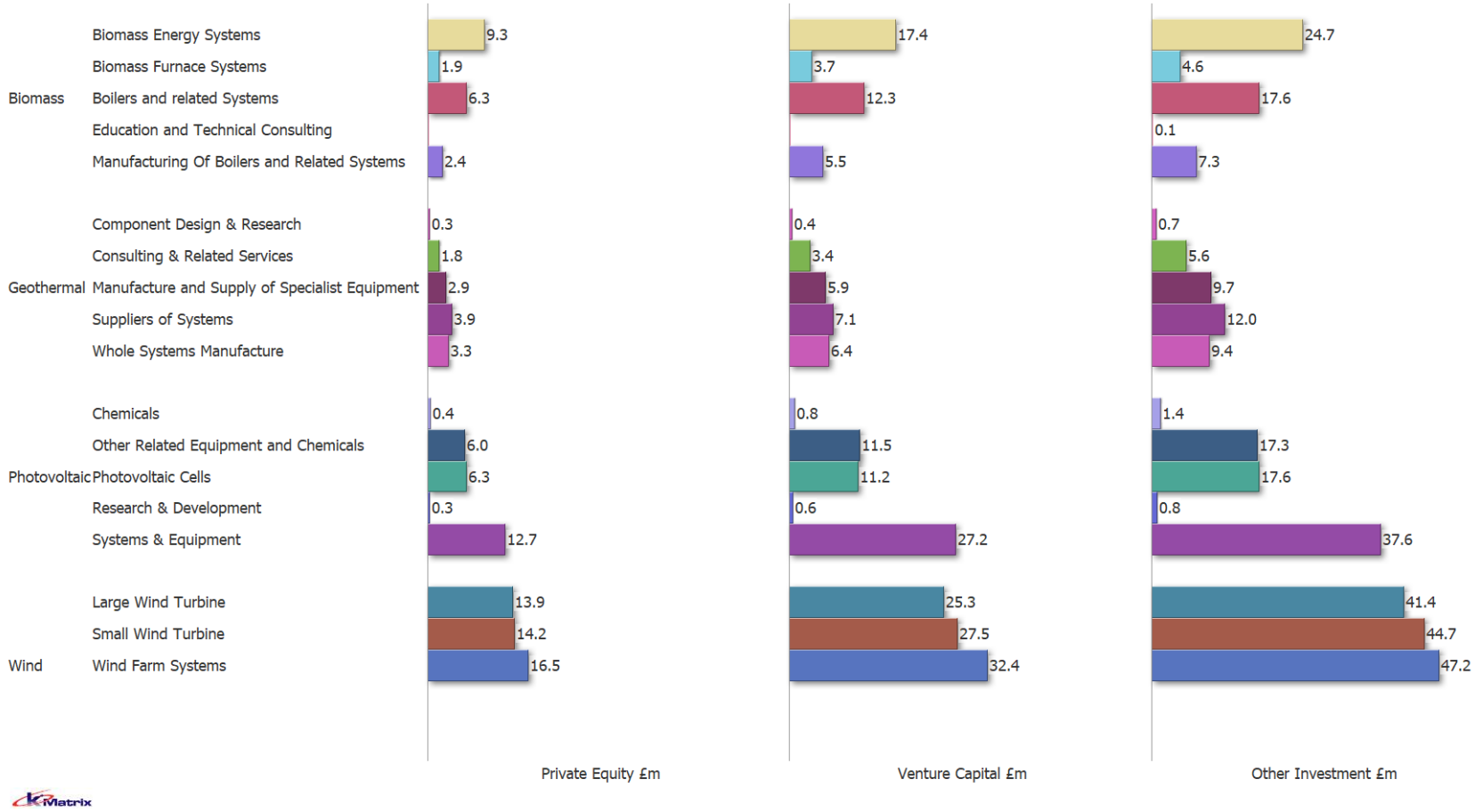
Figure 29: D2N2 LEP's LCEGS Investment in R&D 2019/20 – Level 2 Renewable Energy



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

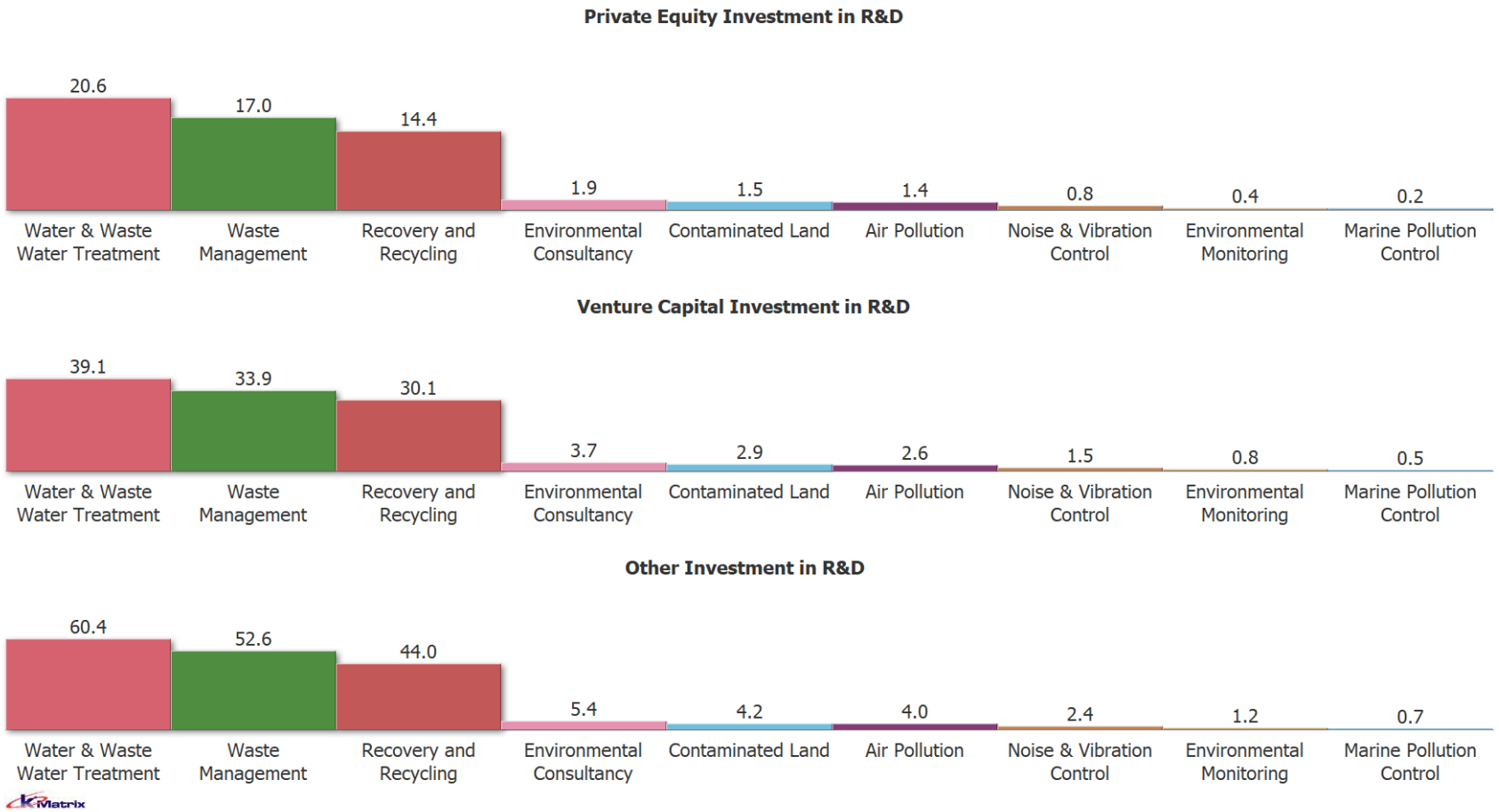
- Wind from £39m to £45m for Private Equity, £78m to £85m for Venture Capital and £118m to £133m for Other Investment
- Photovoltaic from £24m to £51m for Private Equity, £46m to £51m for Venture Capital and £69m to £75m for Other Investment
- Biomass from £17m to £20m for Private Equity, £32m to £39m for Venture Capital and £53m to £54m for Other Investment
- Geothermal from £11m to £12m for Private Equity, £21m to £23m for Venture Capital and £30m to £37m for Other Investment

Figure 30: D2N2 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, Venture Capital and Other Investment is similar to the Sales pattern in section 2.4.

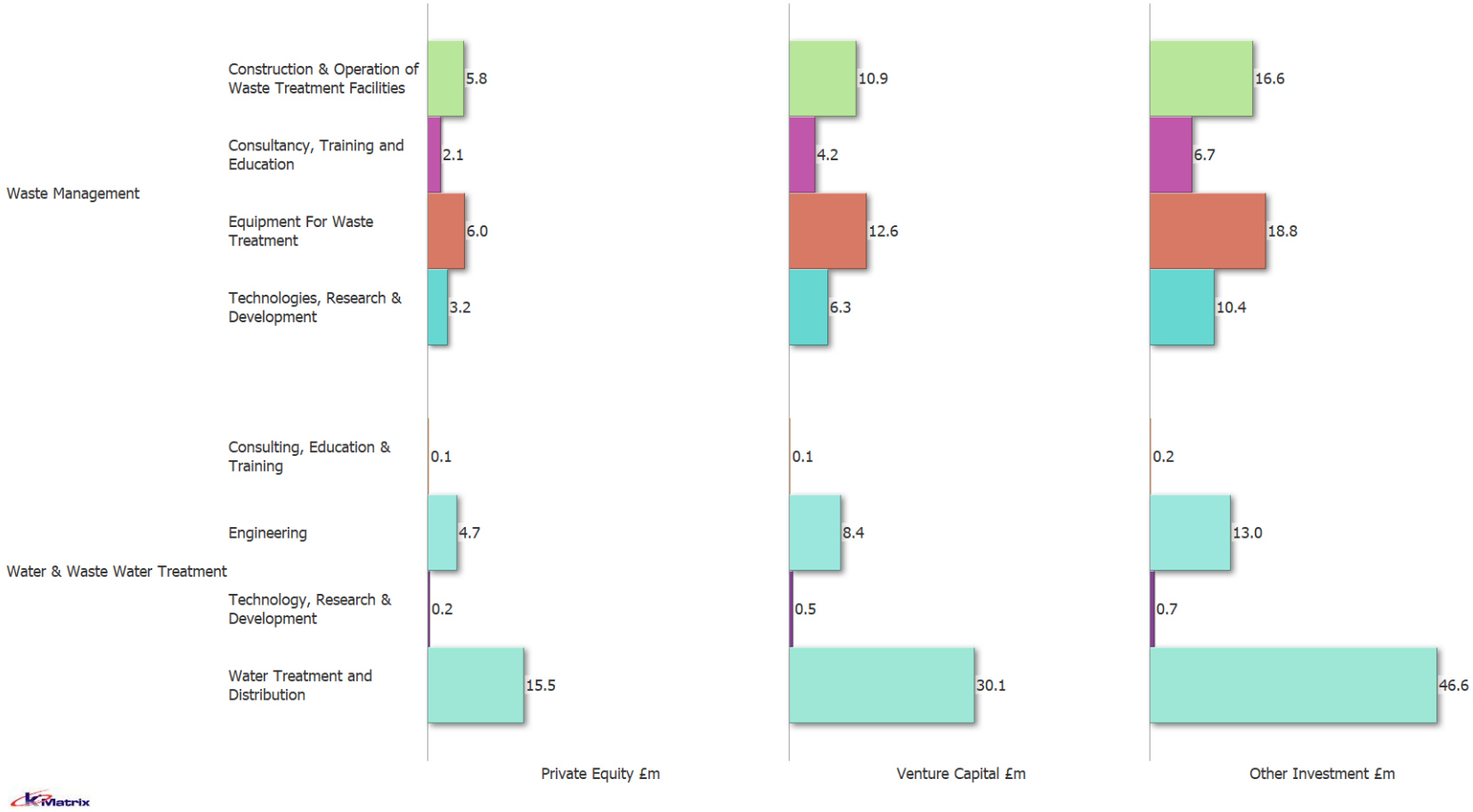
Figure 31: D2N2 LEP's LCEGS Investment in R&D 2019/20 – Level 2 Environmental



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

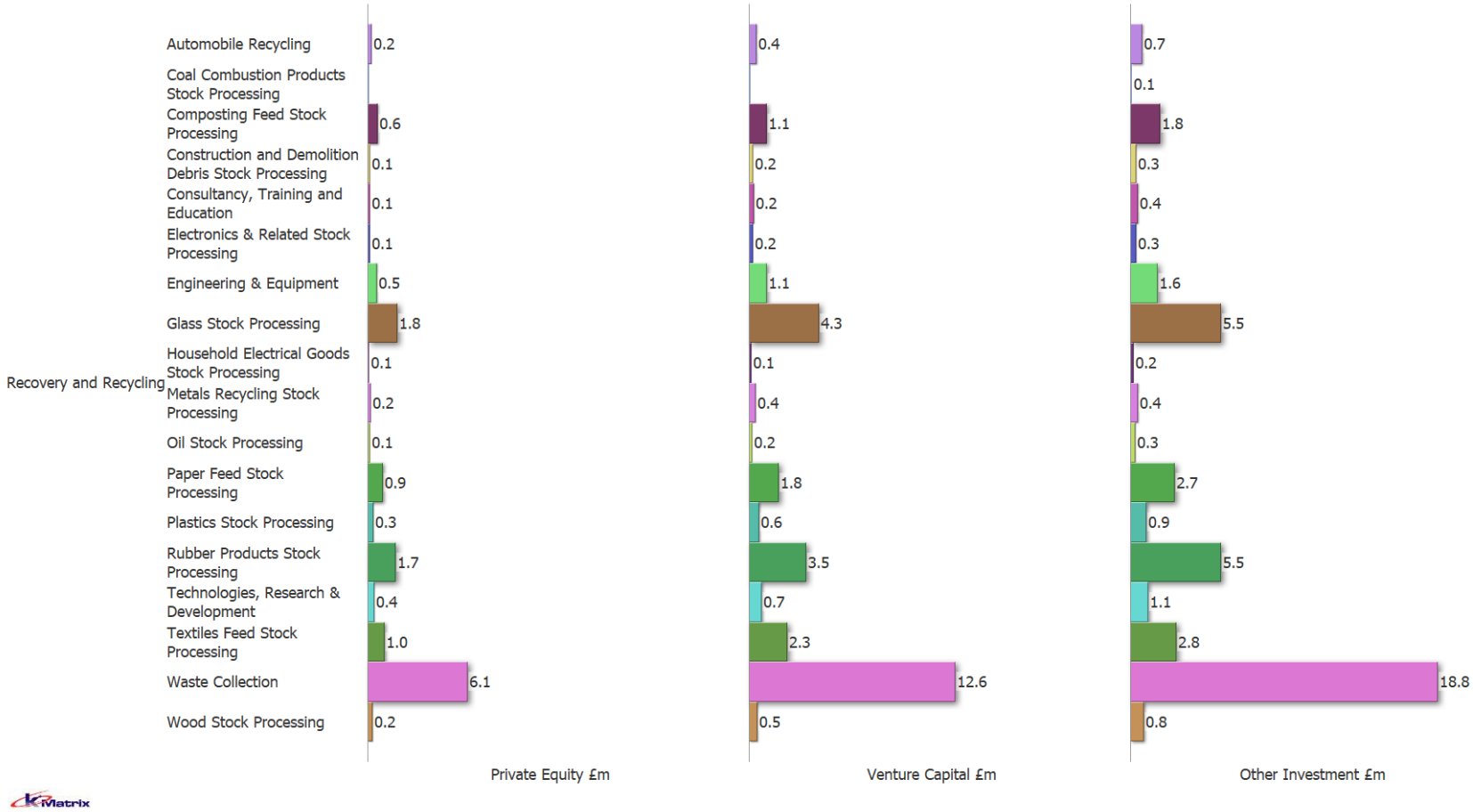
- Water & Waste Water Treatment from £19m to £21m for Private Equity, staying at £39m to £39m for Venture Capital and £56m to £60m for Other Investment
- Waste Management staying at £17m for Private Equity, £34m for Venture Capital and from £51m to £53m for Other Investment
- Recovery and Recycling staying at £14m for Private Equity, from £27m to £30m for Venture Capital and £41m to £44m for Other Investment

Figure 32: D2N2 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: D2N2 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 D2N2's LCEGS Company Size

In this section we look at the number of companies within the D2N2 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 D2N2 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: D2N2 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	20	0.0%	20	5.0%	21	117	2.6%	120	3.3%	124	196	1.5%	199	4.0%	207
Low Carbon	37	2.7%	38	5.3%	40	211	0.5%	212	4.2%	221	348	2.0%	355	4.2%	370
Renewable Energy	35	2.9%	36	2.8%	37	212	1.4%	215	3.7%	223	352	1.7%	358	4.2%	373
Total	**92**	**2.2%**	**94**	**4.3%**	**98**	**540**	**1.3%**	**547**	**3.8%**	**568**	**896**	**1.8%**	**912**	**4.2%**	**950**

	# 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	39	2.6%	40	2.5%	41	20	0.0%	20	5.0%	21	392	1.5%	398	4.0%	414
Low Carbon	70	2.9%	72	4.2%	75	34	2.9%	35	2.9%	36	701	1.6%	712	3.8%	739
Renewable Energy	71	1.4%	72	4.2%	75	35	2.9%	36	2.8%	37	705	1.7%	717	3.9%	745
Total	**180**	**2.2%**	**184**	**3.8%**	**191**	**89**	**2.2%**	**91**	**3.3%**	**94**	**1,798**	**1.6%**	**1,827**	**3.9%**	**1,898**

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 5.3% was seen in start-ups in the Low Carbon sub-sector, with the weakest growth of 2.5% was seen in large companies in the Environmental sub-sector.

Tables 2a and 2b show the company count for the LCEGS sector across the D2N2 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: D2N2 LEP's LCEGS Number of Companies Split by Company Size, with Growth 2017/18 to 2019/20 – Level 2

		# Start-up					# Micro					# SMEs				
			Growth		Growth			Growth		Growth			Growth		Growth	
Level 1	Level 2	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Environmental	Air Pollution	0	0	0	0	0	3	0.0%	3	0.0%	3	5	0.0%	5	0.0%	5
Environmental	Contaminated Land	0	0	0	0	1	3	0.0%	3	0.0%	3	5	0.0%	5	0.0%	5
Environmental	Environmental Consultancy	1	0.0%	1	0.0%	1	4	0.0%	4	0.0%	4	6	0.0%	6	16.7%	7
Environmental	Environmental Monitoring	0	0	0	0	0	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1
Environmental	Marine Pollution Control	0	0	0	0	0	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1
Environmental	Noise & Vibration Control	0	0	0	0	0	2	0.0%	2	0.0%	2	3	0.0%	3	0.0%	3
Environmental	Recovery and Recycling	5	0.0%	5	0.0%	5	29	3.4%	30	3.3%	31	48	2.1%	49	4.1%	51
Environmental	Waste Management	6	0.0%	6	0.0%	6	35	2.9%	36	2.8%	37	59	1.7%	60	3.3%	62
Environmental	Water & Waste Water Treatment	7	0.0%	7	0.0%	7	41	2.4%	42	2.4%	43	68	1.5%	69	4.3%	72
Low Carbon	Additional Energy Sources	1	0.0%	1	0.0%	1	5	0.0%	5	0.0%	5	8	0.0%	8	12.5%	9
Low Carbon	Alternative Fuel Vehicle	5	0.0%	5	0.0%	5	31	0.0%	31	3.2%	32	50	2.0%	51	3.9%	53
Low Carbon	Alternative Fuels	13	0.0%	13	0.0%	13	77	0.0%	77	5.2%	81	127	1.6%	129	3.9%	134
Low Carbon	Building Technologies	13	0.0%	13	7.7%	14	79	1.3%	80	3.8%	83	133	1.5%	135	3.7%	140
Low Carbon	Carbon Capture & Storage	0	0	0	0	0	2	0.0%	2	0.0%	2	3	0.0%	3	0.0%	3
Low Carbon	Carbon Finance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Low Carbon	Energy Management	2	0.0%	2	0.0%	2	11	0.0%	11	9.1%	12	19	0.0%	19	5.3%	20
Low Carbon	Nuclear Power	3	0.0%	3	33.3%	4	5	20.0%	6	16.7%	7	8	12.5%	9	22.2%	11
Renewable Energy	Biomass	7	0.0%	7	0.0%	7	41	0.0%	41	4.9%	43	68	1.5%	69	2.9%	71
Renewable Energy	Geothermal	4	0.0%	4	0.0%	4	23	4.3%	24	4.2%	25	39	2.6%	40	2.5%	41
Renewable Energy	Hydro	0	0	0	0	0	2	0.0%	2	0.0%	2	3	0.0%	3	0.0%	3
Renewable Energy	Photovoltaic	9	0.0%	9	11.1%	10	55	1.8%	56	3.6%	58	91	2.2%	93	4.3%	97
Renewable Energy	Renewable Consultancy	0	0	0	0	0	2	0.0%	2	50.0%	3	4	0.0%	4	0.0%	4
Renewable Energy	Wave & Tidal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewable Energy	Wind	15	0.0%	15	6.7%	16	89	2.2%	91	2.2%	93	148	0.7%	149	4.7%	156
Total		**91**	**0.0%**	**91**	**5.5%**	**96**	**541**	**1.7%**	**550**	**3.8%**	**571**	**897**	**1.6%**	**911**	**4.2%**	**949**

Table 2b: D2N2 LEP's LCEGS Number of Companies Split by Company Size, with Growth 2017/18 to 2019/20 – Level 2

		# Large					# Corporations					Total # Companies				
			Growth		Growth			Growth		Growth			Growth		Growth	
Level 1	Level 2	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Environmental	Air Pollution	1	0.0%	1	0.0%	1	0	0	0	0	0	9	0.0%	9	11.1%	10
Environmental	Contaminated Land	1	0.0%	1	0.0%	1	0	0	0	100.0%	1	10	0.0%	10	0.0%	10
Environmental	Environmental Consultancy	1	0.0%	1	0.0%	1	1	0.0%	1	0.0%	1	13	0.0%	13	0.0%	13
Environmental	Environmental Monitoring	0	0	0	0	0	0	0	0	0	0	3	0.0%	3	0.0%	3
Environmental	Marine Pollution Control	0	0	0	0	0	0	0	0	0	0	2	0.0%	2	0.0%	2
Environmental	Noise & Vibration Control	1	0.0%	1	0.0%	1	0	0	0	0	0	5	0.0%	5	20.0%	6
Environmental	Recovery and Recycling	10	0.0%	10	0.0%	10	5	0.0%	5	0.0%	5	97	1.0%	98	4.1%	102
Environmental	Waste Management	12	0.0%	12	0.0%	12	6	0.0%	6	0.0%	6	118	1.7%	120	3.3%	124
Environmental	Water & Waste Water Treatment	14	0.0%	14	0.0%	14	7	0.0%	7	0.0%	7	136	1.5%	138	4.3%	144
Low Carbon	Additional Energy Sources	2	0.0%	2	0.0%	2	1	0.0%	1	0.0%	1	16	0.0%	16	6.3%	17
Low Carbon	Alternative Fuel Vehicle	10	0.0%	10	10.0%	11	5	0.0%	5	0.0%	5	102	1.0%	103	3.9%	107
Low Carbon	Alternative Fuels	25	4.0%	26	3.8%	27	13	0.0%	13	0.0%	13	255	1.6%	259	3.5%	268
Low Carbon	Building Technologies	26	3.8%	27	3.7%	28	13	0.0%	13	7.7%	14	264	1.5%	268	3.7%	278
Low Carbon	Carbon Capture & Storage	1	0.0%	1	0.0%	1	0	0	0	0	0	6	0.0%	6	0.0%	6
Low Carbon	Carbon Finance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Low Carbon	Energy Management	4	0.0%	4	0.0%	4	2	0.0%	2	0.0%	2	38	0.0%	38	5.3%	40
Low Carbon	Nuclear Power	2	50.0%	3	0.0%	3	0	100.0%	1	0.0%	1	19	15.8%	22	4.5%	23
Renewable Energy	Biomass	14	0.0%	14	0.0%	14	7	0.0%	7	0.0%	7	135	2.2%	138	3.6%	143
Renewable Energy	Geothermal	8	0.0%	8	0.0%	8	4	0.0%	4	0.0%	4	78	1.3%	79	3.8%	82
Renewable Energy	Hydro	1	0.0%	1	0.0%	1	0	0	0	0	0	6	0.0%	6	0.0%	6
Renewable Energy	Photovoltaic	18	5.6%	19	0.0%	19	9	0.0%	9	11.1%	10	182	2.2%	186	4.3%	194
Renewable Energy	Renewable Consultancy	1	0.0%	1	0.0%	1	0	0	0	0	0	8	0.0%	8	0.0%	8
Renewable Energy	Wave & Tidal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewable Energy	Wind	30	0.0%	30	3.3%	31	15	0.0%	15	6.7%	16	295	1.7%	300	4.0%	312
Total		**182**	**2.2%**	**186**	**2.2%**	**190**	**88**	**1.1%**	**89**	**4.5%**	**93**	**1,797**	**1.7%**	**1,827**	**3.9%**	**1,898**

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 Renewable Consultancy is seen in the Micro category when 2 companies grew to 3.

1.10 D2N2 LEP's LCEGS by Skills

In this section we look at the skills within the D2N2 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: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – LCEGS Sector

	LCEGS Sector Totals				
		Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20
Technicians	833	7.0%	891	-1.5%	878
Snr Management SME	1,918	-4.0%	1,842	22.4%	2,254
Supervisory	1,931	6.5%	2,057	7.3%	2,208
Middle / Junior Management	1,930	0.8%	1,946	10.0%	2,141
Designer / Developer	286	-2.8%	278	16.9%	326
Clerical	991	-0.1%	990	7.8%	1,066
Self Employed	269	3.7%	279	8.8%	303
Advisor or Agent	189	0.4%	190	1.9%	194
Educator	6	1.7%	6	12.0%	7
Specialist or Consultant	1,026	0.7%	1,033	5.2%	1,087
Editor	32	-0.3%	32	8.4%	35
Industrial Researchers	327	6.8%	350	1.5%	355
Scientist	145	5.6%	154	7.4%	165
Maintenance Engineer	2,175	3.7%	2,256	11.5%	2,516
Civil Engineer	163	-0.9%	162	5.8%	171
Production Engineer	414	2.6%	425	4.4%	444
Power distribution Engineer	1,025	-4.8%	975	17.0%	1,141
Construction Engineer	227	8.7%	247	0.3%	248
Sales Exec	1,060	2.0%	1,081	3.2%	1,116
Marketing Personnel	1,032	0.3%	1,035	5.3%	1,090
General Semi Skilled Worker	2,141	-1.8%	2,101	9.0%	2,291
General Labour	2,565	-0.7%	2,547	8.3%	2,759
Other Employees	2,890	6.7%	3,084	-6.5%	2,885
Administrative workers	1,124	1.2%	1,137	14.3%	1,299
Total Number of Employees	**34,070**	**0.5%**	**34,244**	**2.7%**	**35,172**

At the sector-level we can see that the number of employees per occupational classification varies considerably between each year. For example, the Technicians classification saw growth of 7.0% between 2017/18 and -1.6% 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: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Level 1

	Low Carbon					Renewable Energy					Environmental				
		Growth		Growth			Growth		Growth			Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Technicians	266	7.0%	284	-1.1%	281	338	6.9%	362	-1.7%	355	229	7.0%	245	-1.7%	241
Snr Management SME	457	-3.8%	440	22.7%	540	1,103	-4.1%	1,058	22.3%	1,294	358	-3.8%	345	22.1%	421
Supervisory	476	6.5%	507	7.8%	546	1,079	6.5%	1,149	7.2%	1,232	376	6.7%	401	7.2%	430
Middle / Junior Management	475	1.2%	480	10.4%	530	1,082	0.7%	1,090	9.8%	1,196	374	0.7%	377	10.0%	414
Designer / Developer	74	-2.4%	72	16.9%	85	86	-2.9%	83	16.7%	97	127	-2.9%	123	17.1%	144
Clerical	250	0.0%	249	8.3%	270	548	-0.1%	547	7.5%	588	193	-0.2%	193	7.8%	208
Self Employed	98	3.7%	102	9.5%	111	71	3.5%	74	8.5%	80	100	3.7%	103	8.4%	112
Advisor or Agent	93	0.4%	93	2.3%	95	24	0.4%	24	1.7%	25	72	0.5%	73	1.4%	74
Educator	0	1.7%	0	11.8%	0	0	1.6%	0	12.7%	0	6	1.7%	6	12.0%	7
Specialist or Consultant	266	1.7%	270	5.0%	284	533	0.3%	534	5.3%	562	228	0.4%	229	5.1%	240
Editor	8	1.2%	8	9.1%	9	8	-0.4%	8	8.0%	8	17	-0.9%	17	8.2%	18
Industrial Researchers	185	6.8%	197	1.7%	201	38	6.7%	41	1.3%	41	104	6.9%	111	1.2%	113
Scientist	97	5.7%	102	7.5%	110	14	5.6%	15	7.1%	16	34	5.4%	36	7.3%	39
Maintenance Engineer	539	3.5%	558	12.1%	625	1,158	3.7%	1,201	11.4%	1,338	478	4.1%	498	11.1%	553
Civil Engineer	39	0.0%	39	6.0%	41	38	-1.1%	37	5.6%	40	86	-1.2%	85	5.7%	90
Production Engineer	127	2.9%	130	4.4%	136	174	2.4%	178	4.4%	186	114	2.5%	116	4.2%	121
Power distribution Engineer	217	-4.7%	207	17.3%	243	567	-4.9%	539	17.0%	631	240	-4.6%	229	16.9%	268
Construction Engineer	49	8.9%	53	1.0%	53	76	8.7%	83	0.1%	83	102	8.7%	111	0.2%	111
Sales Exec	321	2.7%	329	3.0%	339	529	1.7%	538	3.3%	556	210	1.8%	214	3.2%	221
Marketing Personnel	316	0.1%	317	5.9%	335	524	0.4%	527	5.0%	553	191	0.4%	192	4.9%	202
General Semi Skilled Worker	541	-1.2%	534	8.6%	580	1,127	-2.1%	1,104	9.1%	1,204	473	-2.1%	463	9.3%	506
General Labour	856	-0.8%	850	8.8%	924	1,370	-0.8%	1,359	8.1%	1,469	339	-0.5%	338	8.1%	365
Other Employees	672	6.9%	719	-5.5%	679	1,651	7.2%	1,770	-7.3%	1,641	567	5.0%	595	-5.2%	564
Administrative workers	298	1.0%	301	15.0%	346	580	1.2%	587	14.1%	670	245	1.3%	249	14.0%	284
Total Number of Employees	**13,118**	**0.6%**	**13,202**	**2.7%**	**13,563**	**13,430**	**0.4%**	**13,485**	**2.7%**	**13,853**	**7,521**	**0.5%**	**7,556**	**2.6%**	**7,756**

A similar pattern is seen the Level 1 figures, with natural fluctuations in employee numbers. The number 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 96% of employment in the LCEGS sector in the D2N2 LEP. Tables 5a-5d shows the numbers of employees within each standard Occupational Class for the top 11 Level 2 sub-sectors of the LCEGS sector.

Table 5a: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Alternative Fuel Vehicle, Alternative Fuels and Biomass

	Alternative Fuel Vehicle					Alternative Fuels					Biomass				
		Growth		Growth			Growth		Growth			Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Technicians	14	6.6%	15	-1.2%	15	106	7.0%	113	-1.5%	111	60	6.9%	64	-1.9%	63
Snr Management SME	25	-4.2%	24	22.9%	29	92	-3.8%	89	22.7%	109	247	-4.1%	237	22.5%	290
Supervisory	31	5.9%	32	7.6%	35	110	6.7%	118	7.4%	127	237	6.6%	253	7.0%	271
Middle / Junior Management	31	0.7%	31	10.5%	34	110	1.1%	111	10.2%	122	238	0.8%	240	9.8%	264
Designer / Developer	3	-3.3%	3	17.0%	4	19	-3.2%	18	16.8%	22	28	-2.9%	27	16.7%	32
Clerical	19	-0.3%	19	8.0%	20	55	-0.1%	55	8.3%	60	121	0.0%	120	7.4%	129
Self Employed	19	3.0%	19	9.6%	21	30	3.7%	31	9.2%	34	12	3.7%	13	8.8%	14
Advisor or Agent	33	0.0%	33	2.0%	34	3	0.5%	3	2.0%	3	4	0.6%	4	1.4%	4
Educator	0	0	0	0	0	0	0	0	0	0	0	1.6%	0	12.7%	0
Specialist or Consultant	3	4.1%	3	1.9%	3	83	1.5%	84	4.8%	88	133	0.3%	133	5.3%	140
Editor	0	0	0	0	0	0	0	0	0	0	4	-0.1%	4	7.7%	4
Industrial Researchers	54	6.7%	57	1.5%	58	41	6.7%	43	2.0%	44	5	7.5%	6	0.6%	6
Scientist	5	5.6%	6	7.3%	6	74	5.6%	78	7.4%	84	8	5.7%	8	6.9%	9
Maintenance Engineer	43	3.4%	45	11.9%	50	138	3.4%	143	11.9%	160	237	3.5%	245	11.8%	274
Civil Engineer	7	-0.9%	7	5.1%	7	1	-0.8%	1	5.7%	1	4	-0.6%	4	4.8%	4
Production Engineer	0	0	0	0	0	75	2.7%	77	4.0%	80	37	2.5%	38	4.1%	40
Power distribution Engineer	7	-5.1%	6	17.3%	7	26	-5.3%	24	17.5%	28	118	-5.1%	112	17.4%	132
Construction Engineer	7	8.4%	7	0.5%	7	1	9.0%	1	0.5%	1	4	8.9%	4	-0.1%	4
Sales Exec	36	2.5%	37	2.7%	38	113	2.9%	117	2.7%	120	119	1.9%	122	3.0%	125
Marketing Personnel	36	-0.5%	36	6.5%	39	113	0.2%	113	5.6%	120	118	0.5%	119	4.5%	124
General Semi Skilled Worker	31	-1.7%	30	8.6%	33	146	-1.4%	144	8.4%	157	239	-2.0%	234	8.7%	255
General Labour	49	-1.0%	49	8.4%	53	196	-0.9%	194	8.6%	211	252	-0.4%	251	7.9%	271
Other Employees	37	0.5%	37	3.9%	39	136	4.0%	141	-2.0%	139	357	7.8%	385	-8.6%	352
Administrative workers	25	0.8%	26	14.7%	29	73	0.8%	73	15.0%	84	122	1.3%	124	14.1%	141
Total Number of Employees	**1,876**	**0.4%**	**1,883**	**2.6%**	**1,931**	**4,972**	**0.7%**	**5,006**	**2.4%**	**5,128**	**2,510**	**0.5%**	**2,523**	**2.6%**	**2,588**

Table 5b: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Building Technologies, Energy Management and Geothermal

	Building Technologies					Energy Management					Geothermal				
		Growth		Growth			Growth		Growth			Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Technicians	111	6.8%	118	-1.2%	117	19	6.9%	20	-1.6%	20	30	6.8%	32	-1.6%	31
Snr Management SME	277	-4.1%	266	23.0%	327	35	-4.0%	34	22.4%	42	116	-4.0%	112	22.5%	137
Supervisory	267	6.3%	284	7.9%	307	37	6.4%	39	7.6%	42	112	6.4%	119	7.5%	128
Middle / Junior Management	267	1.1%	270	10.4%	298	37	0.8%	37	10.3%	41	112	0.7%	112	10.0%	124
Designer / Developer	32	-3.2%	31	17.2%	36	10	-3.2%	9	17.3%	11	13	-3.1%	13	16.9%	15
Clerical	140	-0.2%	140	8.3%	151	19	-0.3%	19	8.0%	21	57	-0.2%	57	7.7%	62
Self Employed	31	3.2%	32	9.6%	35	9	3.5%	9	8.7%	10	7	3.4%	7	8.8%	7
Advisor or Agent	38	0.1%	38	2.1%	39	8	0.4%	8	1.6%	8	6	0.1%	6	2.1%	6
Educator	0	0	0	0	0	0	1.7%	0	11.7%	0	0	0	0	0	0
Specialist or Consultant	141	1.6%	143	5.0%	150	21	0.9%	21	4.6%	22	59	0.5%	59	5.1%	62
Editor	1	-0.5%	1	8.1%	1	3	-0.6%	3	8.2%	4	3	-0.8%	3	8.2%	3
Industrial Researchers	71	6.9%	76	1.6%	77	7	7.1%	8	1.0%	8	4	6.7%	5	1.3%	5
Scientist	10	5.5%	10	7.7%	11	4	5.5%	4	7.5%	4	3	5.5%	4	7.5%	4
Maintenance Engineer	274	3.1%	282	12.3%	317	45	3.6%	47	11.7%	52	118	3.6%	122	11.7%	136
Civil Engineer	17	-0.8%	17	5.6%	18	7	-1.0%	7	5.2%	7	6	-1.1%	6	5.4%	6
Production Engineer	35	2.6%	36	4.2%	37	8	2.1%	9	4.7%	9	20	2.4%	20	4.3%	21
Power distribution Engineer	144	-5.2%	136	17.4%	160	22	-4.8%	21	17.2%	24	58	-4.9%	56	17.0%	65
Construction Engineer	27	8.8%	29	0.5%	29	7	8.6%	8	0.0%	8	5	8.5%	5	0.3%	5
Sales Exec	130	2.3%	133	3.0%	137	22	2.1%	23	3.0%	23	61	2.0%	62	3.2%	64
Marketing Personnel	129	-0.1%	129	5.8%	136	21	0.1%	21	5.3%	22	59	0.2%	59	5.1%	62
General Semi Skilled Worker	285	-1.2%	282	8.4%	305	43	-2.1%	42	9.0%	45	118	-1.8%	115	8.8%	126
General Labour	521	-0.8%	517	8.8%	562	65	-0.9%	64	8.8%	70	174	-0.7%	173	8.3%	187
Other Employees	396	8.5%	430	-8.1%	395	56	6.9%	60	-5.7%	57	168	8.5%	182	-8.0%	167
Administrative workers	157	0.7%	158	15.3%	182	23	1.3%	23	14.2%	26	60	1.1%	60	14.2%	69
Total Number of Employees	**4,998**	**0.3%**	**5,015**	**2.8%**	**5,153**	**726**	**0.3%**	**728**	**2.6%**	**747**	**1,486**	**0.4%**	**1,491**	**2.7%**	**1,532**

Table 5c: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Photovoltaic, Recovery & Recycling and Waste Management

	Photovoltaic					Recovery & Recycling					Waste Management				
		Growth		Growth			Growth		Growth			Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Technicians	97	6.9%	104	-1.2%	103	69	6.7%	73	-1.4%	72	57	7.3%	61	-2.2%	60
Snr Management SME	292	-4.4%	279	22.2%	341	78	-4.0%	75	22.0%	92	103	-4.0%	99	22.2%	121
Supervisory	282	6.4%	300	7.7%	323	81	6.5%	86	7.3%	93	113	6.6%	120	7.4%	129
Middle / Junior Management	280	0.7%	282	10.1%	311	81	0.7%	81	10.1%	90	113	0.7%	114	9.8%	125
Designer / Developer	21	-3.1%	20	17.1%	24	59	-3.0%	57	17.2%	67	24	-2.7%	23	17.0%	27
Clerical	143	-0.1%	143	7.5%	153	41	-0.3%	41	8.0%	44	60	-0.4%	60	8.0%	64
Self Employed	15	3.5%	16	8.8%	17	20	3.5%	21	8.6%	23	29	3.9%	31	8.2%	33
Advisor or Agent	2	-0.2%	2	2.4%	2	7	0.2%	7	1.7%	8	41	0.5%	41	1.3%	41
Educator	0	0	0	0	0	0	1.7%	0	12.1%	0	2	1.6%	2	11.7%	3
Specialist or Consultant	133	0.1%	133	5.3%	141	67	0.2%	67	5.4%	71	58	0.4%	58	5.1%	61
Editor	0	0	0	0	0	3	-1.0%	3	8.4%	3	6	-1.0%	6	8.1%	7
Industrial Researchers	11	6.4%	11	1.6%	11	18	6.5%	19	1.4%	20	56	7.1%	60	1.2%	61
Scientist	0	5.2%	0	7.3%	0	16	5.3%	17	7.4%	18	10	5.4%	11	7.2%	12
Maintenance Engineer	288	3.8%	299	11.2%	333	102	3.8%	106	11.0%	118	138	3.9%	143	11.2%	160
Civil Engineer	8	-1.5%	8	6.7%	8	31	-1.3%	31	5.8%	32	22	-1.4%	22	5.9%	23
Production Engineer	39	2.2%	40	5.1%	42	37	2.4%	37	4.6%	39	25	2.8%	25	4.1%	26
Power distribution Engineer	146	-4.9%	139	16.8%	162	55	-4.7%	53	16.8%	62	70	-4.6%	66	16.7%	77
Construction Engineer	15	8.5%	17	0.6%	17	31	8.5%	34	0.6%	34	27	9.0%	30	0.0%	30
Sales Exec	141	1.4%	143	3.7%	148	68	1.8%	70	3.1%	72	57	1.4%	57	3.5%	59
Marketing Personnel	139	0.4%	140	5.4%	147	54	0.0%	54	5.7%	58	54	0.4%	54	4.5%	56
General Semi Skilled Worker	298	-2.3%	291	10.0%	320	134	-2.2%	131	9.7%	144	126	-2.2%	124	9.3%	135
General Labour	384	-1.2%	380	8.7%	412	137	-0.8%	136	8.3%	147	78	-0.4%	78	8.1%	84
Other Employees	414	7.4%	444	-6.7%	415	111	7.7%	120	-5.8%	113	175	3.5%	181	-3.3%	175
Administrative workers	149	1.0%	150	14.6%	172	56	1.1%	57	14.5%	65	75	1.3%	76	13.8%	86
Total Number of Employees	**3,524**	**0.3%**	**3,534**	**3.1%**	**3,643**	**1,870**	**0.3%**	**1,876**	**2.8%**	**1,928**	**2,232**	**0.4%**	**2,242**	**2.6%**	**2,299**

Table 5d: D2N2 LEP's LCEGS Skills, measured as Job Descriptions with growth 2017/18 to 2019/20 – Water & Waste Water Treatment

	Water & Waste Water Treatment					Wind				
		Growth		Growth			Growth		Growth	
Skill	2017/18	%	2018/19	%	2019/20	2017/18	%	2018/19	%	2019/20
Technicians	87	7.1%	93	-1.5%	92	146	6.9%	156	-2.0%	153
Snr Management SME	146	-3.5%	141	22.1%	172	440	-3.9%	423	22.1%	516
Supervisory	147	6.9%	157	7.1%	168	439	6.6%	468	6.7%	499
Middle / Junior Management	145	0.8%	147	10.1%	161	442	0.7%	445	9.6%	488
Designer / Developer	34	-2.9%	33	17.2%	39	21	-2.6%	21	16.2%	24
Clerical	74	-0.1%	74	7.6%	79	222	-0.2%	221	7.4%	238
Self Employed	38	3.8%	40	8.4%	43	34	3.5%	35	8.2%	38
Advisor or Agent	6	1.0%	6	1.0%	6	4	0.6%	4	0.9%	4
Educator	0	1.6%	0	11.9%	0	0	0	0	0	0
Specialist or Consultant	83	0.6%	83	4.8%	87	203	0.2%	204	5.4%	214
Editor	3	-0.6%	3	8.2%	3	1	-1.0%	0	8.5%	1
Industrial Researchers	7	7.2%	7	0.7%	7	5	6.1%	6	1.0%	6
Scientist	3	5.5%	3	7.3%	3	1	5.4%	1	6.7%	1
Maintenance Engineer	196	4.4%	205	11.0%	227	504	3.8%	523	11.3%	583
Civil Engineer	24	-1.1%	24	5.4%	26	18	-1.1%	17	5.4%	18
Production Engineer	45	2.5%	46	4.0%	47	77	2.4%	79	4.3%	82
Power distribution Engineer	94	-4.5%	90	17.1%	105	238	-4.9%	227	16.9%	265
Construction Engineer	34	8.7%	37	0.0%	37	50	8.7%	54	-0.1%	54
Sales Exec	65	2.1%	66	3.2%	69	204	1.7%	207	3.3%	214
Marketing Personnel	65	0.8%	65	4.6%	68	204	0.4%	205	5.0%	215
General Semi Skilled Worker	173	-1.9%	170	9.2%	186	461	-2.1%	452	8.8%	492
General Labour	89	-0.2%	88	8.0%	95	546	-0.6%	543	7.7%	585
Other Employees	229	4.9%	240	-6.9%	223	697	6.5%	742	-6.9%	692
Administrative workers	89	1.5%	91	13.9%	103	242	1.3%	245	13.7%	279
Total Number of Employees	**2,638**	**0.6%**	**2,653**	**2.6%**	**2,723**	**5,636**	**0.4%**	**5,661**	**2.6%**	**5,808**

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 D2N2's LCEGS Growth

In Section 1.1 annual growth in D2N2 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 D2N2 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 D2N2 LEP covers 20% of the MEH's total LCEGS sector in terms of sales. The growth rates for the D2N2 LEP are slower than the MEH regional average, but exhibit a similar pattern, being relatively uniform across sub-sectors 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 D2N2 LEP are in line with this trend.

While annual growth in the LCEGS sector as a whole has varied between 0.5 and 4.6% 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, with the exception of Nuclear which is currently undergoing more rapid growth than the regional average. 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 D2N2 has grown slower than the MEH average, but it is still 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 D2N2 growth rates were 4.0% between 2017/18 and 2018/19 and 4.5% 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 D2N2 growth rates were 4.1% between 2017/18 and 2018/19 and 4.7% 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 D2N2 growth rates were 4.1% between 2017/18 and 2018/19 and 4.6% 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 D2N2 growth rates were 4.1% between 2017/18 and 2018/19 and 4.6% 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 D2N2 growth rates were 4.1% between 2017/18 and 2018/19 and 4.6% 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
- Hydro, where the D2N2 growth rates were 4.1% between 2017/18 and 2018/19 and 5.6% between 2018/19 and 2019/20 and the UK growth rates were 5.6% between 2017/18 and 2018/19 and -3.6% between 2018/19 and 2019/20
- Nuclear, where the D2N2 growth rates were 12.9% between 2017/18 and 2018/19 and 14.3% between 2018/19 and 2019/20 and the UK growth rates were 5.5% between 2017/18 and 2018/19 and -2.5% between 2018/19 and 2019/20

Table 6: D2N2 LEP's LCEGS Sales (£m), Company and Employment Growth 2017/18 to 2019/20

		Sales £m					# Companies					# Employees				
Level 1	Level 2	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20
Environmental	Air Pollution	25.6	4.0%	26.6	4.5%	27.8	9	1.7%	9	4.0%	10	178	0.4%	179	2.6%	184
Environmental	Contaminated Land	26.0	4.1%	27.0	4.6%	28.3	10	1.7%	10	4.0%	10	182	0.6%	183	2.5%	188
Environmental	Environmental Consultancy	33.4	4.0%	34.7	4.6%	36.3	13	1.7%	13	3.8%	13	234	0.5%	235	2.6%	241
Environmental	Environmental Monitoring	7.2	4.0%	7.5	4.6%	7.9	3	1.9%	3	3.9%	3	51	0.1%	51	2.7%	52
Environmental	Marine Pollution Control	4.9	4.2%	5.1	4.7%	5.4	2	1.7%	2	3.9%	2	35	0.4%	35	2.9%	36
Environmental	Noise & Vibration Control	14.6	4.0%	15.2	4.6%	15.9	5	1.6%	5	4.0%	6	101	0.5%	102	2.6%	105
Environmental	Recovery and Recycling	267.7	4.1%	278.5	4.6%	291.4	97	1.5%	98	4.0%	102	1,870	0.3%	1,876	2.8%	1,928
Environmental	Waste Management	320.4	4.0%	333.2	4.5%	348.2	118	1.6%	120	4.0%	124	2,232	0.4%	2,242	2.6%	2,299
Environmental	Water & Waste Water Treatment	377.6	4.0%	392.7	4.5%	410.6	136	1.8%	138	3.9%	144	2,638	0.6%	2,653	2.6%	2,723
Low Carbon	Additional Energy Sources	43.2	4.1%	44.9	4.6%	47.0	16	1.5%	16	3.7%	17	303	0.6%	305	2.6%	313
Low Carbon	Alternative Fuel Vehicle	266.0	4.1%	276.9	4.7%	289.8	102	1.1%	103	3.8%	107	1,876	0.4%	1,883	2.6%	1,931
Low Carbon	Alternative Fuels	706.9	4.1%	735.5	4.6%	769.6	255	1.3%	259	3.8%	268	4,972	0.7%	5,006	2.4%	5,128
Low Carbon	Building Technologies	712.5	4.1%	741.7	4.6%	775.9	264	1.4%	268	3.9%	278	4,998	0.3%	5,015	2.8%	5,153
Low Carbon	Carbon Capture & Storage	16.1	4.0%	16.7	4.5%	17.5	6	1.9%	6	3.7%	6	112	0.4%	113	2.7%	116
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	103.4	4.1%	107.6	4.6%	112.6	38	1.6%	38	3.9%	40	726	0.3%	728	2.6%	747
Low Carbon	Nuclear Power	4.2	12.9%	4.8	14.3%	5.4	19	11.9%	22	3.9%	23	132	17.0%	154	13.9%	176
Renewable Energy	Biomass	357.1	4.0%	371.4	4.6%	388.3	135	1.6%	138	3.7%	143	2,510	0.5%	2,523	2.6%	2,588
Renewable Energy	Geothermal	213.1	4.1%	221.7	4.6%	231.9	78	1.8%	79	4.0%	82	1,486	0.4%	1,491	2.7%	1,532
Renewable Energy	Hydro	15.8	4.1%	16.4	4.6%	17.2	6	1.0%	6	3.7%	6	111	0.5%	112	2.6%	114
Renewable Energy	Photovoltaic	505.4	4.1%	526.2	4.7%	550.7	182	1.9%	186	4.1%	194	3,524	0.3%	3,534	3.1%	3,643
Renewable Energy	Renewable Consultancy	22.6	4.1%	23.5	4.6%	24.6	8	1.7%	8	4.0%	8	157	0.7%	158	2.6%	163
Renewable Energy	Wave & Tidal	0.8	4.4%	0.8	5.0%	0.8	0	2.1%	0	4.4%	0	5	-0.4%	5	4.0%	6
Renewable Energy	Wind	803.7	4.0%	836.0	4.5%	873.9	295	1.6%	300	4.0%	312	5,636	0.4%	5,661	2.6%	5,808
Total		**4,848.0**	**4.1%**	**5,044.8**	**4.6%**	**5,277.1**	**1,797**	**1.7%**	**1,827**	**3.9%**	**1,899**	**34,070**	**0.5%**	**34,244**	**2.7%**	**35,172**

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:

- Alternative Fuel Vehicle with 8.9% (MEH 11.4%, UK 5.7%)
- Hydro with 8.9% (MEH 11.0%, UK 1.8%)
- Energy Management with 11.4% (MEH 11.4%, UK 5.7%)
- Contaminated Land Reclamation and Remediation with 8.8% (MEH 11.4%, UK 1.0%)
- Air Pollution with 8.7% (MEH 11.4%, UK 5.8%)

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 8.8% (MEH 11.3%, UK 16.8%)
- Environmental Monitoring with 8.8% (MEH 11.3%, UK12.2%)
- Marine Pollution Control with 9.1% (MEH 11.4%, UK 12.7%)
- Noise & Vibration Control with 8.8% (MEH 11.4%, UK 23.3%)
- Recovery & Recycling with 8.9% (MEH 11.3%, UK 13.7%)
- Waste Management with 8.7% (MEH 11.2%, UK 12.6%)
- Water & Waste Water Treatment with 8.7% (MEH 11.3%, UK 12.7%)
- Additional Energy Sources with 8.9% (MEH 11.3%, UK 15.9%)
- Alternative Fuels with 8.9% (MEH 11.4%, UK 13.8%)
- Building Technologies with 8.9% (MEH 11.5%, UK 13.7%)
- Carbon Capture & Storage with 8.7% (MEH 11.3%, UK 19.0%)
- Biomass with 8.7% (MEH 11.3%, UK 28.2%)
- Geothermal with 8.9% (MEH 11.3%, UK 18.8%)
- Photovoltaic with 9.0% (MEH 11.3%, UK 24.3%)
- Wave & Tidal with 9.6% (MEH 11.2%, UK 24.9%)
- Wind with 8.7% (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 D2N2 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 (2.4% and 19.9% 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 D2N2 LEP's LCEGS Sales (£m) and 3-Year Growth Comparison

		UK		MEH			LEP							
Level 1	Level 2	UK Sales £m 2019/20	UK 3-Year Growth %	MEH Sales £m 2019/20	MEH 3-year Growth %	MEH as % of UK	LEP Sales £m 2019/20	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
Environmental	Air Pollution	1,283.9	5.8%	143.2	11.4%	11.2%	27.8	8.7%	2.2%	0.9	1.5	19.4%	0.8	1.0
Environmental	Contaminated Land Reclamation & Remediation	1,269.2	1.0%	143.3	11.4%	11.3%	28.3	8.8%	2.2%	2.1	9.2	19.7%	0.8	1.0
Environmental	Environmental Consultancy and Related Services	1,268.4	16.8%	179.9	11.3%	14.2%	36.3	8.8%	2.9%	2.7	0.5	20.2%	0.8	1.0
Environmental	Environmental Monitoring, Instrumentation and Analysis	247.6	12.2%	38.0	11.3%	15.4%	7.9	8.8%	3.2%	3.0	0.7	20.7%	0.8	1.0
Environmental	Marine Pollution Control	206.3	12.7%	27.7	11.4%	13.4%	5.4	9.1%	2.6%	2.4	0.7	19.4%	0.8	1.0
Environmental	Noise & Vibration Control	394.7	23.3%	79.5	11.4%	20.1%	15.9	8.8%	4.0%	3.8	0.4	20.0%	0.8	1.0
Environmental	Recovery and Recycling	11,071.7	13.7%	1,452.5	11.3%	13.1%	291.4	8.9%	2.6%	2.5	0.6	20.1%	0.8	1.0
Environmental	Waste Management	7,384.8	12.6%	1,769.7	11.2%	24.0%	348.2	8.7%	4.7%	4.4	0.7	19.7%	0.8	1.0
Environmental	Water Supply and Waste Water Treatment	10,943.9	12.7%	2,014.9	11.3%	18.4%	410.6	8.7%	3.8%	3.5	0.7	20.4%	0.8	1.0
Low Carbon	Additional Energy Sources	2,129.7	15.9%	234.7	11.3%	11.0%	47.0	8.9%	2.2%	2.1	0.6	20.0%	0.8	1.0
Low Carbon	Alternative Fuel Vehicle	19,578.8	5.7%	1,472.3	11.4%	7.5%	289.8	8.9%	1.5%	1.4	1.6	19.7%	0.8	1.0
Low Carbon	Alternative Fuels	32,416.4	13.8%	3,761.4	11.4%	11.6%	769.6	8.9%	2.4%	2.2	0.6	20.5%	0.8	1.0
Low Carbon	Building Technologies	24,963.7	13.7%	3,995.6	11.5%	16.0%	775.9	8.9%	3.1%	2.9	0.6	19.4%	0.8	1.0
Low Carbon	Carbon Capture & Storage	816.0	19.0%	90.3	11.3%	11.1%	17.5	8.7%	2.1%	2.0	0.5	19.4%	0.8	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%	112.6	8.9%	2.9%	2.7	1.6	20.1%	0.8	1.0
Low Carbon	Nuclear Power	4,946.3	2.9%	5.4	29.0%	0.1%	5.4	29.0%	0.1%	0.1	9.9	100.0%	1.0	5.0
Renewable Energy	Biomass	11,234.4	28.2%	1,943.2	11.3%	17.3%	388.3	8.7%	3.5%	3.2	0.3	20.0%	0.8	1.0
Renewable Energy	Geothermal	19,687.0	18.8%	1,163.0	11.3%	5.9%	231.9	8.9%	1.2%	1.1	0.5	19.9%	0.8	1.0
Renewable Energy	Hydro	703.5	1.8%	74.4	11.0%	10.6%	17.2	8.9%	2.4%	2.3	4.9	23.1%	0.8	1.2
Renewable Energy	Photovoltaic	11,132.4	24.3%	2,773.4	11.3%	24.9%	550.7	9.0%	4.9%	4.6	0.4	19.9%	0.8	1.0
Renewable Energy	Renewable Energy General Consultancy	722.1	10.8%	122.8	11.3%	17.0%	24.6	8.9%	3.4%	3.2	0.8	20.0%	0.8	1.0
Renewable Energy	Wave & Tidal	171.5	24.9%	4.1	11.2%	2.4%	0.8	9.6%	0.5%	0.5	0.4	20.6%	0.9	1.0
Renewable Energy	Wind	36,664.3	42.2%	4,373.1	11.3%	11.9%	873.9	8.7%	2.4%	2.2	0.2	20.0%	0.8	1.0
		219,523.9	**18.9%**	**26,556.2**	**11.4%**	**12.1%**	**5,277.1**	**8.9%**	**2.4%**			**19.9%**		

Figure 34 shows how the D2N2 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 D2N2 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 D2N2 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 three relatively small sub-sectors, Nuclear, Contaminated Land & Reclamation and Hydroelectric. Contaminated Land & Reclamation and Hydroelectric are strengths, because they are both above the expected size of market (2.2 for Contaminated Land and 2.4 for Hydro) and are growing significantly stronger than the UK average (11.5% LEP vs. 1.0% UK for Contaminated Land and 11.3% 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

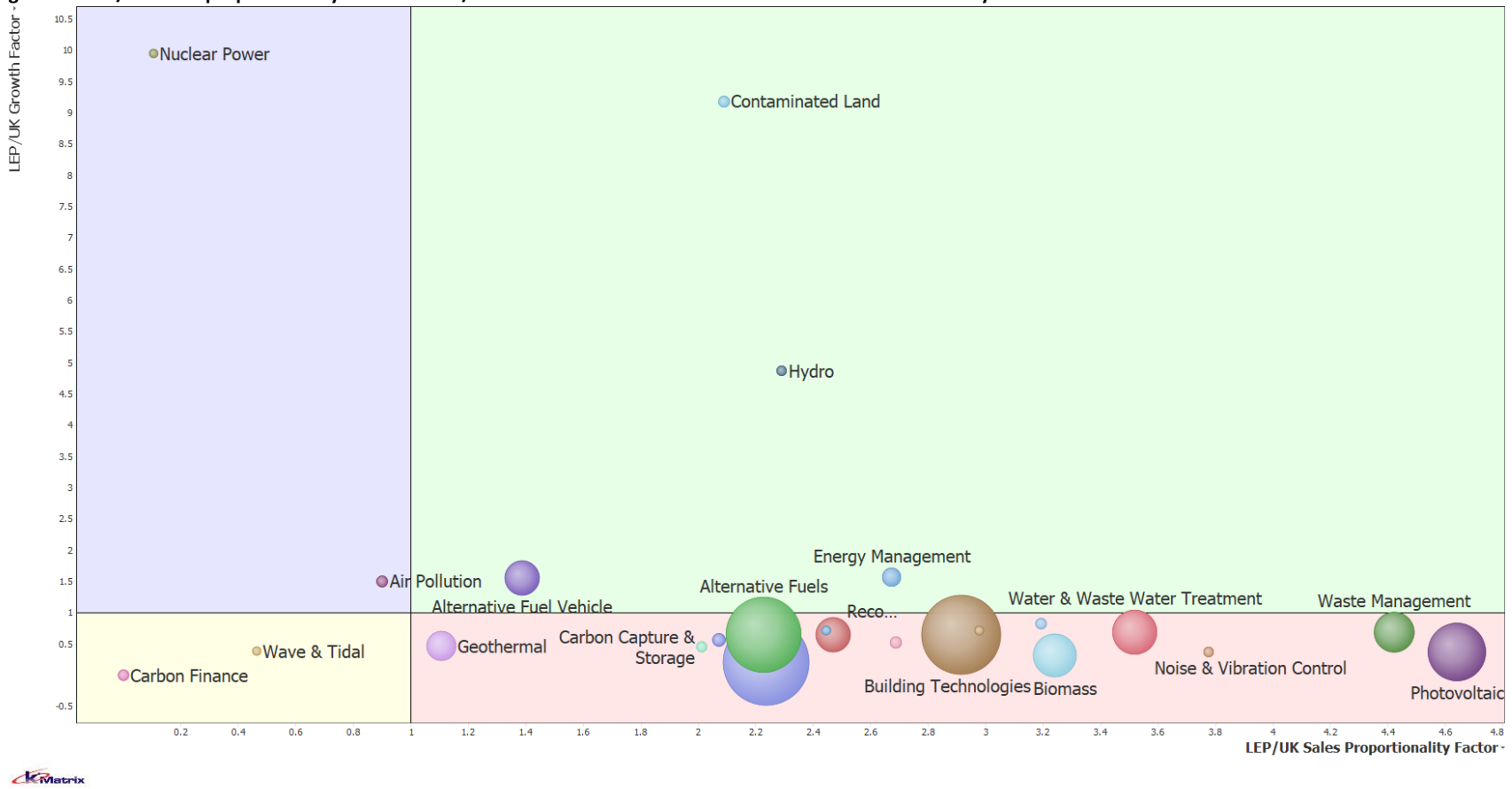
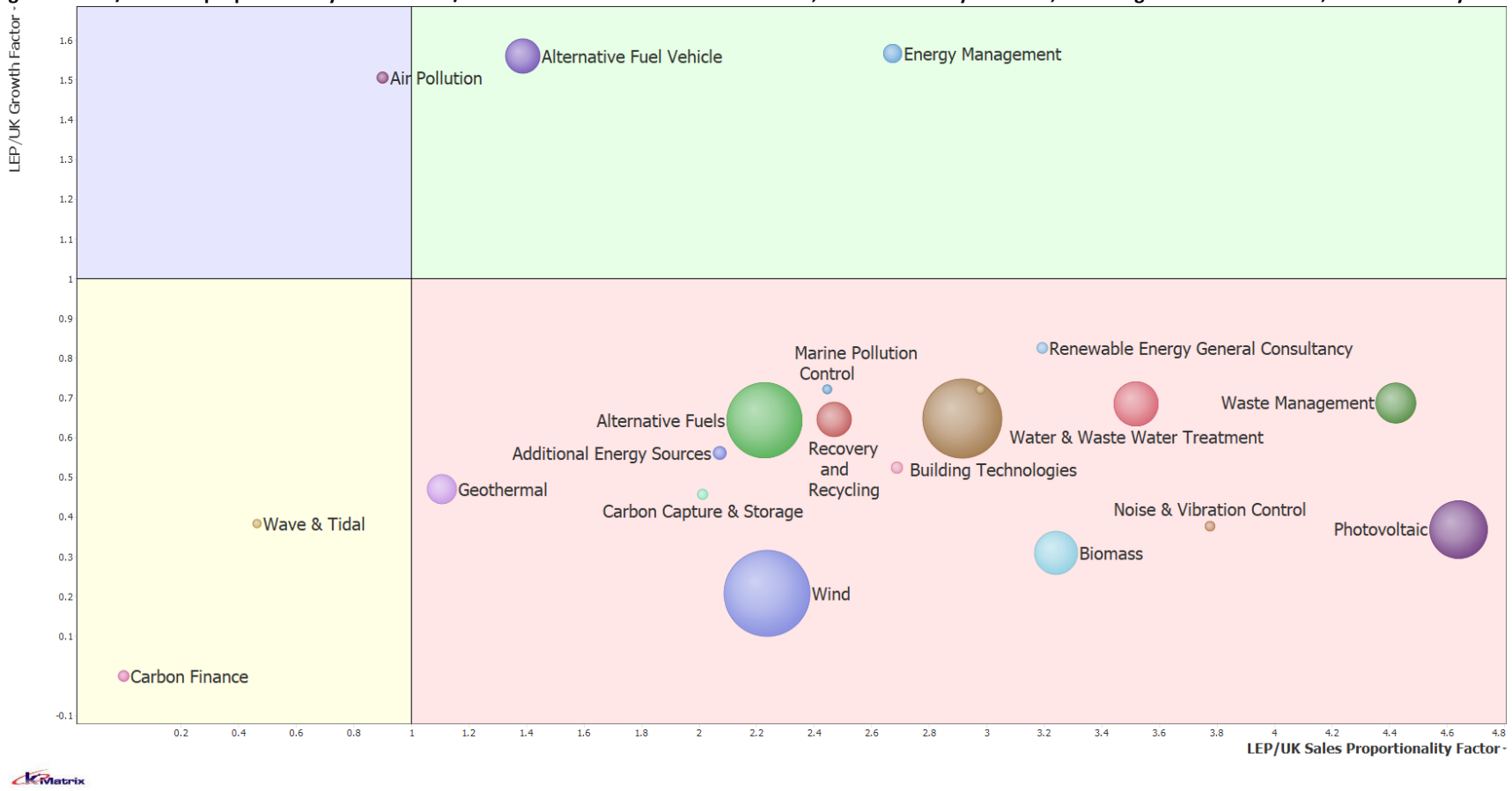


Figure 35 provides the same information as figure 34, but with Contaminated Land, Nuclear and Hydro excluded. By excluding these outliers with very strong growth, we can examine the other sub-sectors. Energy Management and Alternative Fuel Vehicle have the ideal characteristics of above UK average growth and above LEP average size. Those in the bottom right quadrant (red) hold a larger UK share than the LEP's average LCEGS UK market share. The large size of sub-sectors such as Photovoltaic, Building Technologies, Alternative Fuels, Waste Management, Biomass and Wind set these sub-sector apart as being strengths. Those in the lower left (yellow) quadrant i.e. Wave & tidal and Carbon Finance 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 D2N2'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 a 'Low' with a score of 1

Calculation:

$$\frac{(11x3) + (15x2) + (4x1)}{30} = 2.23$$

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 D2N2 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 a good combination of size and scalability, while Renewable Energy General Consultancy may be small in terms of market but is highly scalable. Biomass is a good example of a sub-sector which is has good GVA but low scalability. Scalability graphs for each Local Authority can be found in Appendix 4. Wind, Waste Management, Energy Management and Alternative Fuel Vehicles are in a stronger position than the regional average.

Figure 36: D2N2 LEP's Scalability vs. GVA of Level 2 Sub-sectors – Bubbles Sized by GVA

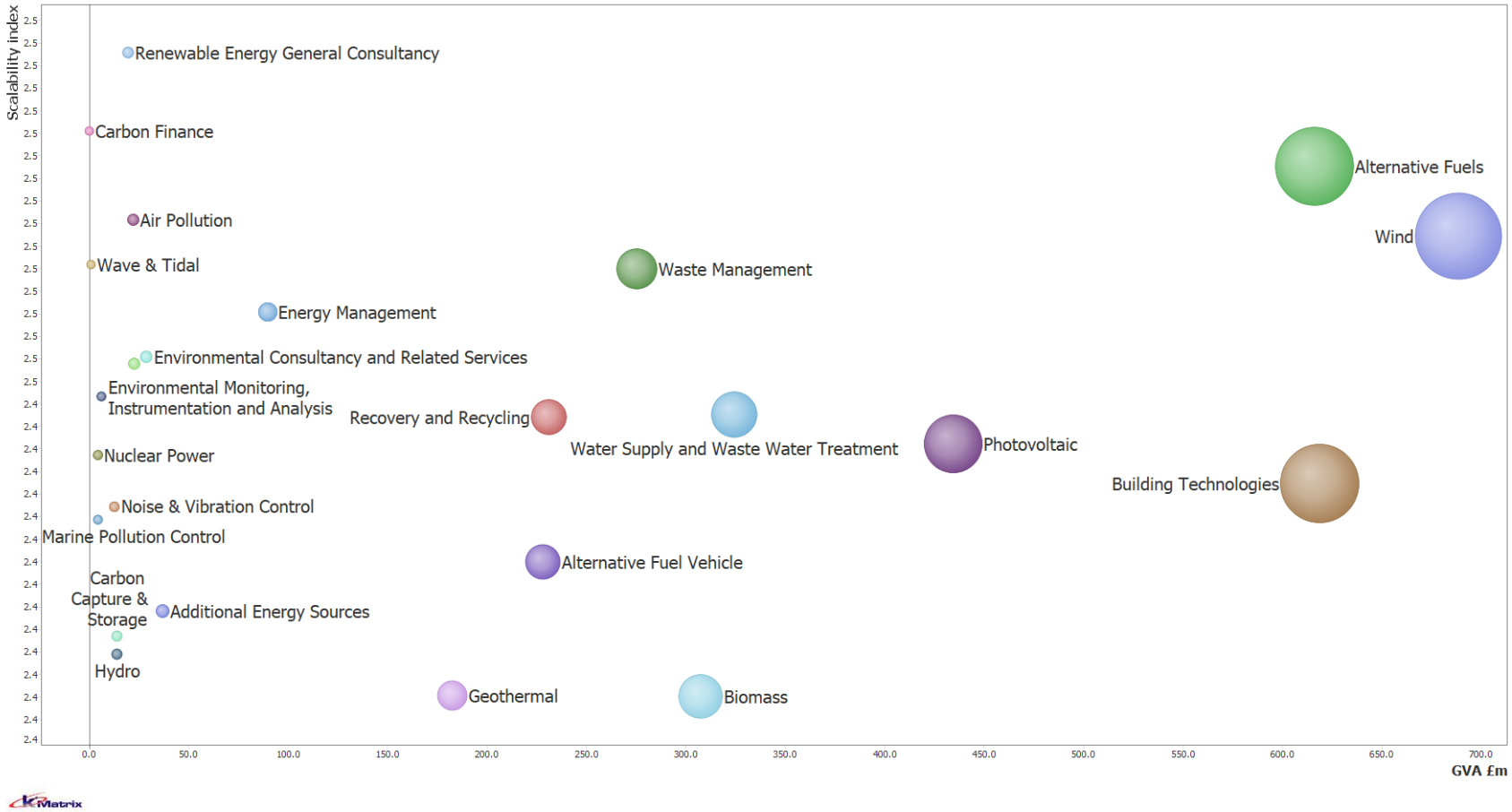
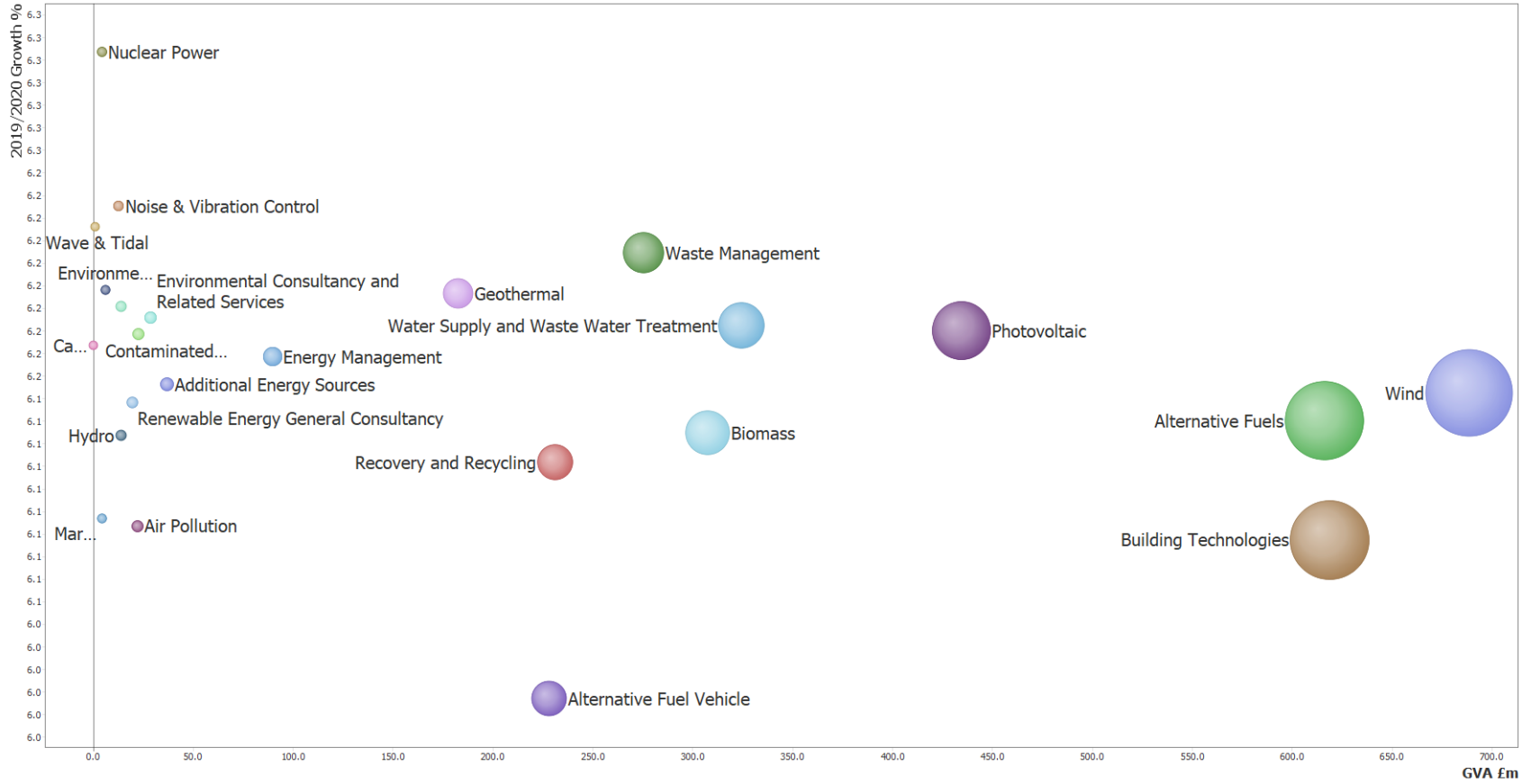


Figure 37 shows the same principle as Figure 36, but with GVA plotted against the growth rates of the Level 2 sub-sectors for 2019/20. This figure illustrates a different pattern of opportunity to the use of the scalability index. When only viewing growth, we can see that the Wind sub-sector occupies 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. In terms of Wind, technology is advancing which impacts on scalability. For this reason, scalability is a more useful measure than previous growth when looking at opportunities.

Figure 37: D2N2 LEP's 2019/20 Growth Rates vs. GVA of Level 2 Sub-sectors – Bubbles Sized by GVA



Note: the growth rate for Nuclear is lower than reported elsewhere due to the average taken of Local Authorities across the LEP, the growth in GVA for Nuclear is 13%

1.13 D2N2 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:

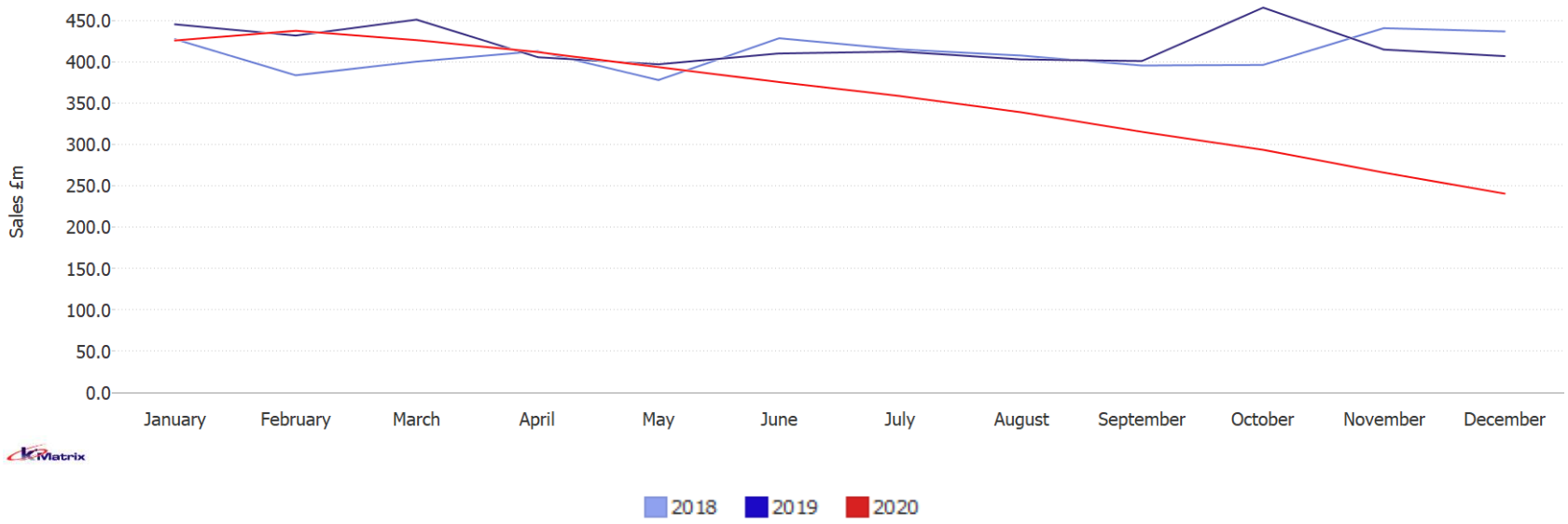
- 1.12.1 Current employment and growth required for 2030 and 2050 net zero targets
- 1.12.2 Current training provision and potential for upskilling of the current workforce within each Level 2 sub-sector
- 1.12.3 Potential of Level 2 sub-sectors to impact on CO2 reduction

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 sills 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 D2N2 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.

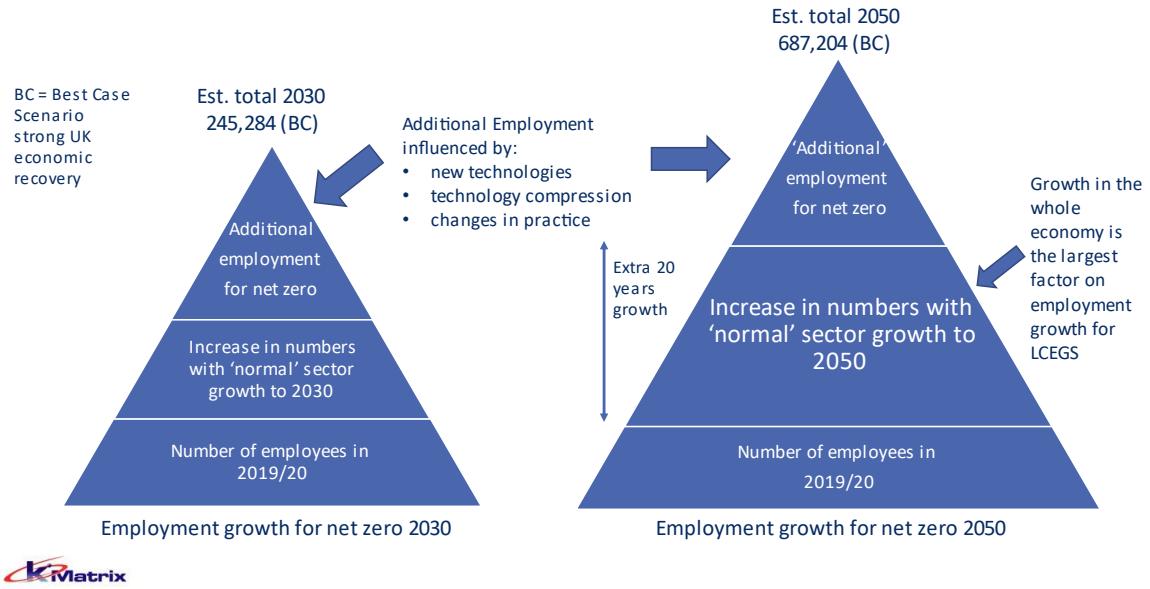
Figure 38: D2N2LEP LCEGS Sales, by month 2018, 2019 and 2020



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 D2N2 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 SOCs 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 7 Educators listed, with a shortage of 2, making a total of 9 in the region, this will equate to over 90 people providing 'pockets' of time, to equate to 9 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: D2N2LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Sector Data

	Current Employment				Net Zero by 2030				Net Zero by 2050			
					Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	878	195	22.2%	1,073	1,149	7.1%	1,503	40.0%	1,769	64.9%	4,218	293.1%
Snr Management SME	2,254	228	10.1%	2,483	2,950	18.8%	3,871	55.9%	4,557	83.6%	10,836	336.5%
Supervisory	2,208	229	10.4%	2,437	2,878	18.1%	3,803	56.1%	4,467	83.3%	10,624	336.0%
Middle / Junior Management	2,141	221	10.3%	2,362	2,795	18.3%	3,684	56.0%	4,320	82.9%	10,288	335.6%
Designer / Developer	326	86	26.5%	412	425	3.1%	559	35.8%	657	59.6%	1,566	280.0%
Clerical	1,066	2	0.2%	1,069	1,396	30.6%	1,832	71.4%	2,153	101.5%	5,110	378.2%
Self Employed	303	39	13.0%	343	396	15.6%	522	52.3%	612	78.6%	1,460	325.7%
Advisor or Agent	194	32	16.5%	226	252	11.7%	333	47.6%	391	73.2%	934	314.2%
Educator	7	2	30.3%	9	10	0.4%	13	32.7%	15	54.9%	35	269.6%
Specialist or Consultant	1,087	35	3.2%	1,122	1,420	26.6%	1,864	66.2%	2,206	96.7%	5,231	366.4%
Editor	35	1	3.9%	36	46	26.2%	60	65.4%	71	95.0%	169	362.4%
Industrial Researchers	355	27	7.7%	382	465	21.5%	608	59.1%	719	88.1%	1,713	348.2%
Scientist	165	54	32.9%	219	216	-1.4%	286	30.2%	333	51.9%	794	262.2%
Maintenance Engineer	2,516	159	6.3%	2,675	3,290	23.0%	4,327	61.8%	5,099	90.6%	12,090	352.0%
Civil Engineer	171	46	27.1%	217	224	3.1%	293	34.9%	346	59.2%	824	279.5%
Production Engineer	444	158	35.7%	602	579	-3.8%	760	26.2%	893	48.4%	2,150	257.3%
Power distribution Engineer	1,141	342	30.0%	1,483	1,494	0.7%	1,958	32.0%	2,316	56.1%	5,498	270.6%
Construction Engineer	248	42	17.0%	290	324	11.9%	425	46.6%	499	72.1%	1,190	310.6%
Sales Exec	1,116	129	11.6%	1,245	1,462	17.4%	1,912	53.5%	2,259	81.4%	5,387	332.5%
Marketing Personnel	1,090	122	11.2%	1,212	1,427	17.8%	1,875	54.7%	2,198	81.4%	5,239	332.3%
General Semi Skilled Worker	2,291	48	2.1%	2,339	2,984	27.6%	3,940	68.5%	4,636	98.2%	10,985	369.6%
General Labour	2,759	0	0.0%	2,759	3,602	30.6%	4,726	71.3%	5,577	102.2%	13,277	381.3%
Other Employees	2,885	146	5.1%	3,031	3,759	24.0%	4,935	62.8%	5,842	92.8%	13,895	358.5%
Administrative workers	1,299	28	2.1%	1,327	1,696	27.8%	2,236	68.5%	2,625	97.8%	6,249	370.9%
Total	**26,977**	**2,374**	**8.8%**	**29,352**	**35,238**	**20.1%**	**46,324**	**57.8%**	**54,562**	**85.9%**	**129,761**	**342.1%**

Table 8 shows that the skills gap throughout the sector varies considerably between SOCs within the sector, with significant gap's within large occupational groupings for Production Engineers 35.7% (MEH 35.7%), Power Distribution Engineer 30.0% (MEH 29.8%) and Technicians 22.2% (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 3.1% (MEH 3.3%) and Administrative Workers 2.1% (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 20.5% (MEH 20.3%)
- Estimated growth in employees to reach net zero under best-case scenario economic growth conditions by 2030 is 58.0% (MEH 57.9%)
- Estimated growth in employees to reach net zero under worst-case scenario economic growth conditions by 2050 is 86.2% (MEH 86.0%)
- Estimated growth in employees to reach net zero under best-case scenario economic growth conditions by 2050 is 342.5% (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 – 10.7% (MEH 10.5%)
Renewable Energy – 7.2% (MEH 7.0%)
Environmental – 10.2% (MEH 10.3%)

Skill gaps between SOC's also varies between Level 1 sub-sectors:
Production Engineers: Low Carbon 46.4% (MEH 47.3%); Renewable Energy 27.6% (MEH 27.9%) and Environmental 34.5% (MEH 34.9%)
Power Distribution Engineers: Low Carbon 34.2% (MEH 33.7%); Renewable Energy 28.7% (MEH 27.1%) and Environmental 31.7% (MEH 32.6%)
Technicians: Low Carbon 27.9% (MEH 27.9%); Renewable Energy 17.4% (MEH 17.3%) and Environmental 22.5% (22.9%)

Shortages also vary between Level 2 sub-sectors, for example the shortage in Production Engineers for Geothermal is 69.9% (MEH 68.8%), but only 13.5% (MEH 13.4%) in Photovoltaic. Level 2 tables are located in Appendix 5 of the D2N2 Market Snapshot report.

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 16.6% (MEH 17.0%); Renewable Energy 33.3% (MEH 34.5%) and Environmental 27.4% (MEH 27.0%)
Power Distribution Engineers of: Low Carbon 27.4% (MEH 28.1%); Renewable Energy 34.7% (MEH 35.1%) and Environmental 30.0% (MEH 29.3%)
Technicians of: Low Carbon 33.7% (MEH 34.2%); Renewable Energy 45.8% (MEH 45.9%) and Environmental 39.6% (MEH 39.6%)

Table 9: D2N2LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Low Carbon

	Low Carbon				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	281	79	27.9%	360	367	1.9%	481	33.7%	565	57.0%	1,347	274.1%
Snr Management SME	540	65	12.1%	605	705	16.6%	923	52.7%	1,092	80.5%	2,597	329.5%
Supervisory	546	69	12.7%	615	711	15.5%	938	52.3%	1,107	79.9%	2,614	324.7%
Middle / Junior Management	530	69	13.0%	599	692	15.6%	908	51.7%	1,071	78.8%	2,550	325.8%
Designer / Developer	85	25	29.4%	109	110	1.0%	145	32.6%	171	56.2%	408	272.7%
Clerical	270	1	0.3%	271	354	30.6%	465	71.6%	549	102.7%	1,285	374.1%
Self Employed	111	18	16.1%	129	145	12.5%	192	48.8%	225	73.8%	537	315.6%
Advisor or Agent	95	15	16.3%	111	124	11.6%	164	48.1%	192	73.6%	459	314.8%
Educator	0	0	22.1%	0	0	7.9%	1	38.7%	1	64.0%	2	292.8%
Specialist or Consultant	284	10	3.7%	294	369	25.3%	485	64.6%	576	95.8%	1,370	365.2%
Editor	9	0	4.2%	9	11	24.8%	15	63.1%	17	95.8%	41	361.2%
Industrial Researchers	201	16	7.9%	216	262	21.2%	343	58.7%	407	88.1%	971	348.8%
Scientist	110	36	32.4%	146	144	-0.9%	191	31.3%	222	52.6%	532	264.8%
Maintenance Engineer	625	51	8.1%	676	813	20.3%	1,074	58.9%	1,268	87.6%	3,012	345.8%
Civil Engineer	41	13	31.8%	55	54	-0.7%	71	29.7%	84	53.2%	200	266.9%
Production Engineer	136	63	46.4%	199	177	-10.9%	232	16.6%	273	37.2%	670	236.8%
Power distribution Engineer	243	83	34.2%	326	315	-3.2%	415	27.4%	492	51.2%	1,167	258.3%
Construction Engineer	53	11	21.3%	65	70	8.0%	91	41.3%	107	66.0%	257	297.6%
Sales Exec	339	51	15.0%	390	442	13.3%	580	48.9%	686	76.1%	1,628	317.6%
Marketing Personnel	335	48	14.3%	383	440	14.8%	580	51.3%	676	76.4%	1,614	321.1%
General Semi Skilled Worker	580	15	2.6%	596	759	27.4%	1,000	67.9%	1,175	97.3%	2,798	369.8%
General Labour	924	0	0.0%	924	1,207	30.6%	1,583	71.3%	1,873	102.7%	4,454	382.0%
Other Employees	679	43	6.3%	722	888	23.0%	1,167	61.6%	1,381	91.4%	3,280	354.3%
Administrative workers	346	9	2.7%	355	453	27.5%	594	67.4%	695	95.6%	1,665	369.0%
Total	**7,365**	**790**	**10.7%**	**8,155**	**9,613**	**17.9%**	**12,639**	**55.0%**	**14,907**	**82.8%**	**35,458**	**334.8%**

Table 10: D2N2LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Renewable Energy

	Renewable Energy				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	355	62	17.4%	418	467	11.9%	609	45.8%	716	71.5%	1,709	309.4%
Snr Management SME	1,294	121	9.3%	1,414	1,694	19.8%	2,223	57.2%	2,612	84.7%	6,210	339.1%
Supervisory	1,232	115	9.3%	1,346	1,606	19.3%	2,129	58.1%	2,493	85.2%	5,942	341.4%
Middle / Junior Management	1,196	109	9.1%	1,305	1,562	19.7%	2,064	58.1%	2,409	84.5%	5,756	340.9%
Designer / Developer	97	21	21.5%	118	127	7.4%	167	41.4%	196	66.5%	464	293.7%
Clerical	588	1	0.2%	589	769	30.5%	1,009	71.3%	1,185	101.0%	2,827	379.7%
Self Employed	80	8	9.6%	88	105	19.0%	137	56.5%	161	83.5%	385	338.3%
Advisor or Agent	25	4	17.2%	29	32	11.4%	42	46.4%	50	72.1%	120	313.7%
Educator	0	0	11.6%	0	0	21.3%	0	52.5%	0	83.6%	0	326.1%
Specialist or Consultant	562	16	2.9%	579	736	27.3%	967	67.2%	1,144	97.7%	2,708	368.0%
Editor	8	0	3.3%	9	11	26.7%	14	65.4%	17	95.1%	40	367.3%
Industrial Researchers	41	3	7.1%	44	54	21.8%	71	60.4%	84	88.6%	199	347.6%
Scientist	16	5	30.5%	21	21	0.6%	27	31.1%	32	54.8%	76	263.9%
Maintenance Engineer	1,338	74	5.5%	1,412	1,752	24.1%	2,304	63.2%	2,716	92.4%	6,410	354.0%
Civil Engineer	40	8	21.1%	48	52	8.1%	68	41.8%	80	66.5%	191	298.3%
Production Engineer	186	53	28.7%	240	244	1.7%	320	33.3%	376	56.7%	898	274.6%
Power distribution Engineer	631	174	27.6%	805	829	3.0%	1,085	34.7%	1,285	59.6%	3,038	277.4%
Construction Engineer	83	10	12.3%	93	109	16.8%	143	52.6%	167	79.2%	400	327.9%
Sales Exec	556	51	9.2%	608	730	20.2%	954	57.0%	1,126	85.3%	2,696	343.7%
Marketing Personnel	553	51	9.2%	604	725	20.1%	950	57.4%	1,116	84.9%	2,655	339.8%
General Semi Skilled Worker	1,204	22	1.8%	1,226	1,566	27.7%	2,070	68.9%	2,438	98.9%	5,754	369.3%
General Labour	1,469	0	0.0%	1,469	1,918	30.6%	2,517	71.3%	2,968	102.0%	7,069	381.1%
Other Employees	1,641	75	4.5%	1,715	2,132	24.3%	2,803	63.4%	3,314	93.2%	7,909	361.0%
Administrative workers	670	12	1.8%	682	873	27.9%	1,156	69.4%	1,357	98.9%	3,220	372.0%
Total	**13,867**	**996**	**7.2%**	**14,862**	**18,115**	**21.9%**	**23,828**	**60.3%**	**28,041**	**88.7%**	**66,676**	**348.6%**

Table 11: D2N2LEP's LCEGS Current Employment and Net Zero 2030 and 2050 Estimated Employment Requirements – Environmental

	Environmental				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	241	54	22.5%	296	315	6.6%	413	39.6%	488	65.3%	1,162	293.0%
Snr Management SME	421	43	10.1%	464	551	18.8%	725	56.3%	854	84.1%	2,029	337.5%
Supervisory	430	45	10.5%	475	560	18.0%	737	55.2%	866	82.4%	2,068	335.5%
Middle / Junior Management	414	43	10.4%	457	541	18.2%	712	55.6%	840	83.6%	1,982	333.3%
Designer / Developer	144	41	28.2%	185	188	1.7%	248	34.1%	290	57.1%	694	275.7%
Clerical	208	0	0.2%	208	272	30.8%	357	71.5%	419	101.3%	998	379.1%
Self Employed	112	14	12.3%	126	146	16.5%	192	53.1%	226	80.0%	537	327.3%
Advisor or Agent	74	12	16.5%	86	96	11.9%	126	47.3%	148	72.9%	355	313.7%
Educator	7	2	30.7%	9	9	0.0%	12	32.4%	14	54.5%	33	268.5%
Specialist or Consultant	240	8	3.4%	249	314	26.4%	412	65.8%	486	95.7%	1,154	364.3%
Editor	18	1	4.0%	19	24	26.7%	32	66.4%	37	94.6%	88	360.8%
Industrial Researchers	113	9	7.8%	121	148	22.1%	194	59.5%	228	87.9%	543	347.5%
Scientist	39	14	35.3%	53	51	-3.5%	67	26.9%	78	48.8%	187	254.3%
Maintenance Engineer	553	34	6.2%	587	724	23.4%	950	61.7%	1,115	89.9%	2,667	354.2%
Civil Engineer	90	25	27.5%	115	118	2.7%	154	34.5%	182	59.0%	433	277.5%
Production Engineer	121	42	34.5%	163	158	-3.1%	208	27.4%	245	49.9%	582	256.7%
Power distribution Engineer	268	85	31.7%	353	350	-0.7%	459	30.0%	538	52.7%	1,293	266.5%
Construction Engineer	111	21	18.5%	132	145	10.3%	191	44.8%	224	70.1%	533	304.7%
Sales Exec	221	27	12.3%	248	290	16.8%	378	52.4%	447	80.1%	1,063	328.6%
Marketing Personnel	202	23	11.5%	225	262	16.8%	344	53.3%	406	80.5%	969	331.4%
General Semi Skilled Worker	506	11	2.2%	517	660	27.5%	870	68.1%	1,023	97.7%	2,434	370.3%
General Labour	365	0	0.0%	365	477	30.6%	625	71.3%	736	101.7%	1,754	380.5%
Other Employees	564	29	5.1%	593	739	24.5%	966	62.8%	1,147	93.4%	2,706	356.0%
Administrative workers	284	6	2.2%	290	371	27.9%	486	67.5%	574	97.9%	1,364	370.5%
Total	**5,746**	**589**	**10.2%**	**6,335**	**7,510**	**18.6%**	**9,856**	**55.6%**	**11,613**	**83.3%**	**27,628**	**336.1%**

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 D2N2 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 a 'Low' with a score of 1
Calculation:

$$\frac{(21x3) + (9x2) + (0x1)}{30} = 2.7$$

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 a 'Low' with a score of 1

Calculation:

$$\frac{(15x3) + (15x2) + (0x1)}{30} = 2.5$$

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 D2N2 LEP, with the bubbles sized by sales £m. This graph shows how the Level 2 sub-sectors perform ***relative to each other*** within the D2N2 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: D2N2 LEP's LCEGS Current Training Capacity against the Potential Upskilling of the Workforce by Level 2 Sub-sector

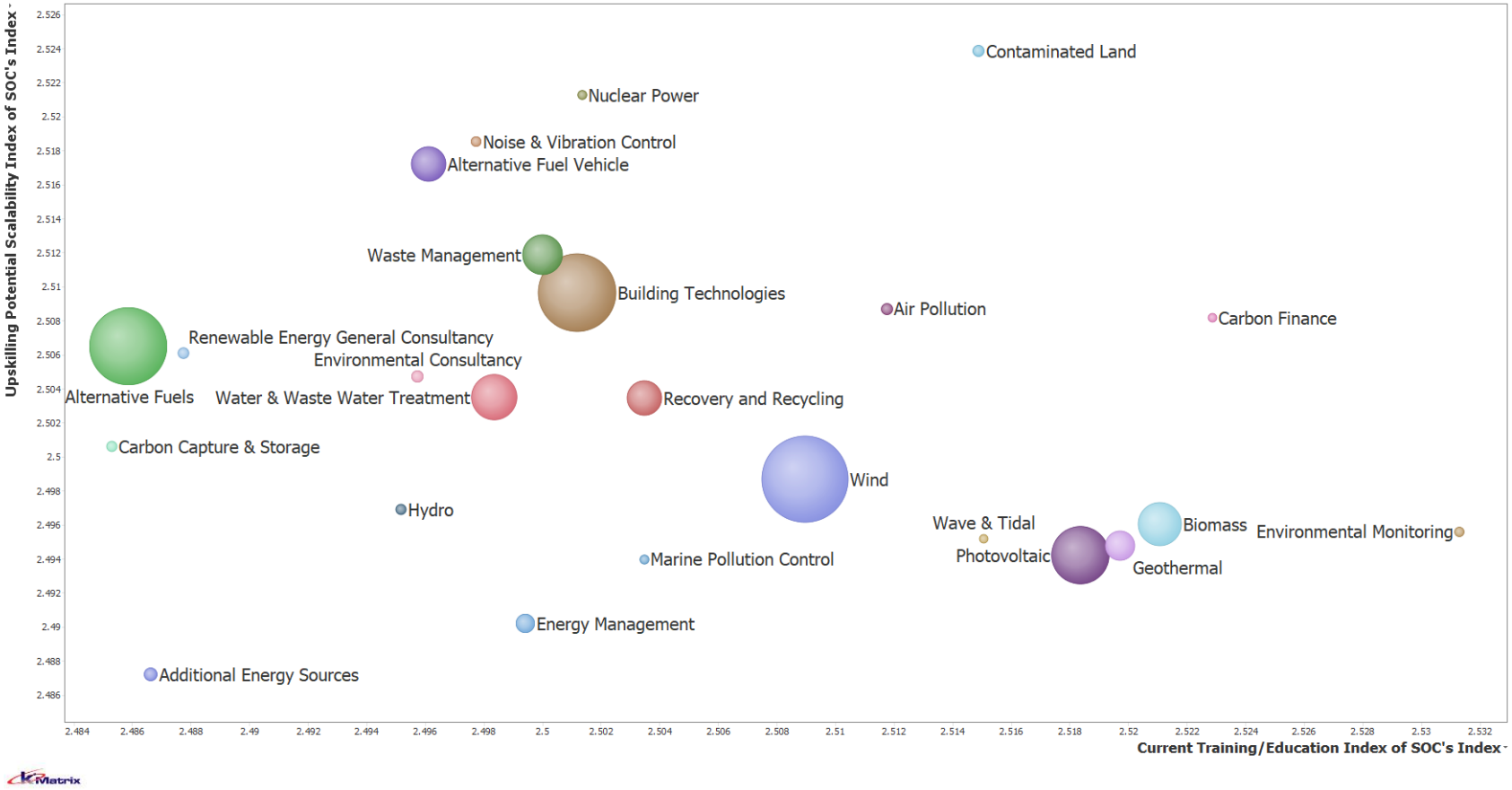


Figure 39 shows that the smaller sub-sector of Contaminated Land and Environmental Monitoring are relatively stronger in Upskilling Potential and current training capacity respectively. This has pushed the other, larger sub-sectors to one side, but Biomass, Photovoltaic and Wind have good current training capacity, while Building Technologies is well placed if the outliers are excluded. With 30% of UK carbon emissions being emitted from domestic heating, insulating windows and other building technologies have the potential to impact significantly on CO2 reduction.

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

In this section we estimate CO_2 reduction potential for Level 2 sub-sectors within the D2N2 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 CO_2 reduction potential of products and services. As such, the potential reduction in CO_2 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 CO_2 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 CO_2 reduction potential within the MEH region and each LEP.

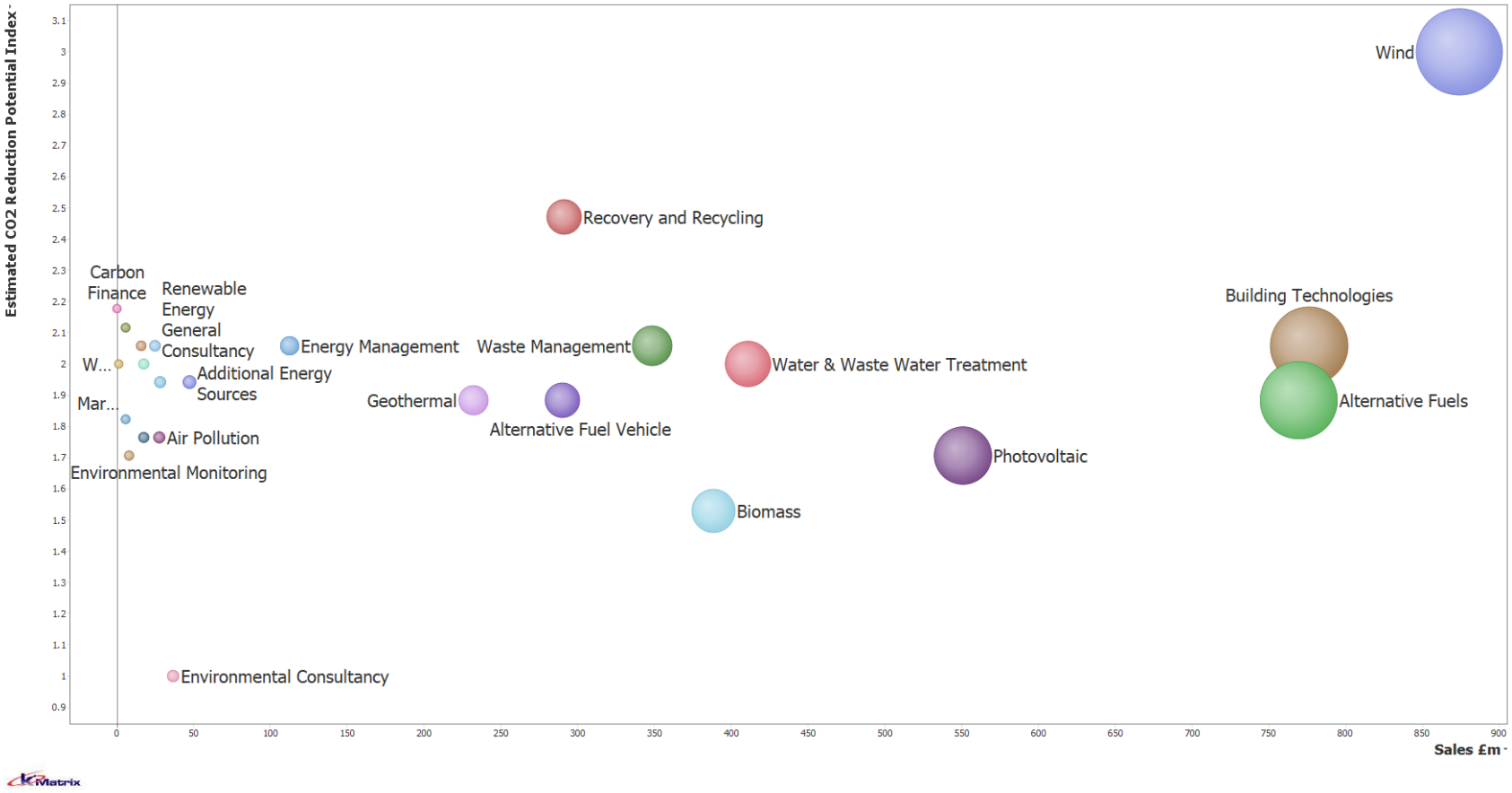
A worked example for Waste Management in the D2N2 LEP, with 17 Local Authorities:
7 Local Authorities estimated as 'High' with a score of 3
4 Local Authorities estimated as 'Medium' with a score of 2
6 Local Authorities estimated as 'Low' with a score of 1

Calculation:

$$\frac{(7x3) + (4x2) + (4x1)}{17} = 1.9$$

Figure 40 shows the estimated CO_2 reduction potential against the sales (£m) for each Level 2 sub-sector, with the bubbles sized for sales and provide a visualization of the relative market sizes and CO_2 reduction potential of the sub-sectors relative to the other sub-sectors. It illustrates the dominance of the Wind Sub-sector, in terms of both sales and CO_2 reduction potential compared with the other Level 2 sub-sectors. Conversely, it also highlights the relatively small size and CO_2 reduction potential of the Environmental Consultancy Sub-sector. Alternative Fuels and Building Technologies have a strong position in terms of size of market, with Building Technologies having a higher CO_2 reduction potential. Photovoltaic is also in a favourable position, with high CO_2 reduction potential and reasonably large market.

Figure 40: D2N2 LEP's LCEGS Estimated CO2 Reduction Potential against Sales (£m) by Level 2 Sub-sector



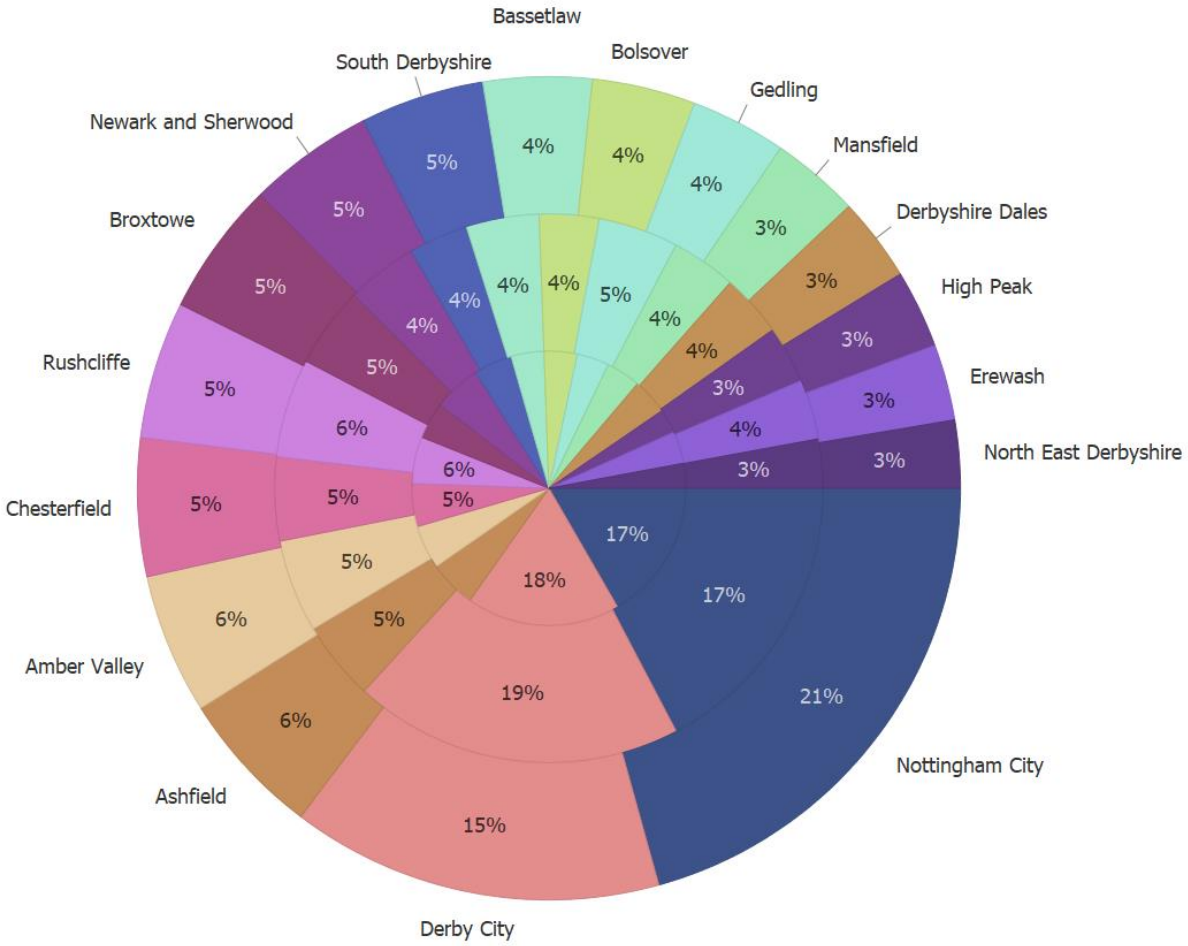
2. D2N2 LEP's LCEGS by Local Authority

2.1 LCEGS by Local Authority

This section of the report the analyses the D2N2 LEP's 17 Local Authorities.

Figure 41 shows LCEGS for 2019/20 split by Local Authority for sales (outer circle), companies (middle circle) and employment (inner circle). Nottingham City accounts for 21% of D2N2 LCEGS sales, 17% of companies and 17% of employment. The top 5 Local Authorities are Nottingham City, Derby City, Ashfield, Amber Valley and Chesterfield. The smallest Local Authorities are High Peak, North East Derbyshire and Erewash with only 3 % of the market.

Figure 41: D2N2 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 and GVA for each of the 17 Local Authorities 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.

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

	Sales £m					Available Sales £m					GVA £m				
Local Authority	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20
Amber Valley	269.5	3.3%	278.4	3.7%	288.8	164.5	-0.1%	164.3	5.9%	174.0	213.5	3.3%	220.5	3.7%	228.7
Ashfield	277.7	4.1%	289.1	4.8%	302.9	164.2	4.3%	171.2	7.6%	184.2	219.1	4.1%	228.1	4.7%	239.0
Bassetlaw	204.1	5.4%	215.1	6.1%	228.3	123.2	4.6%	128.9	7.1%	138.0	164.1	5.4%	173.0	6.1%	183.6
Bolsover	197.0	4.0%	204.8	4.6%	214.3	120.4	0.4%	120.9	3.7%	125.5	158.2	4.0%	164.4	4.6%	172.0
Broxtowe	246.5	7.8%	265.7	8.3%	287.8	145.2	10.2%	159.9	11.6%	178.4	195.6	7.8%	210.7	8.3%	228.3
Chesterfield	271.8	0.8%	274.1	1.0%	276.8	165.0	-0.2%	164.8	0.7%	165.9	220.5	0.8%	222.4	1.0%	224.6
Derby City	699.4	5.4%	736.9	5.8%	779.5	424.2	4.5%	443.4	7.1%	474.8	557.1	5.4%	587.0	5.8%	621.0
Derbyshire Dales	157.5	5.3%	165.9	6.1%	176.1	95.2	4.2%	99.2	6.7%	105.8	124.7	5.3%	131.3	6.1%	139.4
Erewash	148.8	1.6%	151.1	1.6%	153.6	88.4	4.2%	92.2	-1.7%	90.6	119.2	1.6%	121.1	1.6%	123.0
Gedling	182.4	4.2%	190.2	4.4%	198.6	110.7	4.3%	115.4	2.8%	118.6	144.2	4.2%	150.3	4.4%	157.0
High Peak	148.0	4.2%	154.2	4.9%	161.8	88.1	5.6%	93.1	3.5%	96.3	116.6	4.2%	121.5	4.9%	127.5
Mansfield	164.1	6.9%	175.4	7.2%	188.0	97.6	7.6%	105.0	8.2%	113.6	130.6	6.9%	139.6	7.2%	149.6
Newark and Sherwood	219.1	12.3%	246.0	14.4%	281.4	134.0	9.6%	146.8	14.3%	167.8	172.9	12.3%	194.2	14.4%	222.0
North East Derbyshire	126.5	6.0%	134.2	6.3%	142.6	77.7	5.3%	81.8	4.2%	85.3	100.2	6.0%	106.3	6.3%	113.0
Nottingham City	1,038.7	0.7%	1,046.2	0.8%	1,055.0	607.6	2.4%	621.9	2.0%	634.3	812.3	0.7%	818.1	0.8%	825.0
Rushcliffe	264.2	3.0%	272.2	3.3%	281.2	153.9	7.3%	165.1	2.4%	169.1	210.9	3.0%	217.3	3.3%	224.5
South Derbyshire	232.6	5.4%	245.1	6.3%	260.5	137.6	5.1%	144.6	9.8%	158.8	182.3	5.4%	192.1	6.3%	204.2
Total	**4,848.0**	**4.1%**	**5,044.8**	**4.6%**	**5,277.1**	**2,897.6**	**4.2%**	**3,018.6**	**5.4%**	**3,181.0**	**3,841.9**	**4.1%**	**3,997.9**	**4.6%**	**4,182.1**

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 within 0.1%. Growth in Sales is steady between years for most the Local Authorities, with the 2018/19-2019/20 growth less than 0.5% stronger than the previous year, with the exception of Newark and Sherwood, which grew by more than 12.3% in the first year and 14.4% in the second.

There is significant difference in the growth rates between Local Authorities, with the strongest growth between 2018/19 and 2019/20 seen in:

- Newark and Sherwood – 14.4%
- Broxtowe – 8.3%
- Mansfield – 7.2%
- North East Derbyshire – 6.3%
- Bassetlaw – 6.1%
- Derbyshire Dales – 6.1%

Table 13 show the key metrics of Number of Companies and Number of Employees for each of the 17 Local Authorities at the Sector Level for three years with growth rates.

Table 13: Local Authorities Companies and Employment from 2017/18 to 2019/20

	# Employees					Total # Companies				
Local Authority	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20
Amber Valley	1,817	-0.7%	1,804	-5.7%	1,701	94	5.3%	99	8.3%	108
Ashfield	1,805	3.1%	1,861	12.1%	2,087	85	-2.9%	83	10.1%	91
Bassetlaw	1,315	3.4%	1,360	-1.6%	1,339	74	5.4%	78	10.4%	86
Bolsover	1,055	27.9%	1,350	21.2%	1,636	62	3.0%	64	9.0%	69
Broxtowe	1,366	11.7%	1,526	5.8%	1,614	88	-1.2%	87	0.8%	88
Chesterfield	1,840	-4.2%	1,763	-6.2%	1,654	88	-0.2%	88	8.8%	96
Derby City	6,315	0.7%	6,359	-4.2%	6,092	366	-3.8%	353	0.6%	355
Derbyshire Dales	1,504	-9.3%	1,364	11.3%	1,518	68	1.3%	69	-2.7%	67
Erewash	1,260	2.6%	1,292	6.6%	1,377	62	6.6%	66	-0.4%	66
Gedling	1,216	13.2%	1,377	-2.8%	1,339	87	-4.8%	83	8.3%	90
High Peak	1,006	-4.9%	958	2.1%	978	62	-3.9%	60	6.1%	64
Mansfield	1,315	9.9%	1,445	-0.1%	1,444	65	13.9%	74	-2.1%	73
Newark and Sherwood	2,212	-32.6%	1,491	39.1%	2,075	69	8.4%	75	15.3%	87
North East Derbyshire	926	7.0%	991	12.0%	1,110	52	2.0%	53	1.0%	54
Nottingham City	5,745	1.7%	5,844	-3.3%	5,652	302	6.7%	323	2.7%	331
Rushcliffe	1,860	1.0%	1,879	4.0%	1,955	102	5.0%	107	5.0%	113
South Derbyshire	1,513	4.4%	1,580	1.4%	1,602	68	-4.6%	64	-3.6%	62
Total	**34,070**	**0.5%**	**34,244**	**2.7%**	**35,172**	**1,797**	**1.7%**	**1,827**	**3.9%**	**1,899**

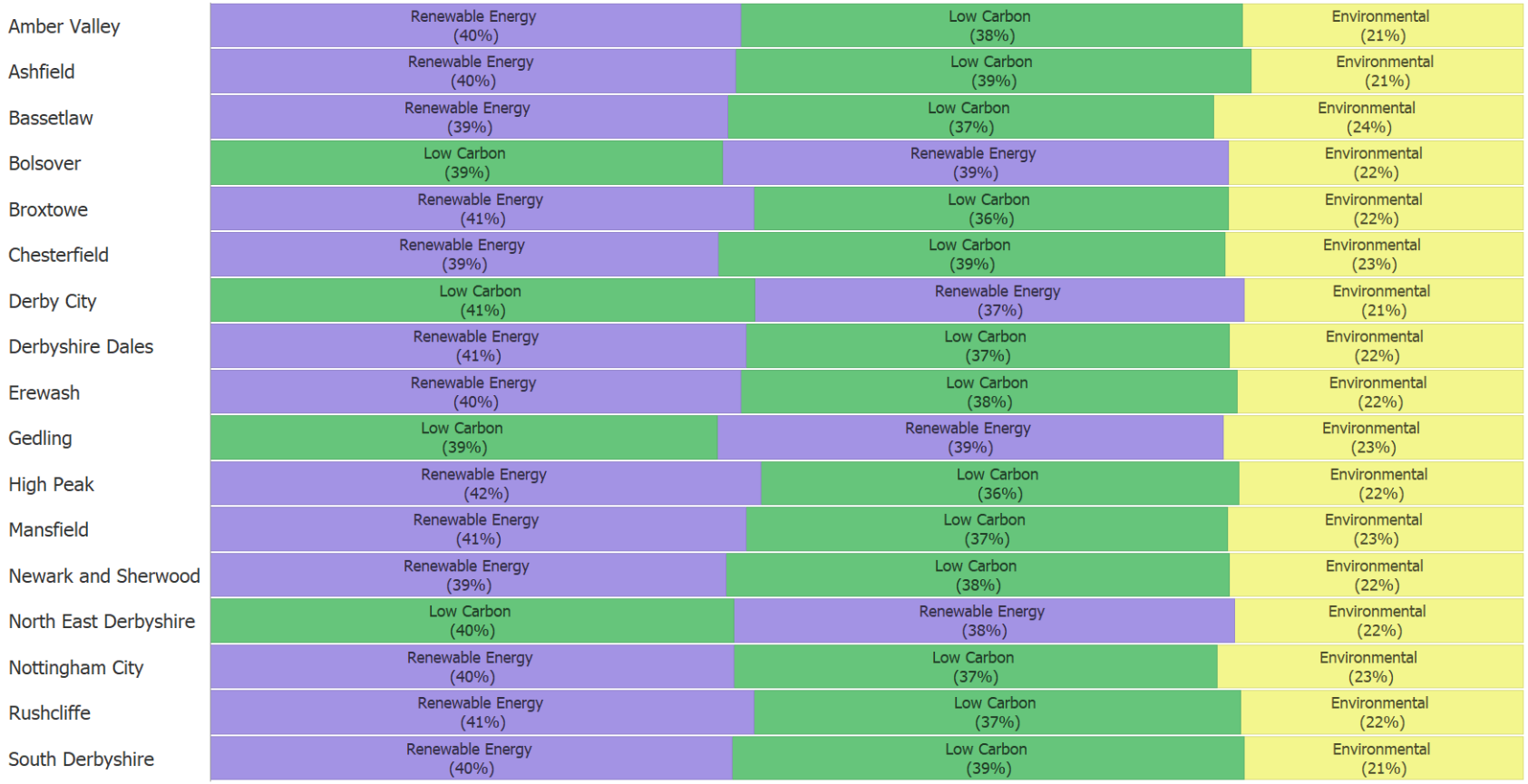
The fluctuation between company and employee numbers are not entirely independent, but they don't necessarily track each other. The fluctuation of employees can represent employees who are redeployed into other sectors within the same company and do not necessarily represent unemployment. Redeployment 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.

2.3 Local Authority Analysis by Year – Level 1

Figure 42 shows the different profiles of the D2N2 Local Authorities when sales is split at Level 1. The Local authorities show variation in Environmental of 24% for Bassetlaw, to 21% for Amber Valley, Ashfield, Derby City and South Derbyshire, to; Low carbon from 41% for Derby City, to 36% for Broxtowe and High Peak; and Renewable Energy from 42% for High Peak to 38% for Derby City and North East Derbyshire. This highlights that D2N2's Local Authorities are not a homogeneous market, but they actually show subtle regional variations in activity within the LCEGS sector. This is further confirmed by Figure 42 below.

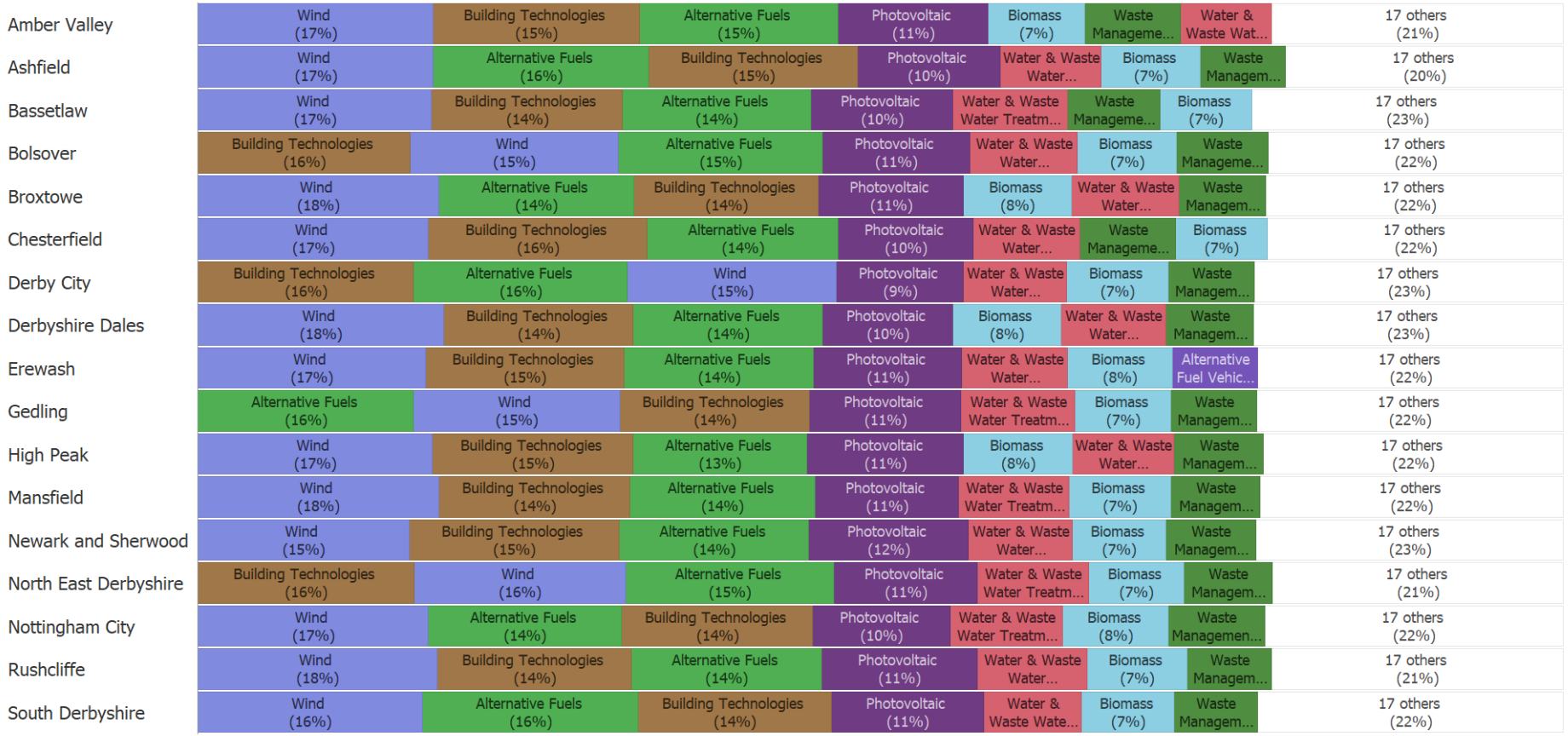
Figure 42: D2N2 LEP's Local Authorities LCEGS Sales 2019/20 (Level 1)



2.4 Local Authority Analysis by Year – Level 2

Figure 43 extends the analysis to include the Top 7 sub-sectors for each of MEH's Local Authorities. Typically, seven sub-sectors account for over 75% of the total value, but the sub-sectors and their rankings do differ across the 17 Local Authorities. There are consistent sub-sectors running through many of the D2N2 LEP's Local Authorities and these include Wind, Building Technologies, Alternative Fuels and Photovoltaic, they are represented in all of the D2N2 LEP's Local Authorities and are consistent with the D2N2 LEP's top four sub-sectors.

Figure 43: D2N2 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 14a and 14b showing a good range of growth rates between the Local Authorities.

Table 14a: Local Authorities Companies by Size from 2017/18 to 2019/20

	# Start-up					# Micro					# SMEs				
Local Authority	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20
Amber Valley	5	5.6%	5	9.2%	5	29	4.1%	30	8.4%	32	47	5.8%	50	8.2%	54
Ashfield	4	-2.2%	4	9.2%	5	25	-2.8%	25	10.9%	27	43	-3.1%	41	10.0%	45
Bassetlaw	4	4.3%	4	10.7%	4	22	5.6%	23	9.7%	26	37	5.4%	39	10.8%	43
Bolsover	3	3.2%	3	8.9%	3	19	3.0%	19	8.5%	21	31	2.9%	32	8.9%	35
Broxtowe	4	-1.2%	4	1.1%	4	26	0.4%	26	0.5%	26	44	-2.3%	43	1.1%	44
Chesterfield	4	0.8%	4	8.6%	5	27	0.0%	27	8.3%	29	44	-0.4%	44	9.3%	48
Derby City	20	-1.5%	20	2.2%	21	110	-3.6%	106	0.6%	106	182	-4.3%	174	1.7%	177
Derbyshire Dales	3	0.4%	3	-2.3%	3	21	0.7%	21	-2.1%	20	34	1.7%	35	-3.0%	34
Erewash	3	7.0%	3	-1.1%	3	19	5.9%	20	0.9%	20	31	6.7%	33	-1.0%	33
Gedling	4	-2.7%	4	6.5%	4	26	-5.0%	25	7.7%	27	44	-5.0%	41	8.9%	45
High Peak	3	-4.9%	3	6.1%	3	19	-4.2%	18	6.1%	19	31	-3.6%	30	6.1%	32
Mansfield	3	14.9%	4	-2.3%	4	20	12.1%	22	-1.0%	22	32	14.8%	37	-2.6%	36
Newark and Sherwood	3	8.9%	4	15.6%	4	21	8.0%	23	14.3%	26	35	8.4%	37	15.9%	43
North East Derbyshire	3	1.1%	3	0.5%	3	16	1.7%	16	1.4%	16	26	2.4%	27	0.8%	27
Nottingham City	15	7.7%	16	2.8%	17	91	6.0%	97	1.8%	98	151	6.9%	161	3.3%	167
Rushcliffe	5	5.3%	5	5.2%	6	31	5.1%	32	6.0%	34	51	5.1%	54	4.2%	56
South Derbyshire	3	-5.4%	3	-2.8%	3	20	-6.1%	19	-3.0%	19	33	-3.3%	32	-4.3%	31
Total	**92**	**2.3%**	**94**	**4.2%**	**98**	**540**	**1.4%**	**547**	**3.9%**	**568**	**897**	**1.7%**	**912**	**4.2%**	**950**

Table 14b: Local Authorities Companies by Size from 2017/18 to 2019/20

	# Large					# Corporations					Total # Companies				
Local Authority	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20	2017/18	Growth %	2018/19	Growth %	2019/20
Amber Valley	9	6.0%	10	7.9%	11	5	6.0%	5	8.9%	5	94	5.3%	99	8.3%	108
Ashfield	9	-2.7%	8	8.8%	9	4	-2.4%	4	10.3%	5	85	-2.9%	83	10.1%	91
Bassetlaw	7	5.8%	8	10.6%	9	4	5.3%	4	10.2%	4	74	5.4%	78	10.4%	86
Bolsover	6	3.2%	6	10.4%	7	3	2.5%	3	10.1%	3	62	3.0%	64	9.0%	69
Broxtowe	9	-0.9%	9	0.2%	9	4	-1.0%	4	0.1%	4	88	-1.2%	87	0.8%	88
Chesterfield	9	-0.3%	9	8.4%	10	4	0.1%	4	8.3%	5	88	-0.2%	88	8.8%	96
Derby City	37	-2.3%	36	0.5%	36	18	-4.0%	17	0.1%	17	366	-3.8%	353	0.6%	355
Derbyshire Dales	7	1.4%	7	-2.8%	7	3	1.9%	3	-3.1%	3	68	1.3%	69	-2.7%	67
Erewash	6	7.6%	7	-1.4%	7	3	6.4%	3	-0.5%	3	62	6.6%	66	-0.4%	66
Gedling	9	-4.9%	8	8.2%	9	4	-3.4%	4	7.6%	5	87	-4.8%	83	8.3%	90
High Peak	6	-3.9%	6	6.9%	6	3	-3.4%	3	5.4%	3	62	-3.9%	60	6.1%	64
Mansfield	7	14.0%	7	-2.2%	7	3	14.2%	4	-3.6%	4	65	13.9%	74	-2.1%	73
Newark and Sherwood	7	8.7%	8	15.1%	9	3	8.5%	4	15.0%	4	69	8.4%	75	15.3%	87
North East Derbyshire	5	1.6%	5	1.4%	5	3	2.3%	3	0.9%	3	52	2.0%	53	1.0%	54
Nottingham City	30	7.4%	32	2.5%	33	15	7.0%	16	2.4%	17	302	6.7%	323	2.7%	331
Rushcliffe	10	4.5%	11	6.2%	11	5	4.8%	5	4.8%	6	102	5.0%	107	5.0%	113
South Derbyshire	7	-6.3%	6	-3.2%	6	3	-4.6%	3	-2.3%	3	68	-4.6%	64	-3.6%	62
Total	**180**	**2.1%**	**184**	**3.8%**	**191**	**89**	**1.9%**	**91**	**3.7%**	**94**	**1,797**	**1.7%**	**1,827**	**3.9%**	**1,899**

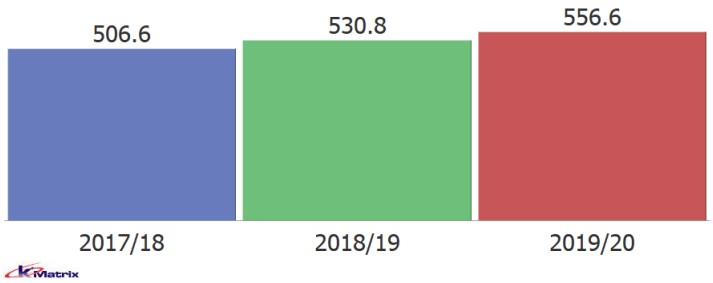
Company number fluctuations may represent companies in more than one sector (such as automotive), who trade sporadically within the LCEGS sector. Decreases in company numbers can therefore be a result of trading in other sectors, not that the company itself has ceased to trade.

3. D2N2 LEP's LCEGS and International Trade

3.1 D2N2 LEP's LCEGS Exports

This section of the report addresses D2N2 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: D2N2 LEP's Exports (£m) 2015/16 to 2017/18

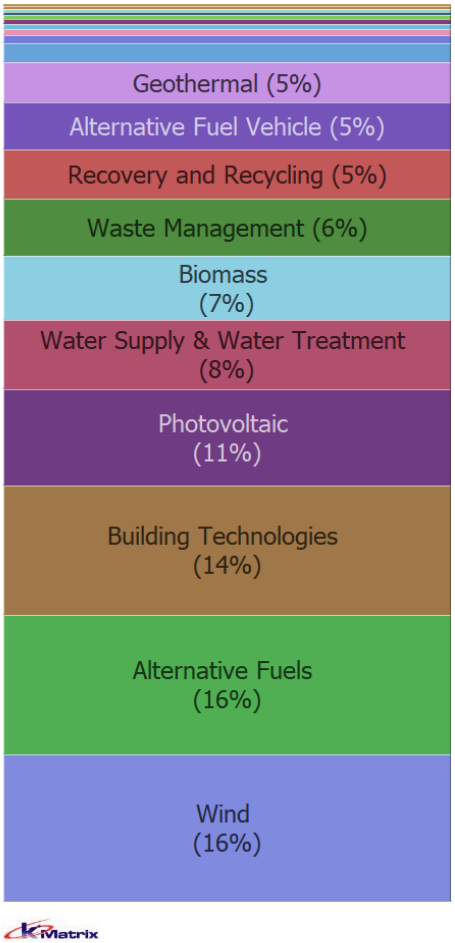


The value of D2N2 LEP's LCEGS Exports was £507m in 2017/18 and has grown to £557m in 2019/20.

Growth between 2017/18 and 2018/19 was 4.8% and growth between 2018/19 and 2019/20 was 4.9%.

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: D2N2 LEP's Exports (%) by Sub-Sector 2019/20

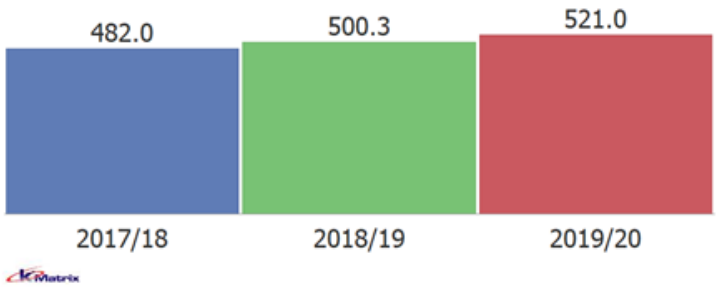


D2N2 LEP represented 19% of all MEH LCEGS exports in 2019/20. This is lower than D2N2 LEP's 20% of overall MEH Sales. This means that the D2N2 LEP has a larger share of the export market than the MEH domestic market.

Figure 45 shows the proportion of D2N2 LEP's LCEGS exports by Level 2 sub-sector, with Wind (17%), Alternative Fuels (16%), Building Technologies (14%), Photovoltaic (11%) and Water & Waste Water Treatment (8%) being the leading sub-sectors and accounting for 65% of all D2N2 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: D2N2 LEP's Imports (£m) 2015/16 to 2017/18

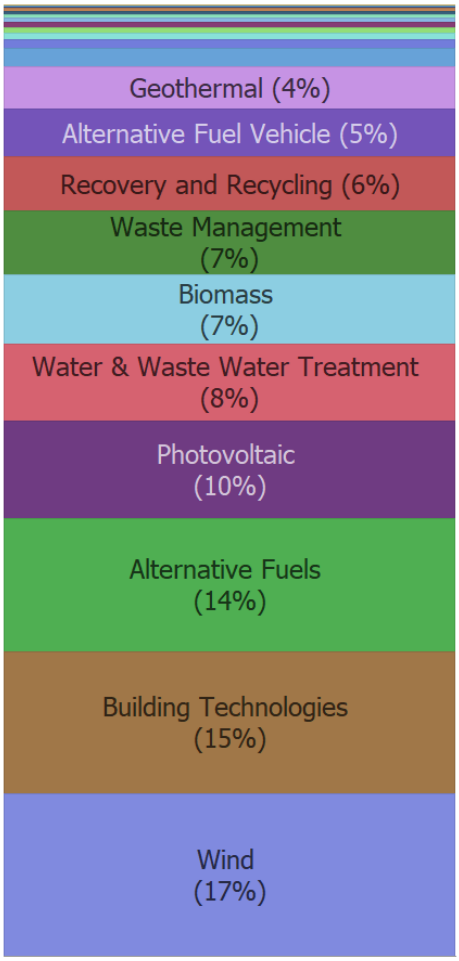


The value of D2N2 LEP's LCEGS Imports was £482m in 2017/18 and has grown to £521m in 2019/20.

Growth between 2017/18 and 2018/19 was 3.8% and growth between 2018/19 and 2019/20 was 4.1%.

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: D2N2 LEP's Imports (%) by Sub-Sector 2019/20



D2N2 LEP represented 20% of all MEH LCEGS imports in 2019/20. This is in line with D2N2 LEP's 20% of overall MEH Sales. This means that the D2N2 LEP has a similar share of the import market than the MEH domestic market.

Figure 47 shows the proportion of D2N2 LEP's LCEGS imports by Level 2 sub-sector, with Wind (17%), Building Technologies (15%), Alternative Fuels (14%), Photovoltaic (10%) and Water & Waste Water Treatment (8%) being the leading sub-sectors and accounting for 64% of all D2N2 LEP's LCEGS imports.

In Table 15 D2N2 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 10.6%, with less than 1.0 percentage point variation between sub-sectors, which is consistent across the three years, indicating a stable and established export market.

Table 15: D2N2 LEP's LCEGS Exports as a % of Sales 2017/18 to 2019/20

		2017/18			2018/19			2019/20		
Level 1	Level 2	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	25.6	2.7	10.6%	26.6	2.8	10.4%	27.8	2.9	10.5%
Environmental	Contaminated Land	26.0	2.7	10.4%	27.0	2.8	10.5%	28.3	3.0	10.8%
Environmental	Environmental Consultancy	33.4	3.4	10.3%	34.7	3.7	10.6%	36.3	3.8	10.5%
Environmental	Environmental Monitoring	7.2	0.8	10.5%	7.5	0.8	10.5%	7.9	0.8	10.3%
Environmental	Marine Pollution Control	4.9	0.5	10.5%	5.1	0.5	10.1%	5.4	0.6	10.8%
Environmental	Noise & Vibration Control	14.6	1.5	10.3%	15.2	1.6	10.3%	15.9	1.6	10.3%
Environmental	Recovery and Recycling	267.7	28.2	10.5%	278.5	29.7	10.7%	291.4	30.2	10.4%
Environmental	Waste Management	320.4	33.5	10.5%	333.2	34.7	10.4%	348.2	35.8	10.3%
Environmental	Water & Waste Water Treatment	377.6	40.0	10.6%	392.7	40.9	10.4%	410.6	42.5	10.3%
Low Carbon	Additional Energy Sources	43.2	4.5	10.4%	44.9	4.7	10.5%	47.0	5.0	10.7%
Low Carbon	Alternative Fuel Vehicle	266.0	29.0	10.9%	276.9	29.2	10.5%	289.8	29.2	10.1%
Low Carbon	Alternative Fuels	706.9	72.3	10.2%	735.5	77.9	10.6%	769.6	87.0	11.3%
Low Carbon	Building Technologies	712.5	72.6	10.2%	741.7	76.6	10.3%	775.9	80.3	10.4%
Low Carbon	Carbon Capture & Storage	16.1	1.7	10.4%	16.7	1.8	10.5%	17.5	1.8	10.3%
Low Carbon	Carbon Finance	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Low Carbon	Energy Management	103.4	10.9	10.6%	107.6	11.4	10.6%	112.6	11.9	10.6%
Low Carbon	Nuclear Power	4.2	0.0	0.0%	4.8	0.0	0.0%	5.4	0.0	0.0%
Renewable Energy	Biomass	357.1	37.3	10.5%	371.4	38.4	10.3%	388.3	39.8	10.2%
Renewable Energy	Geothermal	213.1	22.7	10.6%	221.7	23.3	10.5%	231.9	25.1	10.8%
Renewable Energy	Hydro	15.8	1.8	11.1%	16.4	1.7	10.7%	17.2	1.9	10.8%
Renewable Energy	Photovoltaic	505.4	54.4	10.8%	526.2	56.3	10.7%	550.7	59.9	10.9%
Renewable Energy	Renewable Consultancy	22.6	2.4	10.4%	23.5	2.5	10.7%	24.6	2.6	10.8%
Renewable Energy	Wave & Tidal	0.8	0.1	10.3%	0.8	0.1	10.7%	0.8	0.1	10.5%
Renewable Energy	Wind	803.7	83.6	10.4%	836.0	89.4	10.7%	873.9	90.6	10.4%
Total		**4,848.0**	**506.6**	**10.5%**	**5,044.8**	**530.8**	**10.5%**	**5,277.1**	**556.6**	**10.5%**

In Table 16 D2N2 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 16: D2N2 LEP's LCEGS Available Exports and Available Exports as a % of Exports 2017/18 to 2019/20

		2017/18			2018/19			2019/20		
Level 1	Level 2	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	2.7	0.7	24.5%	2.8	0.7	24.5%	2.9	0.7	24.6%
Environmental	Contaminated Land	2.7	0.7	25.2%	2.8	0.7	24.0%	3.0	0.8	25.1%
Environmental	Environmental Consultancy	3.4	0.8	24.2%	3.7	0.9	24.7%	3.8	0.9	24.8%
Environmental	Environmental Monitoring	0.8	0.2	24.3%	0.8	0.2	24.4%	0.8	0.2	23.7%
Environmental	Marine Pollution Control	0.5	0.1	24.8%	0.5	0.1	24.3%	0.6	0.1	24.4%
Environmental	Noise & Vibration Control	1.5	0.4	24.7%	1.6	0.4	24.1%	1.6	0.4	23.8%
Environmental	Recovery and Recycling	28.2	6.9	24.3%	29.7	7.2	24.4%	30.2	7.4	24.7%
Environmental	Waste Management	33.5	8.2	24.6%	34.7	8.5	24.5%	35.8	8.7	24.3%
Environmental	Water & Waste Water Treatment	40.0	9.8	24.5%	40.9	9.9	24.2%	42.5	10.6	24.9%
Low Carbon	Additional Energy Sources	4.5	1.1	23.8%	4.7	1.2	24.6%	5.0	1.3	25.2%
Low Carbon	Alternative Fuel Vehicle	29.0	7.0	24.1%	29.2	7.3	25.0%	29.2	7.1	24.5%
Low Carbon	Alternative Fuels	72.3	18.0	24.9%	77.9	18.8	24.2%	87.0	21.6	24.8%
Low Carbon	Building Technologies	72.6	18.0	24.7%	76.6	18.9	24.6%	80.3	19.7	24.5%
Low Carbon	Carbon Capture & Storage	1.7	0.4	24.9%	1.8	0.4	25.2%	1.8	0.4	24.9%
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	10.9	2.7	24.5%	11.4	2.7	23.9%	11.9	2.9	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	37.3	9.1	24.4%	38.4	9.7	25.2%	39.8	9.5	23.9%
Renewable Energy	Geothermal	22.7	5.5	24.3%	23.3	5.7	24.4%	25.1	6.1	24.1%
Renewable Energy	Hydro	1.8	0.4	25.0%	1.7	0.4	24.1%	1.9	0.4	22.9%
Renewable Energy	Photovoltaic	54.4	13.3	24.5%	56.3	13.9	24.6%	59.9	14.5	24.2%
Renewable Energy	Renewable Consultancy	2.4	0.6	25.2%	2.5	0.6	24.6%	2.6	0.6	23.9%
Renewable Energy	Wave & Tidal	0.1	0.0	25.2%	0.1	0.0	25.4%	0.1	0.0	24.8%
Renewable Energy	Wind	83.6	20.4	24.3%	89.4	21.7	24.2%	90.6	21.4	23.6%
Total		**506.6**	**124.2**	**24.5%**	**530.8**	**129.9**	**24.5%**	**556.6**	**135.4**	**24.3%**

The sub-sectors with the highest available export to export ratio in 2019/20 are: Additional Energy Sources 25.2%; Contaminated Land Reclamation and Remediation 25.1%; Water and Waste Water Treatment 24.9%; Carbon Capture and Storage 24.9% Alternative Fuels 24.8%; Wave & Tidal 24.8% and Environmental Consulting 24.8%.

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 17 D2N2 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 9.9%, with less than 1.0 percentage point variation between sub-sectors, which is consistent across the three years, indicating a stable and established import market.

Table 17: D2N2 LEP's LCEGS Imports as a % of Sales 2017/18 to 2019/20

		2017/18			2018/19			2019/20		
Level 1	Level 2	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	25.6	2.5	9.7%	26.6	2.7	10.1%	27.8	2.7	9.9%
Environmental	Contaminated Land	26.0	2.6	10.0%	27.0	2.7	10.0%	28.3	2.9	10.2%
Environmental	Environmental Consultancy	33.4	3.5	10.5%	34.7	3.5	9.9%	36.3	3.6	9.8%
Environmental	Environmental Monitoring	7.2	0.7	9.7%	7.5	0.8	10.2%	7.9	0.8	10.3%
Environmental	Marine Pollution Control	4.9	0.5	9.5%	5.1	0.5	9.4%	5.4	0.6	10.3%
Environmental	Noise & Vibration Control	14.6	1.5	10.3%	15.2	1.5	10.0%	15.9	1.6	10.2%
Environmental	Recovery and Recycling	267.7	25.7	9.6%	278.5	27.7	9.9%	291.4	29.3	10.1%
Environmental	Waste Management	320.4	30.2	9.4%	333.2	32.4	9.7%	348.2	34.9	10.0%
Environmental	Water & Waste Water Treatment	377.6	38.7	10.2%	392.7	39.3	10.0%	410.6	41.7	10.2%
Low Carbon	Additional Energy Sources	43.2	4.2	9.7%	44.9	4.8	10.6%	47.0	4.8	10.2%
Low Carbon	Alternative Fuel Vehicle	266.0	25.2	9.5%	276.9	27.6	10.0%	289.8	26.4	9.1%
Low Carbon	Alternative Fuels	706.9	67.8	9.6%	735.5	73.9	10.0%	769.6	72.8	9.5%
Low Carbon	Building Technologies	712.5	76.6	10.7%	741.7	72.2	9.7%	775.9	77.7	10.0%
Low Carbon	Carbon Capture & Storage	16.1	1.8	10.9%	16.7	1.7	9.9%	17.5	1.8	10.3%
Low Carbon	Carbon Finance	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Low Carbon	Energy Management	103.4	10.2	9.9%	107.6	10.8	10.0%	112.6	10.2	9.1%
Low Carbon	Nuclear Power	4.2	0.4	9.9%	4.8	0.5	9.7%	5.4	0.5	9.6%
Renewable Energy	Biomass	357.1	36.1	10.1%	371.4	35.5	9.6%	388.3	38.4	9.9%
Renewable Energy	Geothermal	213.1	21.5	10.1%	221.7	23.1	10.4%	231.9	23.1	10.0%
Renewable Energy	Hydro	15.8	1.6	10.0%	16.4	1.7	10.1%	17.2	1.7	9.8%
Renewable Energy	Photovoltaic	505.4	50.1	9.9%	526.2	55.2	10.5%	550.7	53.8	9.8%
Renewable Energy	Renewable Consultancy	22.6	2.2	9.8%	23.5	2.4	10.1%	24.6	2.6	10.5%
Renewable Energy	Wave & Tidal	0.8	0.1	9.6%	0.8	0.1	9.8%	0.8	0.1	10.2%
Renewable Energy	Wind	803.7	78.6	9.8%	836.0	80.2	9.6%	873.9	89.0	10.2%
Total		**4,848.0**	**482.0**	**9.9%**	**5,044.8**	**500.3**	**9.9%**	**5,277.1**	**521.0**	**9.9%**

Figure 48 shows the Exports plotted against the D2N2 LEP's Growth from to 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 Wind and Alternative Fuels sub-sectors hold the most desirable position of the top 4 sub-sectors, being large in market and mid-level for growth. Waste Management, Geothermal, Photovoltaic and Water & Waste Water Treatment are in the top 11 sub-sectors and although have smaller markets, have higher growth. Markets that should be considered Export strengths include: Wind and Alternative Fuels, Waste Management, Geothermal, Photovoltaic and Water & Waste Water Treatment.

Figure 48: D2N2 LEP's LCEGS Exports vs D2N2 LEP's Level 2 Growth for 2019/20

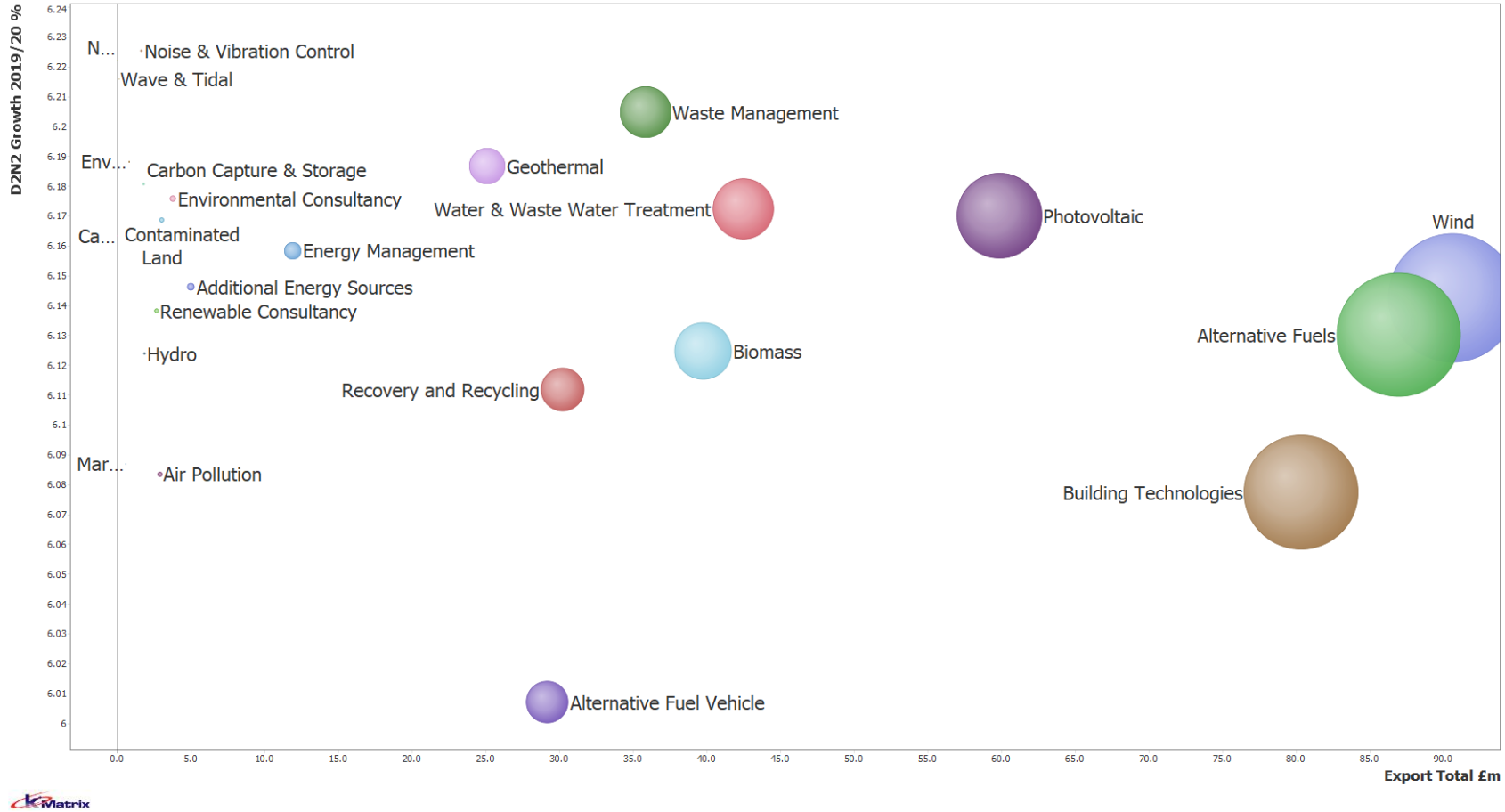
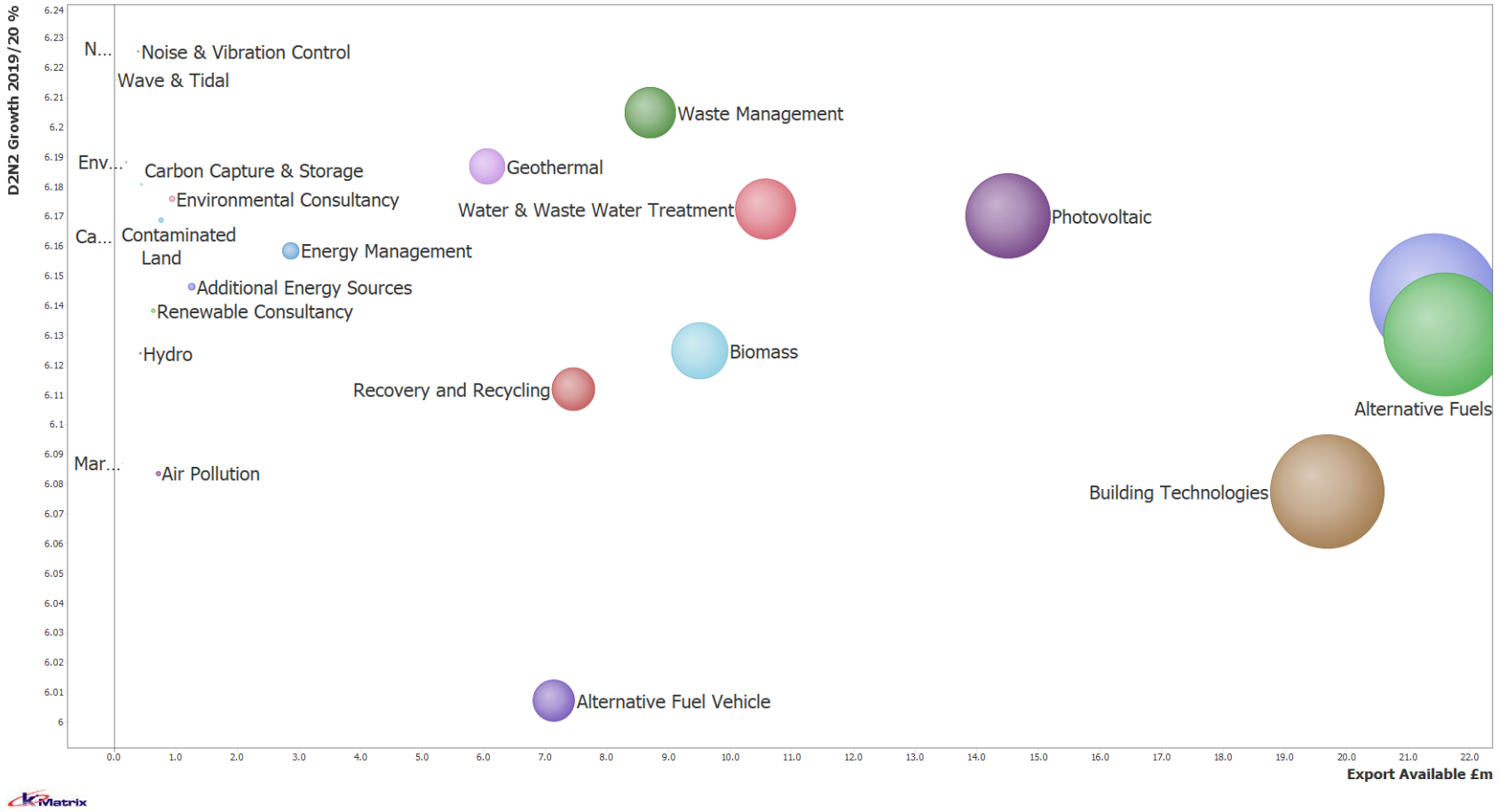


Figure 49 shows the Available Exports plotted against the D2N2 LEP's Growth from to 2018/19 to 2019/20 for all Level 2 sub-sectors, with the bubbles sized according to the size of the Exports. Here we can see that the pattern is slightly different from the Export graph in figure 48, Building Technologies and Alternative Fuels have moved to the right as there is good Export Market Available.

Figure 49: D2N2 LEP's LCEGS Available Exports vs D2N2 LEP's Level 2 Growth for 2019/20

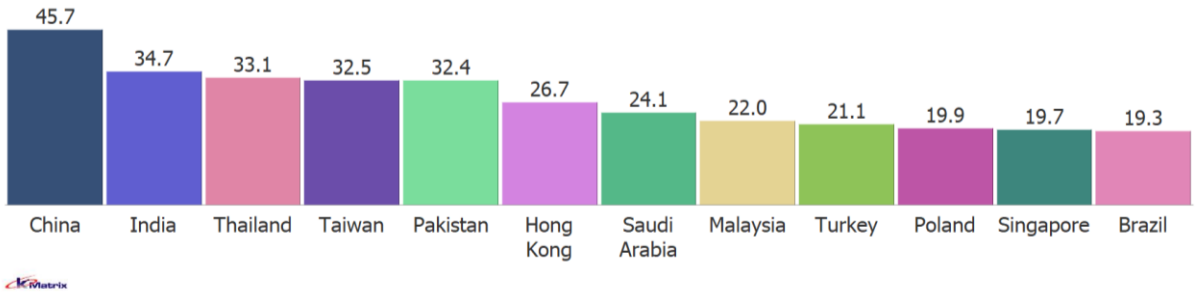


The Top 12 destinations for D2N2 LEP's LCEGS exports are shown in Figure 50. China is the top destination, followed by India, Thailand, Taiwan, Pakistan, Hong Kong, Saudi Arabia, Malaysia, Turkey, Poland, Singapore and Brazil.

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 D2N2 LEP's LCEGS Export Destinations 2019/20



3.2 D2N2 LEP's LCEGS Priority Markets

Table 18 combines analysis of D2N2 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 18: D2N2 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	0.43	0.97	0.77	0.11	2.47	0.59	0.51	0.53	1.36	0.72	1.69	0.43	0.49	0.54	1.08	0.25
Environmental	Waste Management	0.56	1.17	0.92	0.13	2.90	0.64	0.57	0.59	1.56	0.89	2.06	0.51	0.62	0.61	1.30	0.32
Environmental	Water & Waste Water Treatment	0.69	1.59	1.20	0.17	3.38	0.93	0.81	0.95	2.12	1.20	2.83	0.70	0.77	0.91	1.78	0.43
Low Carbon	Alternative Fuel Vehicle	0.77	1.74	1.37	0.20	4.06	1.08	0.87	0.98	2.33	1.35	3.18	0.79	0.99	1.04	2.06	0.49
Low Carbon	Alternative Fuels	1.06	3.02	2.07	0.30	5.75	1.61	1.52	1.39	3.99	2.00	5.19	1.34	1.15	1.42	3.38	0.69
Low Carbon	Building Technologies	1.02	2.34	1.93	0.29	6.48	1.51	1.28	1.46	3.40	1.90	4.51	1.14	1.30	1.33	2.86	0.72
Low Carbon	Carbon Finance	0.26	0.61	0.54	0.07	1.41	0.33	0.28	0.39	0.81	0.47	0.83	0.24	0.33	0.26	0.75	0.17
Low Carbon	Energy Management	0.20	0.49	0.37	0.06	1.11	0.28	0.24	0.27	0.66	0.36	1.02	0.22	0.22	0.28	0.53	0.13
Renewable Energy	Biomass	0.43	0.98	0.79	0.11	2.50	0.56	0.54	0.57	1.55	0.80	1.66	0.46	0.48	0.50	1.15	0.25
Renewable Energy	Geothermal	1.08	2.31	1.79	0.28	5.90	1.38	1.12	1.32	3.32	1.76	4.15	1.04	1.07	1.25	2.58	0.65
Renewable Energy	Photovoltaic	0.58	1.18	1.00	0.14	2.93	0.66	0.62	0.66	1.67	1.02	2.44	0.58	0.64	0.70	1.34	0.32
Renewable Energy	Wind	0.79	1.75	1.43	0.18	4.11	0.95	0.77	0.94	2.36	1.31	2.98	0.76	0.84	0.93	1.85	0.48

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	0.67	1.70	1.03	0.44	0.64	0.50	1.29	1.09	0.51	0.51	0.34	1.72	1.75	1.07	0.91	0.35
Environmental	Waste Management	0.73	1.94	1.18	0.48	0.80	0.55	1.39	1.19	0.55	0.61	0.37	2.01	2.14	1.21	1.11	0.40
Environmental	Water & Waste Water Treatment	1.06	2.58	1.66	0.67	0.96	0.74	1.97	1.51	0.77	0.88	0.50	2.69	2.71	1.59	1.50	0.53
Low Carbon	Alternative Fuel Vehicle	1.29	3.29	1.64	0.83	1.20	0.97	2.23	1.93	0.79	1.04	0.66	2.49	2.61	1.93	1.79	0.64
Low Carbon	Alternative Fuels	1.74	4.40	2.93	1.06	1.91	1.20	3.48	2.52	1.63	1.74	1.02	4.28	4.98	3.13	2.69	0.95
Low Carbon	Building Technologies	1.71	3.99	2.51	1.25	1.60	1.33	3.33	2.66	1.31	1.38	0.82	4.21	4.03	2.83	2.39	0.88
Low Carbon	Carbon Finance	0.38	1.11	0.66	0.30	0.42	0.26	0.70	0.68	0.28	0.36	0.25	0.91	1.16	0.62	0.49	0.22
Low Carbon	Energy Management	0.29	0.89	0.51	0.23	0.31	0.26	0.61	0.50	0.22	0.26	0.17	0.86	0.82	0.53	0.46	0.17
Renewable Energy	Biomass	0.68	1.53	1.10	0.43	0.71	0.51	1.29	1.09	0.59	0.56	0.36	1.80	1.80	1.09	0.92	0.36
Renewable Energy	Geothermal	1.45	3.94	2.33	1.10	1.55	1.22	2.79	2.50	1.11	1.23	0.79	4.15	3.90	2.51	2.20	0.86
Renewable Energy	Photovoltaic	0.84	2.03	1.30	0.61	0.91	0.66	1.57	1.28	0.67	0.72	0.42	2.28	2.13	1.39	1.15	0.43
Renewable Energy	Wind	1.12	2.94	1.81	0.69	1.11	0.91	1.95	1.57	0.87	0.94	0.57	2.99	3.04	1.90	1.49	0.59

Table 18 can be read horizontally to identify the strongest exporting sub-sectors i.e., Building Technologies, 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 Thailand.

Tables 19a, 19b and 19c apply the same conventions as Table 13, but this time broken down to Level 3, which reveals D2N2 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 19a: D2N2 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	0.01	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.01
Recovery and Recycling	Glass Stock Processing	0.06	0.15	0.10	0.02	0.37	0.09	0.07	0.06	0.16	0.09	0.24
Recovery and Recycling	Technologies, Research & Development	0.01	0.02	0.02	0.00	0.05	0.01	0.01	0.01	0.04	0.02	0.05
Recovery and Recycling	Waste Collection	0.18	0.40	0.33	0.04	1.05	0.26	0.22	0.24	0.59	0.32	0.70
Waste Management	Construction & Operation of Waste Treatment Facilities	0.17	0.37	0.28	0.04	0.82	0.21	0.22	0.19	0.55	0.26	0.57
Waste Management	Consultancy, Training and Education	0.07	0.15	0.13	0.02	0.37	0.08	0.08	0.08	0.16	0.10	0.31
Waste Management	Equipment For Waste Treatment	0.21	0.45	0.36	0.05	1.09	0.24	0.17	0.19	0.60	0.36	0.75
Waste Management	Technologies, Research & Development	0.11	0.20	0.15	0.02	0.61	0.11	0.10	0.12	0.24	0.18	0.43
Water & Waste Water Treatment	Engineering	0.15	0.29	0.23	0.03	0.72	0.22	0.19	0.21	0.48	0.23	0.55
Water & Waste Water Treatment	Water Treatment and Distribution	0.53	1.28	0.95	0.14	2.61	0.70	0.62	0.74	1.61	0.95	2.23
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	0.56	1.27	1.06	0.15	3.04	0.84	0.64	0.73	1.68	1.04	2.35
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.21	0.47	0.31	0.05	1.02	0.24	0.23	0.25	0.66	0.31	0.83
Alternative Fuels	Main Stream Bio Fuels	0.18	0.49	0.44	0.06	1.00	0.25	0.24	0.26	0.66	0.44	0.82
Alternative Fuels	Other Bio Fuels	0.73	2.13	1.37	0.20	3.66	1.19	1.13	0.93	2.77	1.32	3.70
Alternative Fuels	Other Fuels	0.08	0.26	0.15	0.03	0.71	0.08	0.08	0.12	0.35	0.12	0.41
Building Technologies	Doors	0.24	0.59	0.51	0.08	1.77	0.47	0.30	0.42	0.97	0.48	1.26
Building Technologies	Insulation and Heat Retention Materials	0.19	0.40	0.36	0.05	1.03	0.24	0.20	0.26	0.53	0.30	0.76
Building Technologies	Monitoring and Control Systems	0.18	0.40	0.27	0.05	0.89	0.24	0.17	0.21	0.58	0.30	0.70
Building Technologies	Windows	0.41	0.94	0.79	0.11	2.79	0.55	0.61	0.56	1.32	0.82	1.78
Energy Management	Technologies, Research & Development	0.02	0.04	0.03	0.00	0.08	0.02	0.02	0.02	0.05	0.03	0.07
Biomass	Biomass Energy Systems	0.17	0.43	0.32	0.05	1.15	0.25	0.25	0.27	0.76	0.36	0.71
Biomass	Biomass Furnace Systems	0.04	0.08	0.07	0.01	0.22	0.05	0.05	0.05	0.13	0.07	0.16
Biomass	Boilers and related Systems	0.15	0.32	0.26	0.03	0.85	0.19	0.17	0.18	0.48	0.26	0.58
Biomass	Manufacturing Of Boilers and Related Systems	0.07	0.14	0.14	0.02	0.29	0.08	0.07	0.07	0.18	0.11	0.21
Geothermal	Manufacture and Supply of Specialist Equipment	0.31	0.72	0.47	0.08	1.71	0.42	0.34	0.35	0.89	0.49	1.05
Geothermal	Suppliers of Systems	0.31	0.65	0.48	0.08	1.77	0.40	0.37	0.38	1.02	0.47	1.30
Geothermal	Whole Systems Manufacture	0.27	0.59	0.54	0.07	1.51	0.33	0.21	0.35	0.90	0.47	1.00
Photovoltaic	Other Related Equipment and Chemicals	0.13	0.26	0.20	0.03	0.70	0.15	0.14	0.17	0.41	0.22	0.54
Photovoltaic	Photovoltaic Cells	0.15	0.24	0.27	0.03	0.58	0.14	0.13	0.16	0.33	0.22	0.51
Photovoltaic	Systems & Equipment	0.28	0.64	0.48	0.08	1.51	0.34	0.33	0.31	0.85	0.55	1.29
Wind	Large Wind Turbine	0.32	0.80	0.54	0.08	1.68	0.39	0.26	0.35	1.03	0.59	1.17
Wind	Small Wind Turbine	0.19	0.41	0.42	0.05	1.03	0.28	0.25	0.28	0.67	0.38	0.88
Wind	Wind Farm Systems	0.27	0.54	0.47	0.05	1.40	0.28	0.26	0.31	0.66	0.34	0.92

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 19b: D2N2 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	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.00
Recovery and Recycling	Glass Stock Processing	0.05	0.06	0.07	0.13	0.03	0.09	0.26	0.15	0.05	0.07	0.07
Recovery and Recycling	Technologies, Research & Development	0.01	0.01	0.02	0.03	0.01	0.02	0.04	0.03	0.01	0.02	0.02
Recovery and Recycling	Waste Collection	0.19	0.21	0.22	0.46	0.12	0.29	0.72	0.42	0.20	0.26	0.22
Waste Management	Construction & Operation of Waste Treatment Facilities	0.15	0.20	0.18	0.42	0.10	0.25	0.63	0.35	0.16	0.27	0.16
Waste Management	Consultancy, Training and Education	0.08	0.07	0.07	0.17	0.04	0.09	0.26	0.15	0.06	0.10	0.08
Waste Management	Equipment For Waste Treatment	0.19	0.25	0.24	0.47	0.11	0.28	0.70	0.47	0.18	0.31	0.22
Waste Management	Technologies, Research & Development	0.09	0.10	0.12	0.23	0.06	0.10	0.36	0.21	0.08	0.12	0.09
Water & Waste Water Treatment	Engineering	0.15	0.15	0.19	0.34	0.09	0.20	0.58	0.31	0.13	0.20	0.13
Water & Waste Water Treatment	Water Treatment and Distribution	0.55	0.61	0.71	1.41	0.34	0.85	1.96	1.32	0.54	0.74	0.60
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	0.58	0.80	0.79	1.61	0.37	0.99	2.55	1.25	0.61	0.90	0.73
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.21	0.20	0.25	0.45	0.12	0.30	0.74	0.39	0.22	0.30	0.24
Alternative Fuels	Main Stream Bio Fuels	0.20	0.26	0.28	0.53	0.14	0.30	0.85	0.54	0.21	0.29	0.18
Alternative Fuels	Other Bio Fuels	0.95	0.73	0.94	2.46	0.44	1.21	2.99	1.99	0.69	1.43	0.84
Alternative Fuels	Other Fuels	0.13	0.09	0.11	0.22	0.06	0.13	0.32	0.24	0.09	0.10	0.11
Building Technologies	Doors	0.27	0.30	0.32	0.67	0.20	0.44	1.11	0.67	0.33	0.46	0.36
Building Technologies	Insulation and Heat Retention Materials	0.20	0.21	0.22	0.45	0.11	0.27	0.68	0.45	0.20	0.28	0.21
Building Technologies	Monitoring and Control Systems	0.16	0.22	0.21	0.42	0.11	0.28	0.72	0.40	0.18	0.22	0.19
Building Technologies	Windows	0.51	0.58	0.59	1.32	0.30	0.72	1.49	1.00	0.55	0.64	0.57
Energy Management	Technologies, Research & Development	0.02	0.02	0.02	0.04	0.01	0.02	0.08	0.04	0.02	0.02	0.02
Biomass	Biomass Energy Systems	0.21	0.21	0.20	0.51	0.12	0.30	0.67	0.44	0.19	0.30	0.22
Biomass	Biomass Furnace Systems	0.04	0.05	0.05	0.12	0.02	0.07	0.13	0.08	0.04	0.06	0.04
Biomass	Boilers and related Systems	0.15	0.15	0.17	0.37	0.08	0.21	0.53	0.40	0.14	0.25	0.19
Biomass	Manufacturing Of Boilers and Related Systems	0.06	0.06	0.07	0.15	0.03	0.11	0.20	0.18	0.06	0.11	0.06
Geothermal	Manufacture and Supply of Specialist Equipment	0.31	0.28	0.35	0.70	0.20	0.41	0.98	0.59	0.31	0.39	0.30
Geothermal	Suppliers of Systems	0.30	0.30	0.37	0.80	0.18	0.39	1.24	0.75	0.32	0.46	0.36
Geothermal	Whole Systems Manufacture	0.24	0.27	0.31	0.62	0.17	0.36	0.97	0.56	0.28	0.43	0.33
Photovoltaic	Other Related Equipment and Chemicals	0.13	0.15	0.15	0.28	0.07	0.19	0.50	0.31	0.14	0.20	0.16
Photovoltaic	Photovoltaic Cells	0.13	0.12	0.16	0.34	0.09	0.22	0.40	0.30	0.15	0.24	0.16
Photovoltaic	Systems & Equipment	0.30	0.34	0.36	0.67	0.15	0.41	1.05	0.63	0.31	0.44	0.32
Wind	Large Wind Turbine	0.32	0.33	0.37	0.76	0.21	0.45	1.24	0.71	0.28	0.44	0.39
Wind	Small Wind Turbine	0.19	0.23	0.24	0.54	0.13	0.31	0.76	0.49	0.20	0.30	0.23
Wind	Wind Farm Systems	0.25	0.28	0.32	0.56	0.14	0.36	0.93	0.62	0.21	0.37	0.30

Table 19c: D2N2 LEP's Level 3 Exports by Country for 2019/20 in £m

Level 2	Level 3	Saudi Arabia	Singapore	South Africa	South Kor	Sweden	Taiwan	Thailand	Turkey	UAE	US
Recovery and Recycling	Consultancy, Training and Education	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00
Recovery and Recycling	Glass Stock Processing	0.18	0.14	0.07	0.06	0.03	0.27	0.23	0.17	0.11	0.04
Recovery and Recycling	Technologies, Research & Development	0.03	0.03	0.01	0.02	0.01	0.05	0.04	0.03	0.03	0.01
Recovery and Recycling	Waste Collection	0.57	0.49	0.23	0.24	0.15	0.75	0.73	0.43	0.42	0.15
Waste Management	Construction & Operation of Waste Treatment Facilities	0.47	0.39	0.18	0.20	0.12	0.61	0.69	0.40	0.34	0.11
Waste Management	Consultancy, Training and Education	0.18	0.15	0.07	0.07	0.05	0.25	0.26	0.15	0.16	0.06
Waste Management	Equipment For Waste Treatment	0.51	0.41	0.21	0.23	0.14	0.79	0.77	0.41	0.45	0.15
Waste Management	Technologies, Research & Development	0.24	0.24	0.09	0.11	0.06	0.37	0.41	0.25	0.15	0.07
Water & Waste Water Treatment	Engineering	0.41	0.31	0.18	0.19	0.11	0.56	0.61	0.31	0.32	0.10
Water & Waste Water Treatment	Water Treatment and Distribution	1.53	1.18	0.58	0.68	0.38	2.09	2.07	1.26	1.17	0.43
Alternative Fuel Vehicle	Alternative Fuels (main Stream) for Vehicles Only	1.72	1.50	0.58	0.83	0.52	1.74	1.89	1.50	1.39	0.49
Alternative Fuel Vehicle	Other Fuels and Vehicles	0.51	0.43	0.22	0.21	0.14	0.75	0.73	0.42	0.41	0.15
Alternative Fuels	Main Stream Bio Fuels	0.55	0.46	0.27	0.22	0.17	0.74	0.81	0.44	0.46	0.15
Alternative Fuels	Other Bio Fuels	2.52	1.69	1.15	1.33	0.72	3.00	3.57	2.24	1.88	0.65
Alternative Fuels	Other Fuels	0.24	0.22	0.13	0.12	0.07	0.27	0.35	0.29	0.21	0.10
Building Technologies	Doors	1.00	0.66	0.31	0.37	0.24	1.17	1.11	0.76	0.58	0.21
Building Technologies	Insulation and Heat Retention Materials	0.48	0.40	0.22	0.24	0.14	0.73	0.57	0.48	0.43	0.15
Building Technologies	Monitoring and Control Systems	0.49	0.45	0.21	0.22	0.14	0.66	0.66	0.41	0.31	0.15
Building Technologies	Windows	1.37	1.15	0.56	0.56	0.31	1.66	1.69	1.18	1.06	0.36
Energy Management	Technologies, Research & Development	0.05	0.04	0.02	0.02	0.01	0.07	0.06	0.04	0.03	0.02
Biomass	Biomass Energy Systems	0.62	0.47	0.29	0.25	0.18	0.83	0.87	0.41	0.41	0.16
Biomass	Biomass Furnace Systems	0.11	0.08	0.05	0.04	0.03	0.17	0.16	0.10	0.10	0.03
Biomass	Boilers and related Systems	0.40	0.39	0.18	0.18	0.11	0.58	0.57	0.41	0.28	0.12
Biomass	Manufacturing Of Boilers and Related Systems	0.16	0.16	0.07	0.08	0.05	0.22	0.20	0.17	0.12	0.05
Geothermal	Manufacture and Supply of Specialist Equipment	0.90	0.73	0.33	0.33	0.21	1.05	1.22	0.66	0.52	0.26
Geothermal	Suppliers of Systems	0.81	0.76	0.37	0.40	0.25	1.15	1.19	0.68	0.65	0.27
Geothermal	Whole Systems Manufacture	0.55	0.61	0.22	0.29	0.21	1.18	0.78	0.70	0.63	0.19
Photovoltaic	Other Related Equipment and Chemicals	0.35	0.29	0.14	0.16	0.10	0.49	0.50	0.34	0.28	0.10
Photovoltaic	Photovoltaic Cells	0.33	0.31	0.18	0.16	0.10	0.56	0.43	0.28	0.24	0.09
Photovoltaic	Systems & Equipment	0.83	0.63	0.32	0.37	0.20	1.15	1.12	0.72	0.59	0.22
Wind	Large Wind Turbine	0.83	0.60	0.38	0.35	0.22	1.21	1.22	0.76	0.62	0.26
Wind	Small Wind Turbine	0.54	0.43	0.23	0.27	0.16	0.84	0.90	0.53	0.43	0.15
Wind	Wind Farm Systems	0.58	0.54	0.26	0.31	0.18	0.94	0.91	0.61	0.43	0.18

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
Indexed numbers for the rows above show that growth in the manufacturing and construction sectors is similar for both the SIC and kMatrix definitions		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

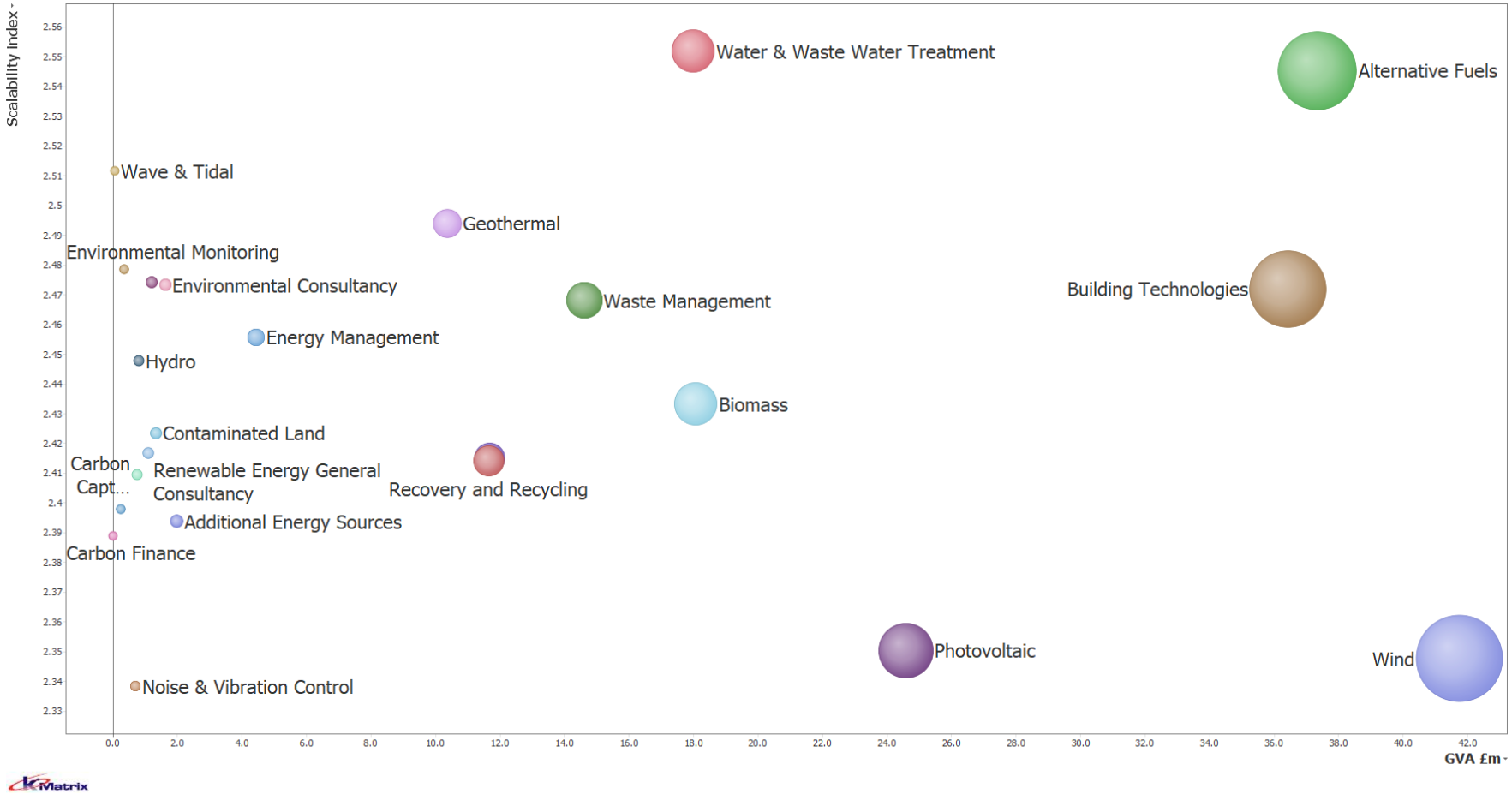
	kMatrix - LCEGS	ONS - EGSS
Sector definition	The LCEGS sector includes the EGSS definition but expands it to include all activities that contribute and enable growth in the sector. Those elements which are excluded from EGSS which are produced for purposes that, while beneficial to the environment, primarily 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

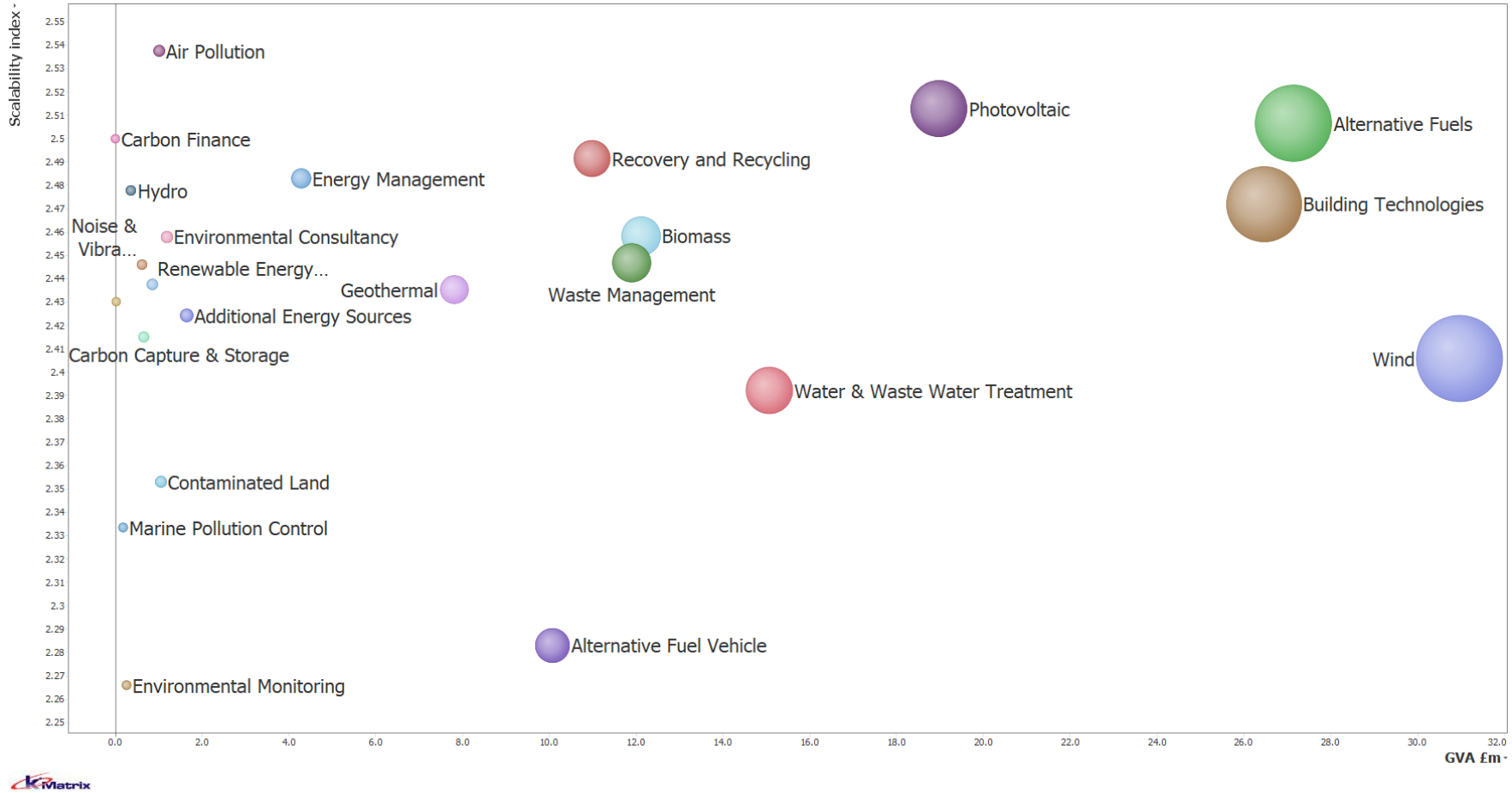
LCEGS Scalability vs. GVA by Local Authority for Level 2

Amber Valley – Scalability Index vs. GVA for 2019/20

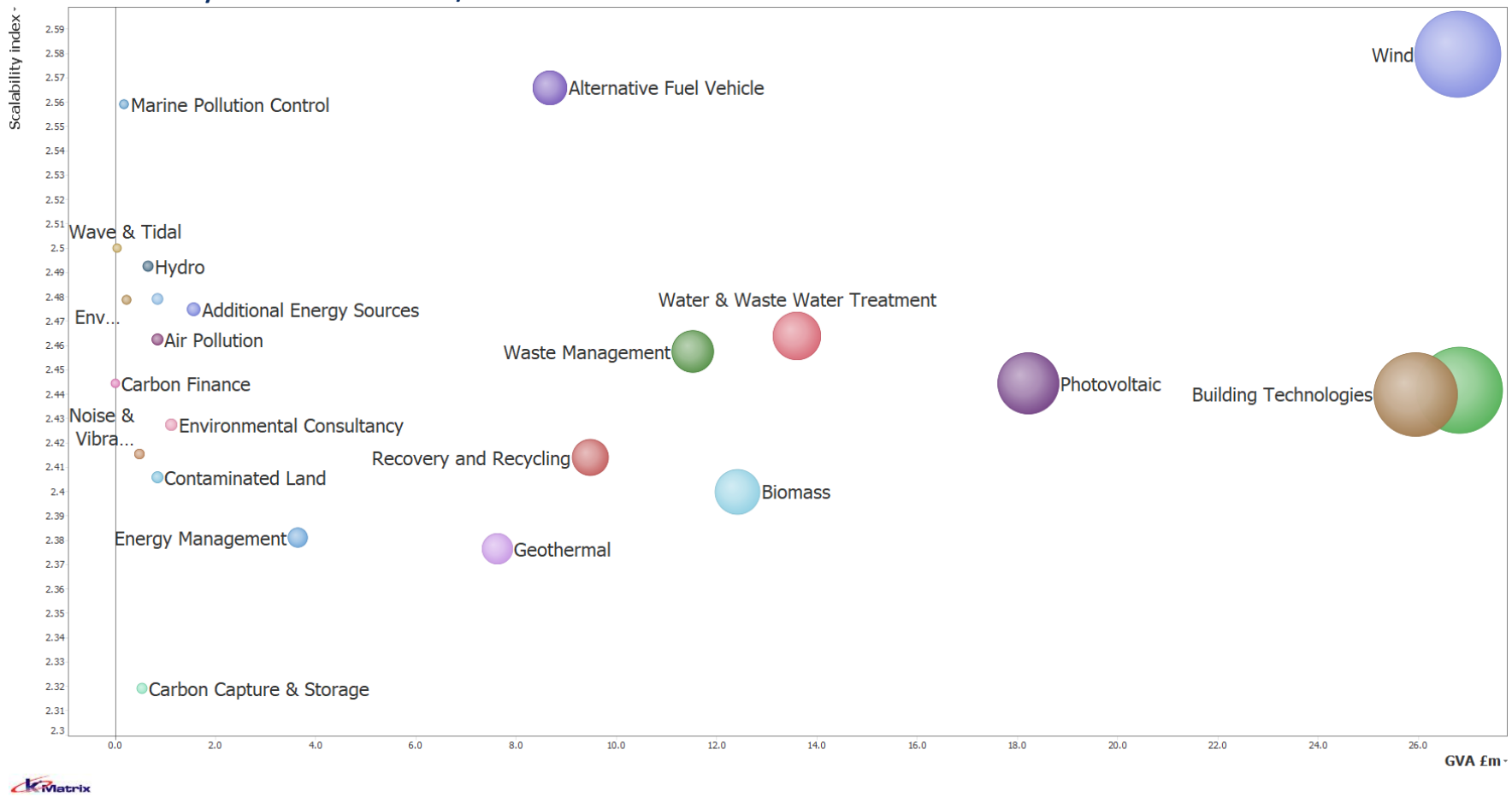
Ashfield – Scalability Index vs. GVA for 2019/20



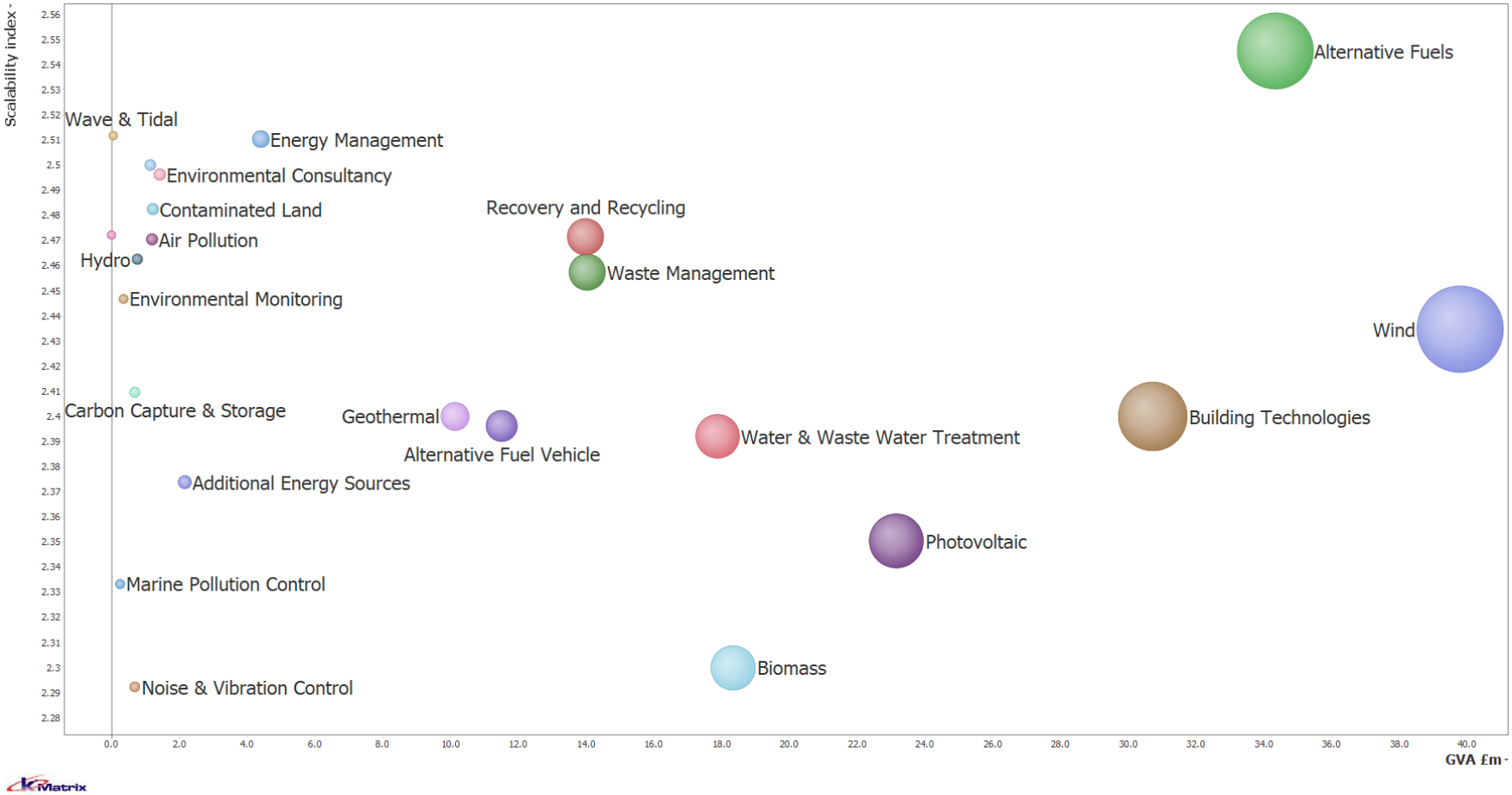
Bassetlaw – Scalability Index vs. GVA for 2019/20



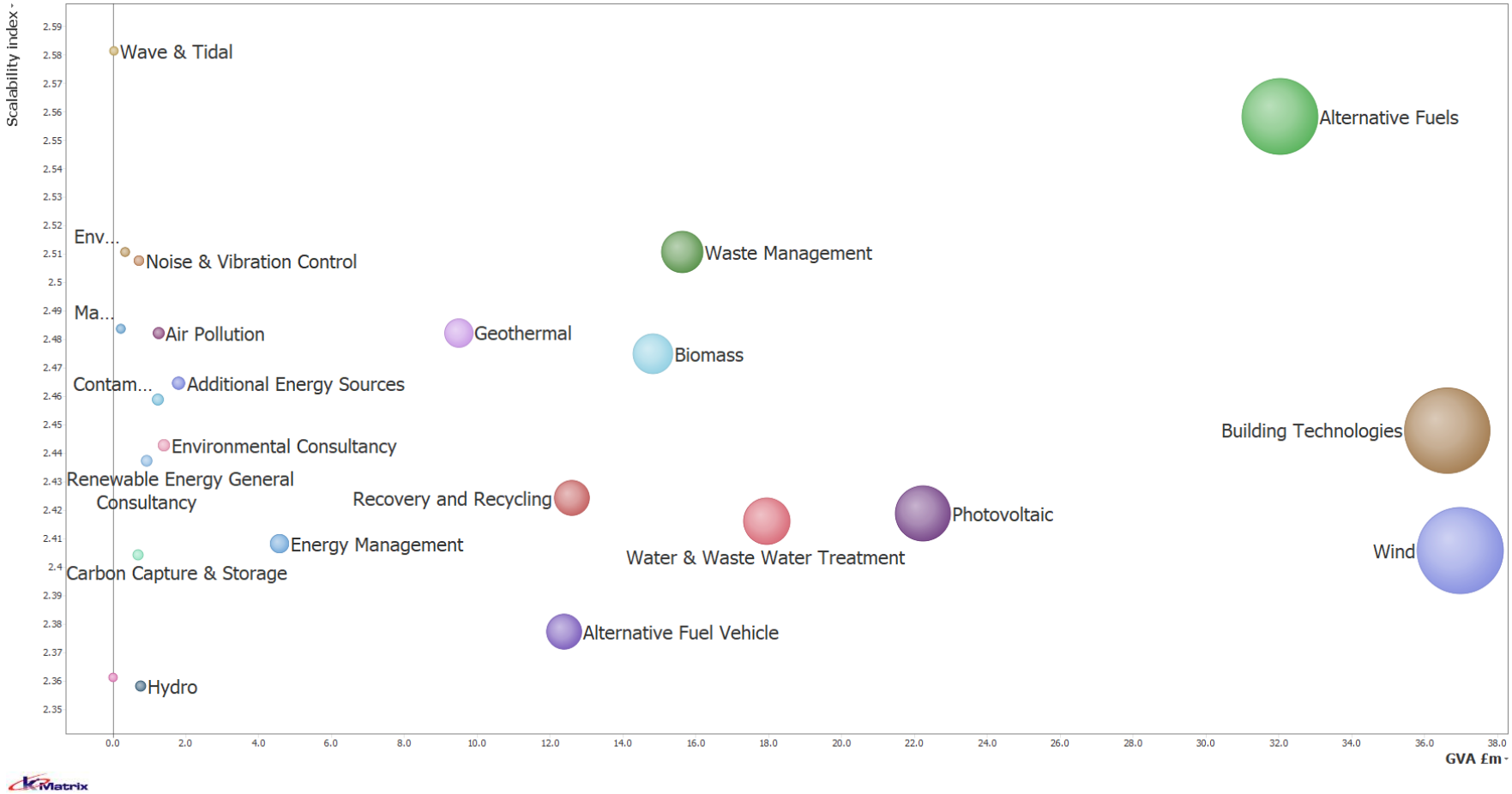
Bolsover – Scalability Index vs. GVA for 2019/20



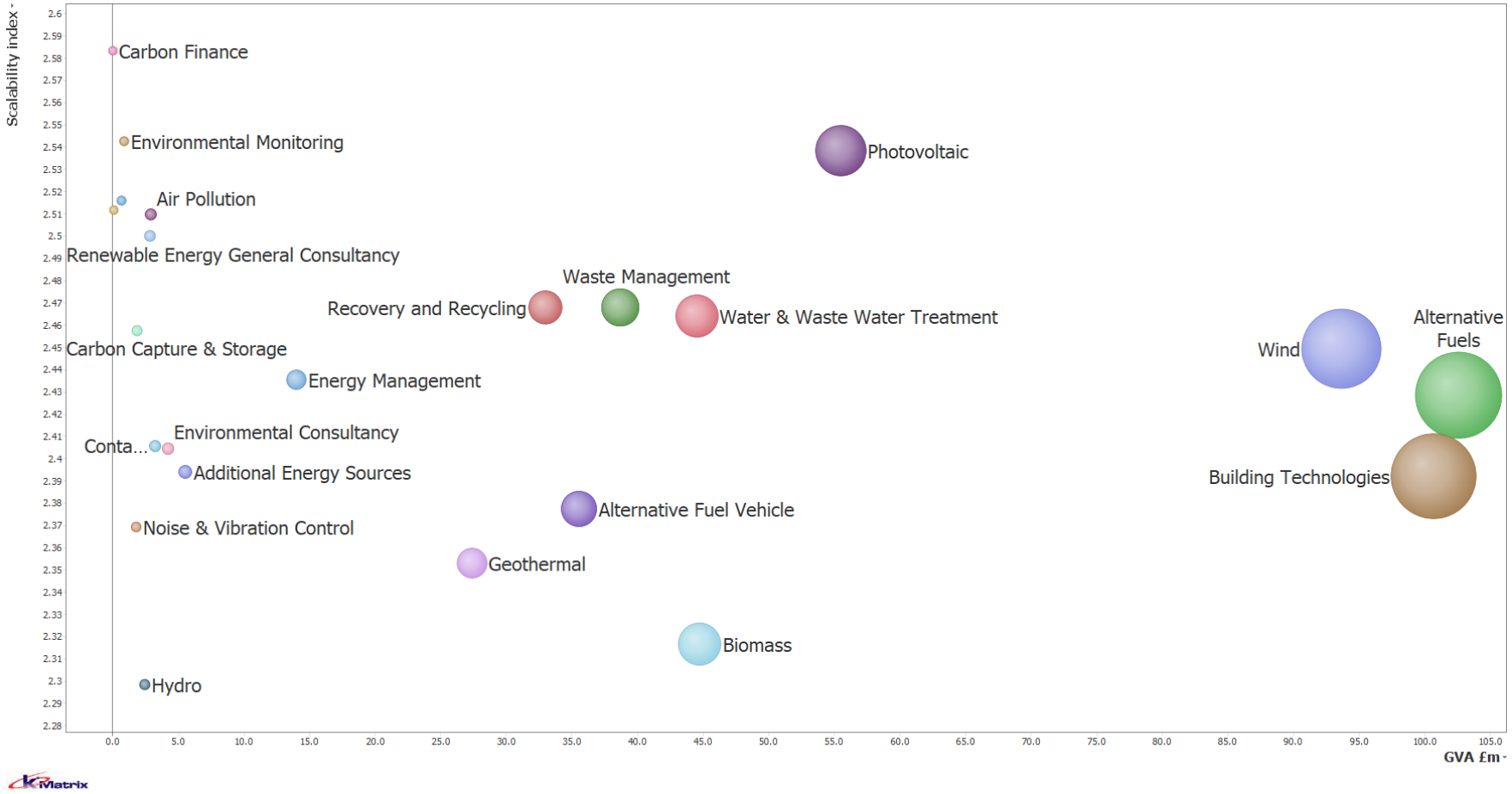
Broxtowe – Scalability Index vs. GVA for 2019/20



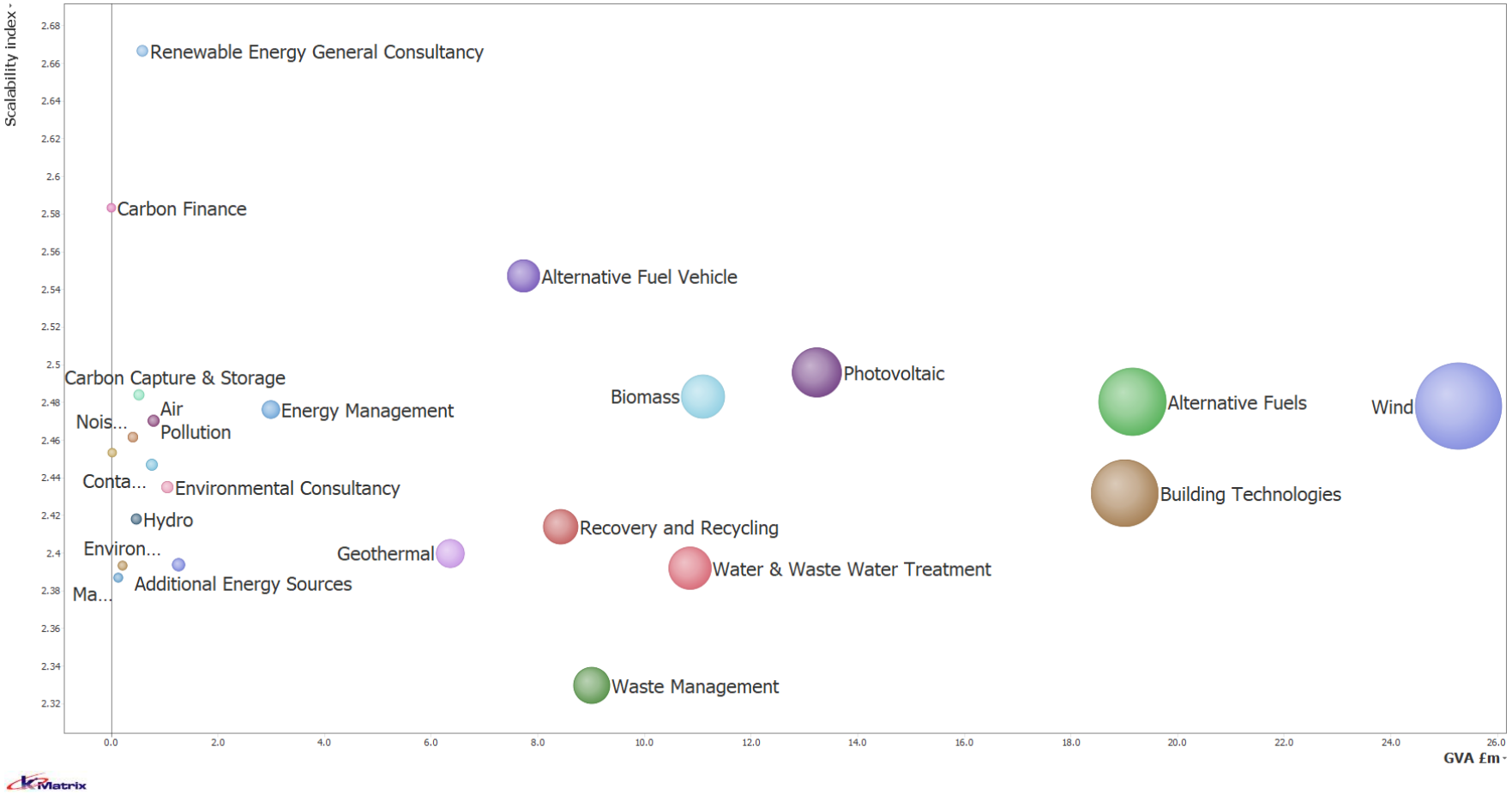
Chesterfield – Scalability Index vs. GVA for 2019/20



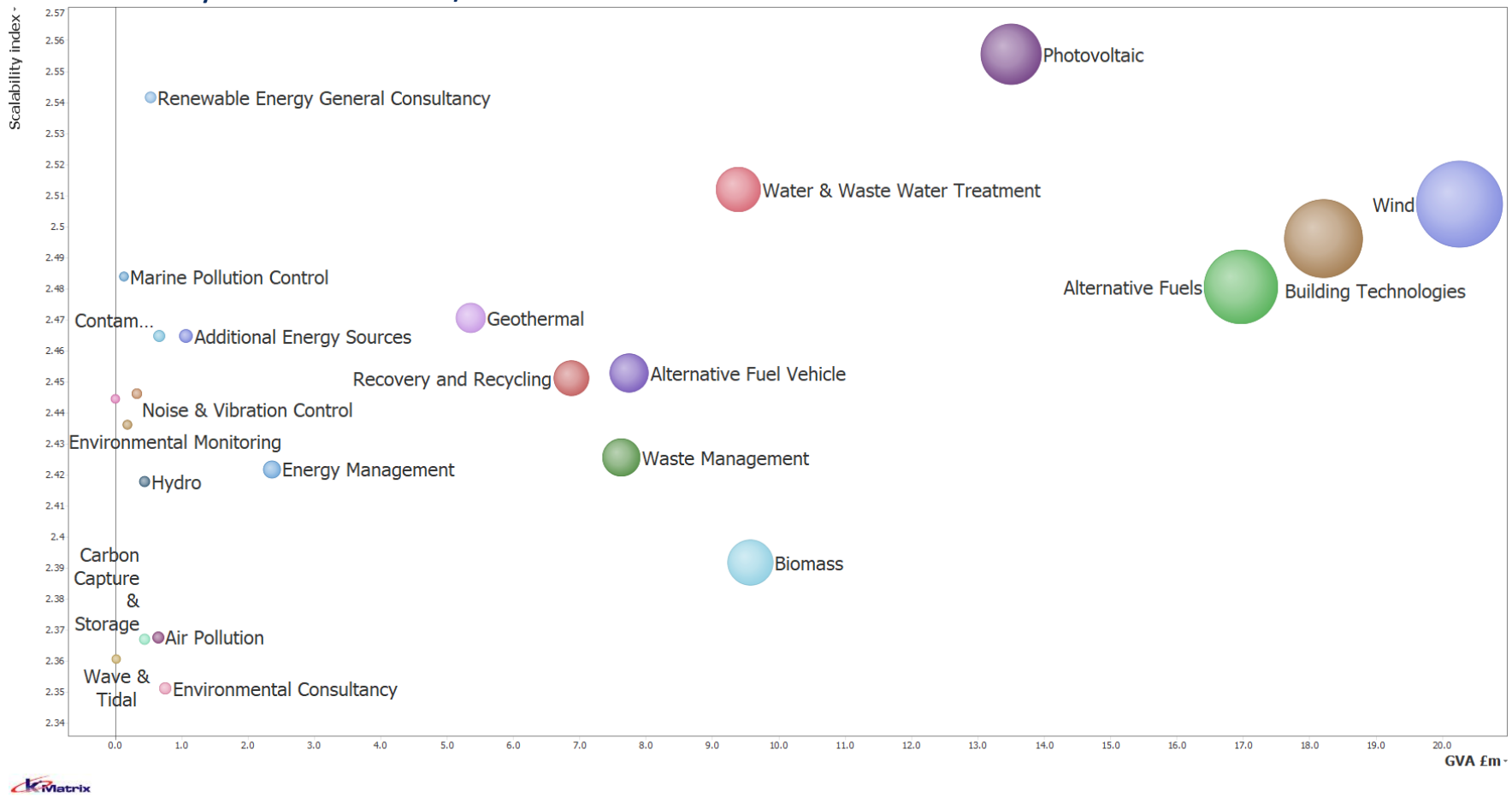
Derby City – Scalability Index vs. GVA for 2019/20



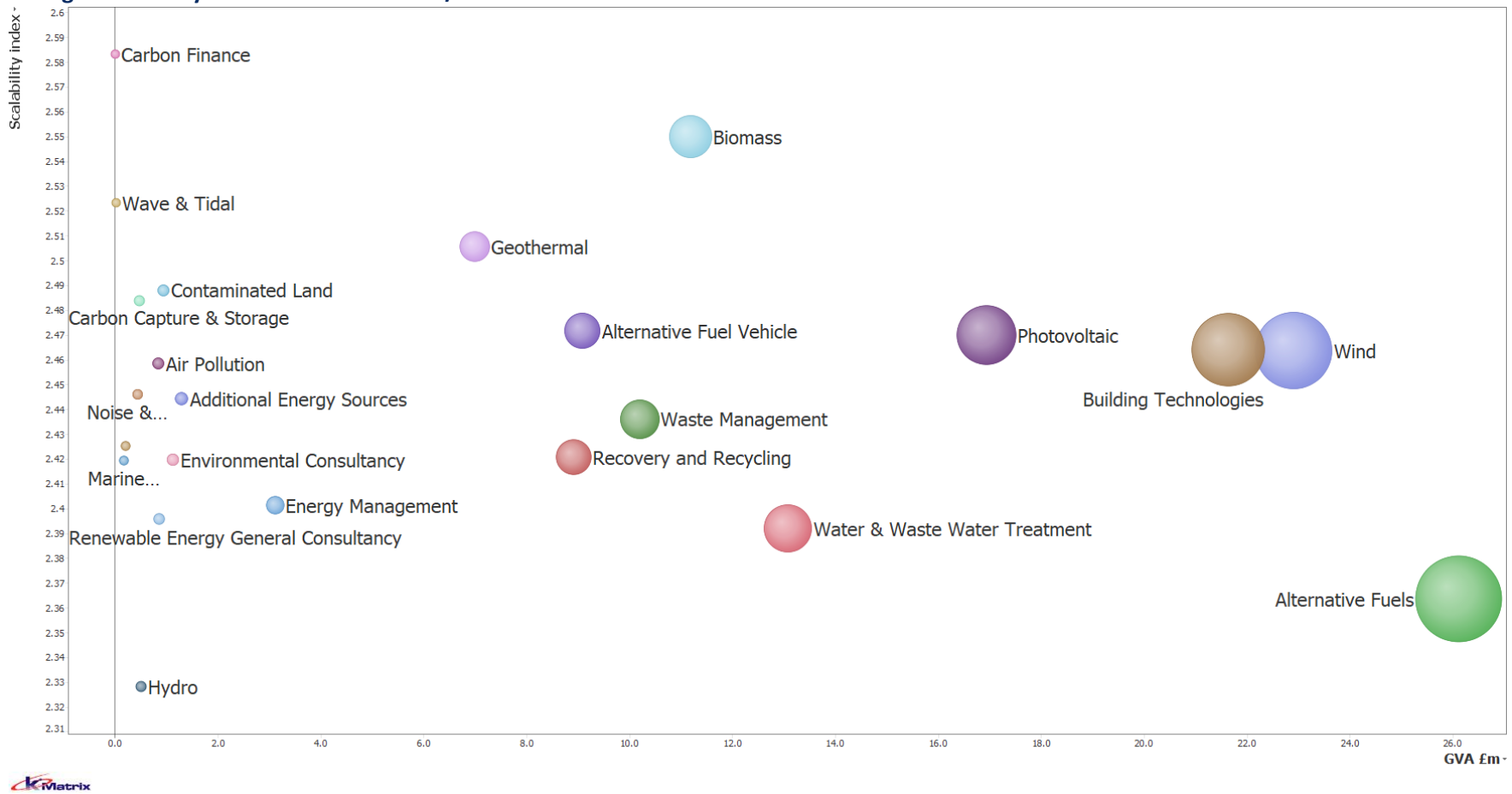
Derbyshire Dales – Scalability Index vs. GVA for 2019/20



Erewash – Scalability Index vs. GVA for 2019/20



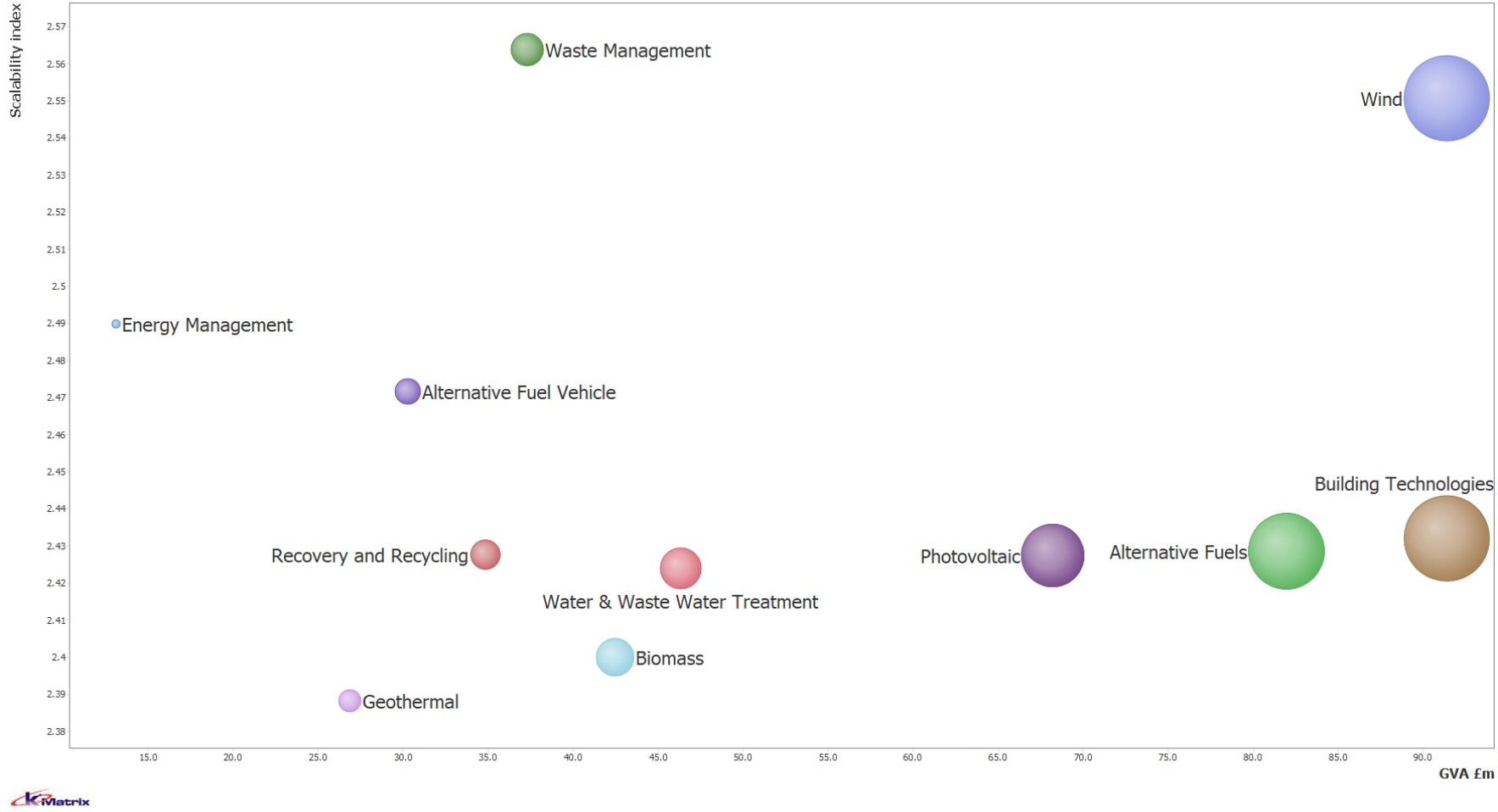
Gedling – Scalability Index vs. GVA for 2019/20



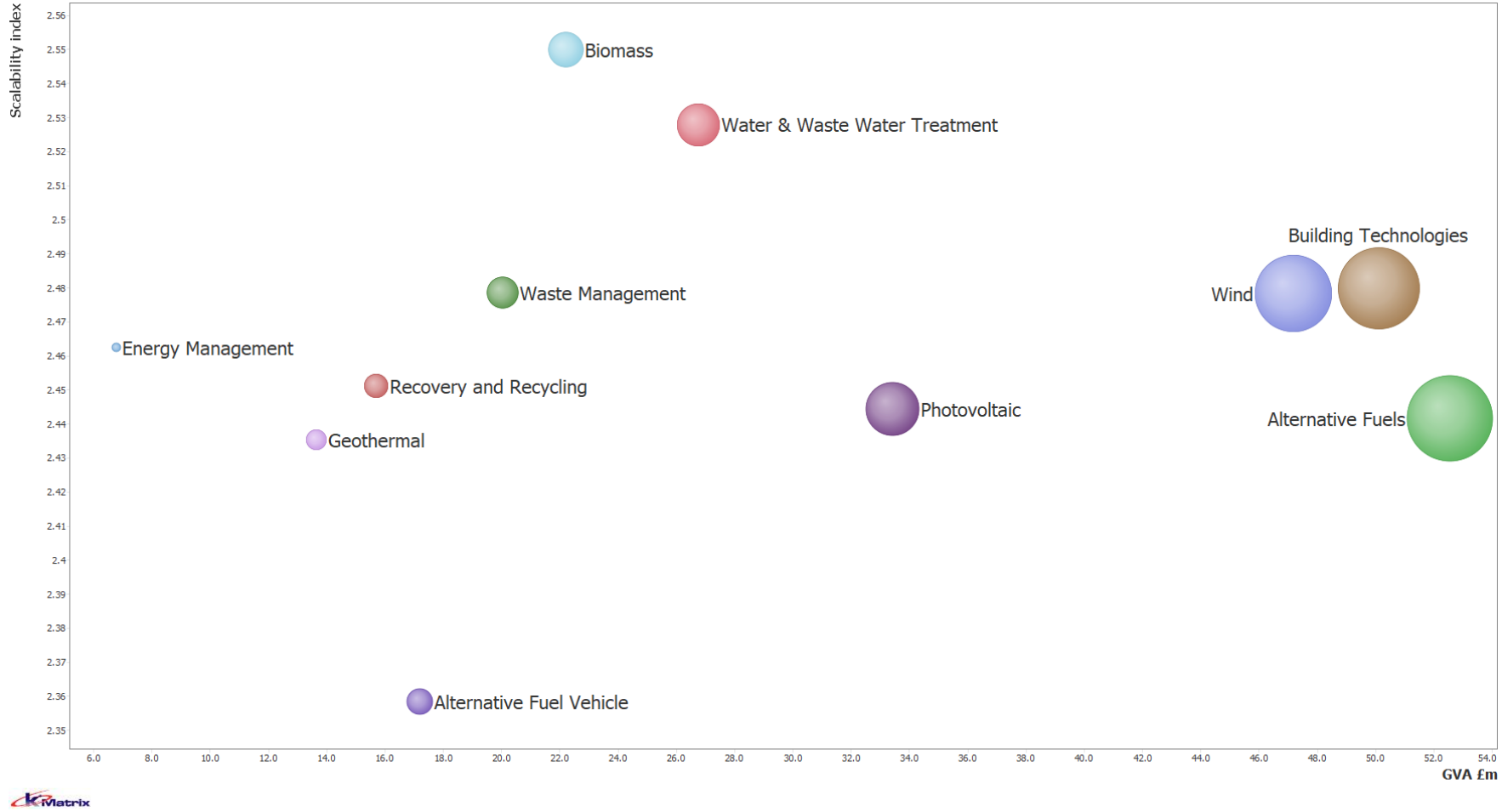
High Peak – Scalability Index vs. GVA for 2019/20

Mansfield – Scalability Index vs. GVA for 2019/20

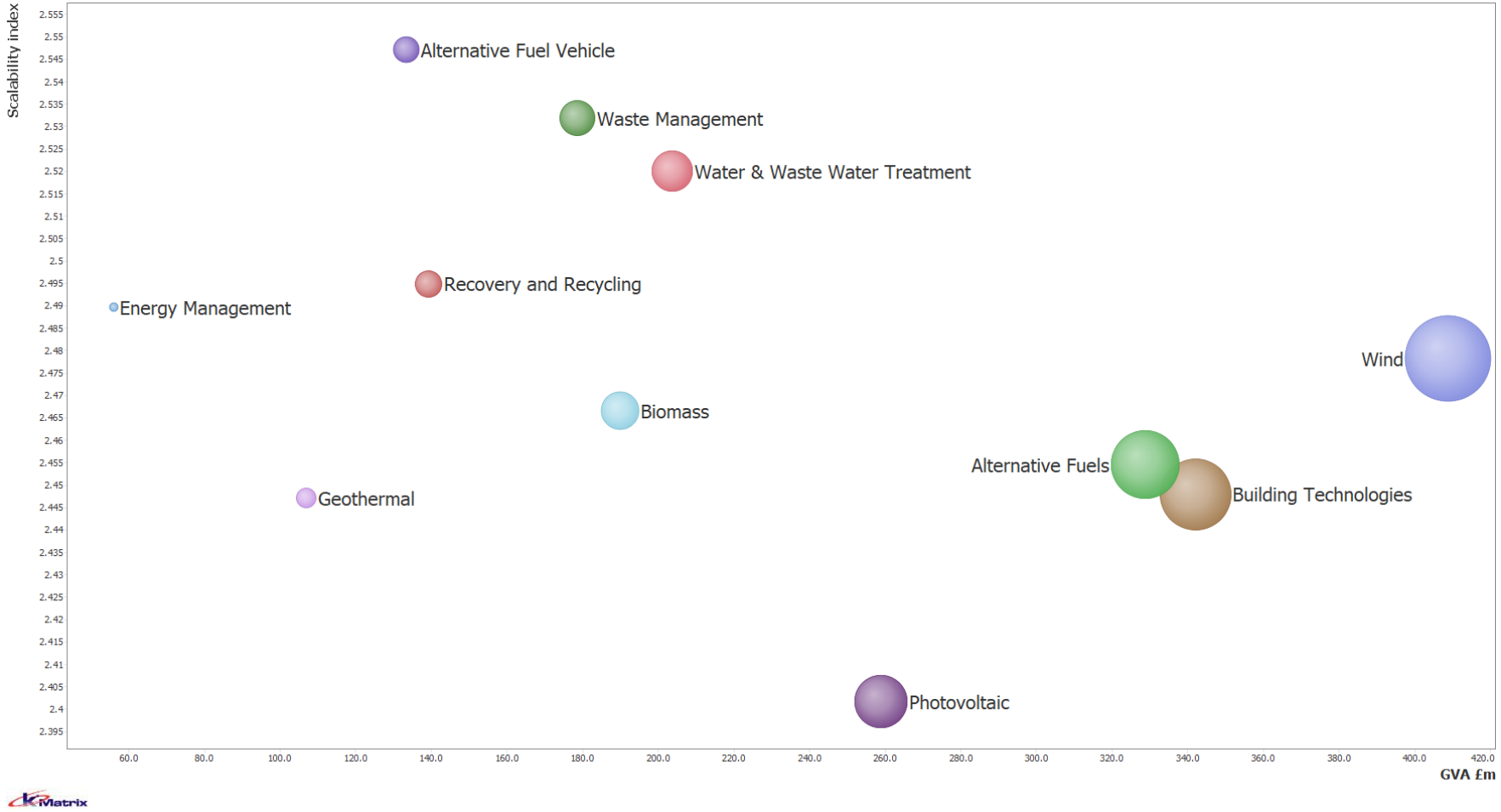
Newark and Sherwood – Scalability Index vs. GVA for 2019/20



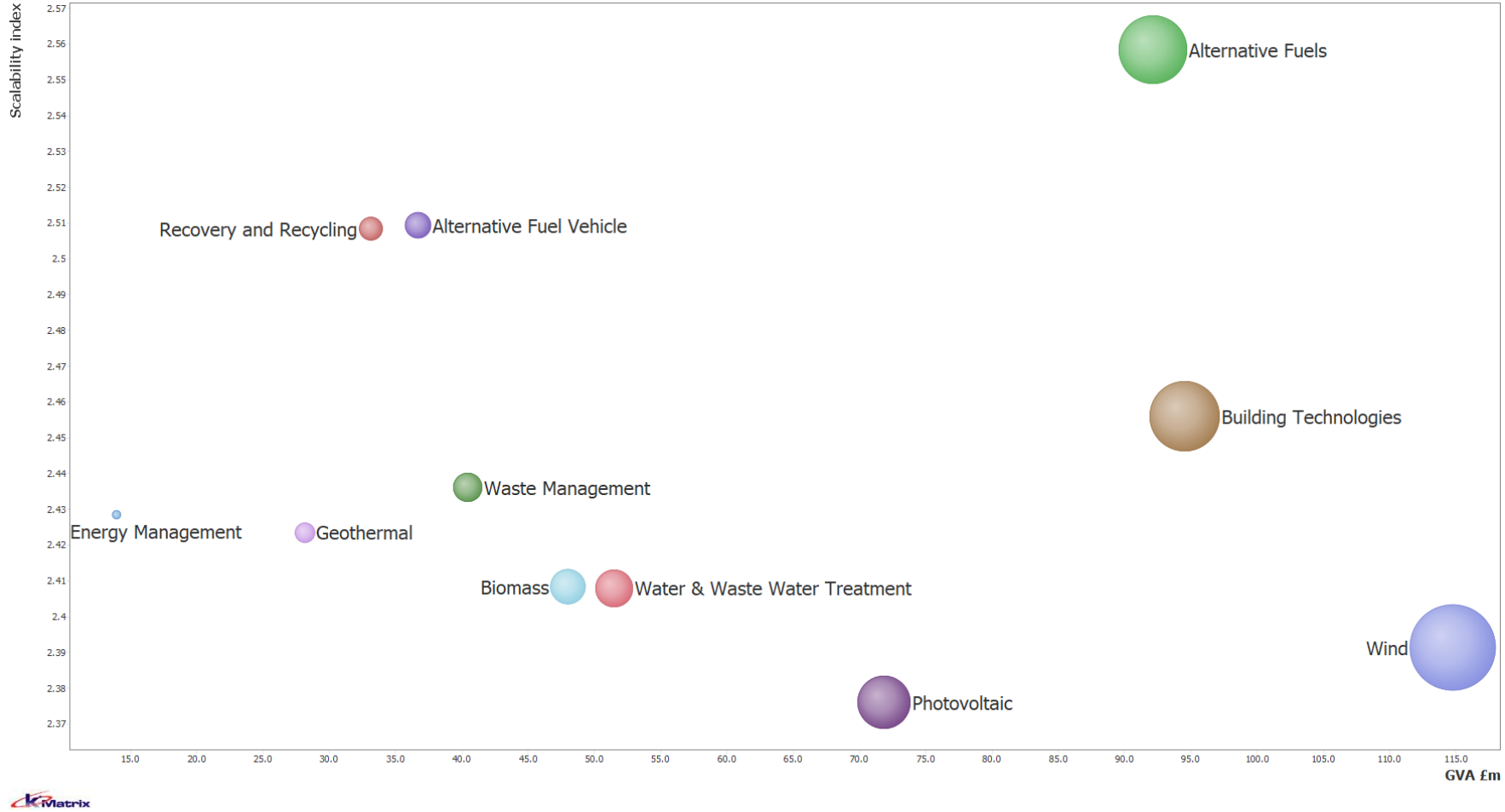
North East Derbyshire – Scalability Index vs. GVA for 2019/20



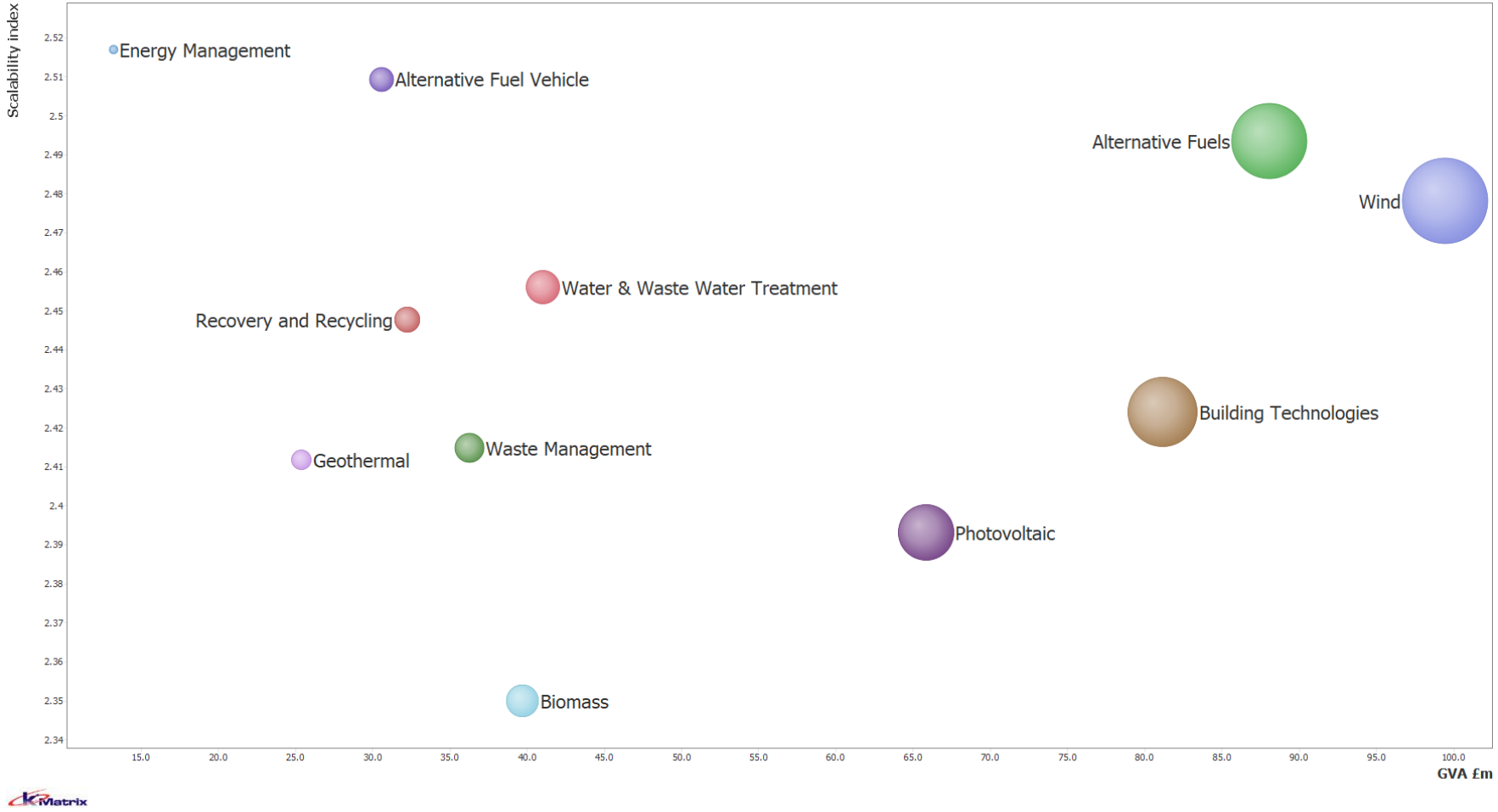
Nottingham City – Scalability Index vs. GVA for 2019/20



Rushcliffe – Scalability Index vs. GVA for 2019/20



South Derbyshire – 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

	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	
SOC	# 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	15	7	46.1%	22	19	-11.5%	26	17.8%	31	40.3%	73	232.7%
Snr Management SME	29	6	21.9%	36	38	7.1%	50	40.5%	59	66.2%	141	296.8%
Supervisory	35	7	21.5%	42	45	7.3%	59	40.5%	70	66.3%	165	290.4%
Middle / Junior Management	34	8	22.8%	42	45	6.2%	59	40.1%	70	64.9%	166	291.1%
Designer / Developer	4	2	46.1%	6	5	-10.5%	7	17.3%	8	37.3%	18	231.2%
Clerical	20	0	0.5%	20	26	29.9%	35	70.8%	41	100.4%	97	376.4%
Self Employed	21	5	22.0%	26	28	6.7%	36	40.8%	43	65.1%	102	295.6%
Advisor or Agent	34	8	23.1%	42	44	5.8%	58	39.9%	68	63.6%	164	294.0%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	3	0	6.2%	4	5	24.1%	6	62.6%	7	92.4%	17	355.3%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	58	7	11.3%	65	76	18.1%	99	52.9%	117	81.9%	282	337.4%
Scientist	6	3	45.9%	9	8	-11.8%	10	17.1%	12	38.2%	29	229.3%
Maintenance Engineer	50	7	13.9%	57	65	14.9%	85	50.4%	100	75.8%	238	318.7%
Civil Engineer	7	3	43.6%	10	9	-9.2%	12	18.5%	14	40.7%	34	239.0%
Production Engineer	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Power distribution Engineer	7	5	69.3%	13	10	-23.1%	13	0.8%	15	19.5%	35	181.8%
Construction Engineer	7	2	34.3%	10	10	-1.5%	12	26.6%	15	50.5%	35	257.9%
Sales Exec	38	9	23.6%	47	50	6.2%	65	38.5%	76	62.4%	184	291.3%
Marketing Personnel	39	9	23.0%	47	51	7.1%	66	39.7%	77	62.1%	185	291.5%
General Semi Skilled Worker	33	2	4.7%	35	43	24.6%	57	64.5%	66	91.6%	159	357.9%
General Labour	53	0	0.0%	53	70	31.2%	91	71.9%	108	103.6%	255	379.4%
Other Employees	39	4	10.9%	43	50	17.1%	67	55.2%	79	82.6%	187	334.7%
Administrative workers	29	1	4.6%	31	39	25.4%	50	64.0%	59	93.1%	141	358.5%
Total	**562**	**95**	**16.9%**	**658**	**735**	**11.8%**	**964**	**46.7%**	**1,135**	**72.6%**	**2,707**	**311.7%**

Alternative Fuels

	Alternative Fuels				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	111	38	34.4%	150	144	-3.5%	189	26.5%	224	49.6%	529	253.5%
Snr Management SME	109	20	18.5%	129	143	10.9%	188	45.8%	221	71.5%	521	303.9%
Supervisory	127	24	19.1%	151	165	9.3%	216	43.2%	256	70.0%	609	304.2%
Middle / Junior Management	122	22	18.3%	145	160	10.3%	208	43.9%	251	73.4%	590	307.7%
Designer / Developer	22	8	37.1%	30	28	-5.3%	37	25.2%	44	49.1%	104	252.9%
Clerical	60	0	0.4%	60	79	30.9%	103	71.2%	122	103.2%	288	379.0%
Self Employed	34	6	18.4%	40	44	9.9%	60	47.4%	69	70.4%	165	309.2%
Advisor or Agent	3	0	18.7%	3	3	8.4%	5	45.0%	5	69.0%	13	308.0%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	88	4	5.0%	93	113	22.4%	151	62.8%	180	94.3%	433	367.4%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	44	4	9.4%	48	58	19.5%	76	57.0%	91	87.9%	216	347.7%
Scientist	84	27	32.5%	111	110	-0.7%	147	31.9%	169	52.5%	406	265.2%
Maintenance Engineer	160	17	10.9%	177	209	17.9%	273	54.1%	325	83.5%	775	337.1%
Civil Engineer	1	0	35.7%	1	1	-2.4%	1	26.1%	1	46.9%	3	256.9%
Production Engineer	80	43	53.8%	123	104	-15.6%	137	10.9%	161	30.3%	401	225.3%
Power distribution Engineer	28	14	50.8%	43	38	-12.1%	49	13.6%	57	33.0%	136	216.2%
Construction Engineer	1	0	26.0%	1	1	3.1%	1	36.3%	1	61.5%	3	280.2%
Sales Exec	120	22	18.6%	142	155	9.2%	205	44.2%	242	70.5%	573	303.8%
Marketing Personnel	120	21	17.6%	141	157	11.1%	208	47.7%	242	72.2%	575	308.5%
General Semi Skilled Worker	157	6	3.5%	162	204	26.0%	272	67.7%	317	95.6%	757	367.3%
General Labour	211	0	0.0%	211	274	30.1%	361	71.1%	427	102.5%	1,017	382.5%
Other Employees	139	13	9.3%	151	181	19.8%	238	57.5%	282	86.3%	670	342.5%
Administrative workers	84	3	3.6%	87	109	25.3%	145	66.2%	170	94.7%	406	365.8%
Total	**1,903**	**296**	**15.5%**	**2,198**	**2,481**	**12.8%**	**3,268**	**48.6%**	**3,858**	**75.5%**	**9,191**	**318.1%**

Biomass

	Biomass				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	63	15	23.2%	78	83	6.3%	107	38.2%	128	64.1%	307	294.3%
Snr Management SME	290	34	11.7%	324	383	18.2%	499	54.0%	584	80.1%	1,405	333.6%
Supervisory	271	33	12.2%	304	355	16.8%	469	54.1%	543	78.6%	1,311	331.4%
Middle / Junior Management	264	30	11.4%	294	347	18.2%	457	55.5%	537	82.7%	1,265	330.6%
Designer / Developer	32	7	22.9%	39	42	6.8%	55	41.0%	65	65.3%	152	289.0%
Clerical	129	0	0.2%	130	168	29.8%	221	70.3%	260	100.4%	620	378.1%
Self Employed	14	2	12.3%	16	18	16.3%	24	53.7%	28	78.6%	67	330.0%
Advisor or Agent	4	0	11.2%	4	5	17.7%	7	55.4%	8	81.4%	19	333.7%
Educator	0	0	11.6%	0	0	21.3%	0	52.5%	0	83.6%	0	326.1%
Specialist or Consultant	140	5	3.5%	145	182	25.2%	241	66.1%	287	97.3%	677	366.0%
Editor	4	0	2.3%	4	5	27.2%	7	66.9%	8	97.5%	19	373.4%
Industrial Researchers	6	0	5.8%	6	7	24.1%	10	63.3%	11	90.0%	27	354.2%
Scientist	9	2	23.2%	11	12	6.5%	15	38.9%	18	63.7%	41	282.0%
Maintenance Engineer	274	20	7.3%	294	361	22.7%	470	59.8%	559	90.2%	1,317	347.7%
Civil Engineer	4	1	22.4%	5	5	6.4%	7	40.9%	8	64.9%	20	293.7%
Production Engineer	40	14	35.2%	54	52	-3.1%	68	27.8%	81	50.6%	190	255.1%
Power distribution Engineer	132	48	36.7%	180	174	-3.6%	229	26.9%	269	49.4%	634	251.9%
Construction Engineer	4	1	17.3%	4	5	11.5%	7	46.5%	8	72.0%	18	308.8%
Sales Exec	125	15	11.8%	140	164	17.1%	214	53.1%	252	80.2%	604	331.9%
Marketing Personnel	124	14	11.5%	138	162	17.1%	212	53.7%	249	80.6%	587	325.0%
General Semi Skilled Worker	255	6	2.3%	261	334	28.0%	432	65.7%	519	99.1%	1,226	370.2%
General Labour	271	0	0.0%	271	349	28.7%	463	70.9%	553	104.2%	1,295	378.1%
Other Employees	352	20	5.7%	372	462	24.3%	605	62.6%	716	92.5%	1,702	357.8%
Administrative workers	141	3	2.5%	145	184	26.8%	245	69.3%	288	99.3%	675	366.6%
Total	**2,947**	**271**	**9.2%**	**3,218**	**3,858**	**19.9%**	**5,064**	**57.3%**	**5,978**	**85.8%**	**14,181**	**340.6%**

Building Technologies

	Building Technologies				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	117	16	13.5%	132	153	15.3%	200	51.1%	233	76.3%	560	323.0%
Snr Management SME	327	22	6.8%	349	427	22.3%	558	59.7%	660	89.0%	1,576	351.5%
Supervisory	307	21	6.8%	328	399	21.7%	528	61.2%	623	90.2%	1,463	346.5%
Middle / Junior Management	298	21	7.2%	319	388	21.7%	511	60.1%	597	87.1%	1,433	349.1%
Designer / Developer	36	5	13.6%	41	48	15.2%	63	51.2%	73	76.9%	175	323.0%
Clerical	151	0	0.1%	152	198	30.7%	261	72.1%	308	103.1%	714	370.9%
Self Employed	35	2	6.5%	38	46	23.0%	61	61.3%	71	89.7%	170	352.6%
Advisor or Agent	39	3	7.0%	42	50	20.8%	67	60.8%	79	88.9%	187	348.7%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	150	3	2.0%	153	196	27.9%	257	67.4%	304	98.6%	718	368.7%
Editor	1	0	1.3%	1	2	29.4%	2	68.7%	3	98.2%	6	378.0%
Industrial Researchers	77	3	3.4%	80	100	26.0%	132	65.8%	156	95.3%	370	364.4%
Scientist	11	2	13.8%	12	14	15.1%	19	50.0%	22	77.6%	52	321.4%
Maintenance Engineer	317	13	4.0%	330	410	24.3%	547	65.8%	644	95.3%	1,529	363.8%
Civil Engineer	18	2	13.8%	20	23	15.0%	31	50.3%	36	76.6%	87	325.8%
Production Engineer	37	8	20.5%	45	49	9.0%	64	41.9%	75	66.7%	182	302.3%
Power distribution Engineer	160	31	19.5%	191	207	8.1%	273	42.9%	326	70.4%	772	303.8%
Construction Engineer	29	3	10.3%	32	38	18.4%	50	55.7%	58	82.2%	140	338.2%
Sales Exec	137	9	6.8%	147	179	22.1%	235	60.2%	279	90.0%	660	349.4%
Marketing Personnel	136	9	6.6%	145	179	23.4%	236	62.0%	275	89.0%	657	352.0%
General Semi Skilled Worker	305	4	1.4%	310	400	29.2%	524	69.3%	618	99.6%	1,471	375.1%
General Labour	562	0	0.0%	562	735	30.8%	963	71.3%	1,140	102.7%	2,713	382.5%
Other Employees	395	13	3.4%	409	517	26.6%	679	66.0%	805	96.9%	1,908	366.8%
Administrative workers	182	3	1.4%	185	240	29.7%	313	69.3%	365	97.4%	876	374.2%
Total	**3,830**	**193**	**5.0%**	**4,023**	**4,999**	**24.3%**	**6,571**	**63.3%**	**7,750**	**92.6%**	**18,420**	**357.8%**

Energy Management

	Energy Management				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	20	9	44.9%	29	26	-9.6%	34	18.2%	40	38.5%	96	231.7%
Snr Management SME	42	9	21.4%	50	54	7.4%	71	41.3%	85	68.1%	199	295.0%
Supervisory	42	9	21.1%	51	55	8.1%	72	41.3%	85	66.9%	205	299.9%
Middle / Junior Management	41	9	21.8%	50	53	7.2%	70	40.6%	82	65.6%	194	290.6%
Designer / Developer	11	5	44.2%	16	14	-9.3%	19	19.4%	22	39.9%	52	235.2%
Clerical	21	0	0.5%	21	27	29.7%	35	70.7%	42	102.6%	99	377.0%
Self Employed	10	2	22.5%	12	13	6.9%	17	40.6%	20	64.4%	48	289.7%
Advisor or Agent	8	2	22.5%	10	11	6.9%	14	41.3%	17	65.7%	40	294.1%
Educator	0	0	22.1%	0	0	8.6%	0	38.8%	1	63.5%	1	293.0%
Specialist or Consultant	22	2	6.8%	24	29	23.1%	37	58.9%	45	89.6%	106	352.4%
Editor	4	0	4.5%	4	5	24.1%	6	61.3%	8	96.1%	18	355.3%
Industrial Researchers	8	1	11.6%	9	10	17.4%	14	53.7%	16	80.8%	38	330.4%
Scientist	4	2	44.3%	6	6	-9.4%	8	19.2%	9	41.7%	21	236.1%
Maintenance Engineer	52	7	13.5%	59	68	14.6%	90	51.6%	106	79.0%	251	324.3%
Civil Engineer	7	3	45.7%	11	10	-9.6%	13	17.7%	15	39.3%	35	230.2%
Production Engineer	9	6	66.8%	15	12	-22.0%	15	2.8%	18	21.9%	43	187.6%
Power distribution Engineer	24	17	68.2%	41	32	-22.5%	42	1.9%	49	20.4%	115	182.7%
Construction Engineer	8	3	34.5%	11	11	-2.6%	14	27.3%	16	50.5%	39	258.7%
Sales Exec	23	5	23.1%	29	30	5.4%	40	40.6%	47	64.5%	113	291.2%
Marketing Personnel	22	5	21.8%	27	29	8.2%	38	40.5%	45	66.5%	106	296.2%
General Semi Skilled Worker	45	2	4.5%	47	59	25.4%	79	66.1%	93	95.7%	217	359.1%
General Labour	70	0	0.0%	70	91	30.8%	119	71.2%	141	102.0%	334	380.1%
Other Employees	57	6	11.2%	63	74	17.4%	98	54.7%	115	82.0%	273	332.3%
Administrative workers	26	1	4.4%	27	34	24.6%	45	64.5%	53	92.4%	127	363.9%
Total	**577**	**105**	**18.2%**	**681**	**753**	**10.6%**	**990**	**45.3%**	**1,168**	**71.5%**	**2,771**	**306.7%**

Geothermal

	Geothermal				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	31	14	45.2%	45	41	-9.8%	53	17.5%	63	39.2%	151	231.0%
Snr Management SME	137	32	23.2%	168	179	6.5%	233	38.3%	275	63.5%	656	289.4%
Supervisory	128	29	22.4%	156	167	7.0%	219	40.2%	257	64.7%	611	291.0%
Middle / Junior Management	124	28	22.3%	151	162	7.4%	211	39.9%	249	65.0%	595	293.9%
Designer / Developer	15	7	44.8%	21	19	-9.6%	25	18.1%	30	39.9%	70	230.1%
Clerical	62	0	0.5%	62	80	29.7%	106	71.1%	124	100.1%	296	377.1%
Self Employed	7	2	23.1%	9	10	6.8%	13	39.4%	15	63.6%	36	289.2%
Advisor or Agent	6	1	22.8%	8	8	7.8%	11	39.7%	13	64.4%	31	293.6%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	62	4	6.7%	66	81	22.7%	106	61.0%	126	90.4%	297	349.2%
Editor	3	0	4.3%	4	4	25.9%	6	63.6%	7	92.4%	16	362.9%
Industrial Researchers	5	1	11.1%	5	6	17.4%	8	55.3%	10	82.5%	23	329.7%
Scientist	4	2	44.9%	6	5	-8.9%	7	18.2%	8	39.9%	18	229.5%
Maintenance Engineer	136	18	13.2%	154	177	15.2%	233	51.5%	274	77.9%	661	329.1%
Civil Engineer	6	3	45.2%	9	8	-9.8%	11	17.6%	13	38.2%	30	231.8%
Production Engineer	21	15	69.9%	36	27	-23.5%	36	0.8%	43	18.8%	102	185.0%
Power distribution Engineer	65	43	66.6%	108	85	-21.6%	112	3.4%	132	21.4%	312	187.6%
Construction Engineer	5	2	34.8%	7	7	-2.7%	9	27.4%	11	49.7%	25	255.5%
Sales Exec	64	14	21.9%	78	83	7.2%	110	41.9%	129	66.2%	307	295.4%
Marketing Personnel	62	14	22.6%	76	82	7.1%	106	39.2%	125	64.3%	296	289.2%
General Semi Skilled Worker	126	6	4.5%	131	164	25.0%	216	64.3%	255	94.1%	602	358.7%
General Labour	187	0	0.0%	187	245	30.9%	323	72.5%	379	102.2%	913	387.2%
Other Employees	167	19	11.6%	187	219	17.0%	285	52.4%	339	81.5%	808	332.6%
Administrative workers	69	3	4.4%	72	90	24.9%	119	65.1%	139	93.9%	328	357.1%
Total	**1,492**	**255**	**17.1%**	**1,747**	**1,952**	**11.7%**	**2,558**	**46.4%**	**3,015**	**72.5%**	**7,184**	**311.1%**

Photovoltaic

	Photovoltaic				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	103	9	8.8%	112	135	20.9%	176	57.7%	205	83.7%	495	343.6%
Snr Management SME	341	15	4.4%	356	448	25.8%	585	64.4%	688	93.3%	1,641	360.7%
Supervisory	323	14	4.3%	337	421	24.9%	558	65.8%	657	95.0%	1,544	358.4%
Middle / Junior Management	311	14	4.6%	325	404	24.3%	538	65.6%	630	93.8%	1,506	363.3%
Designer / Developer	24	2	8.8%	26	31	20.5%	40	56.8%	48	86.5%	112	337.2%
Clerical	153	0	0.1%	154	199	29.3%	260	69.1%	311	102.3%	739	380.9%
Self Employed	17	1	4.3%	18	23	25.0%	30	64.7%	35	94.3%	83	361.7%
Advisor or Agent	2	0	4.7%	2	3	25.0%	4	62.6%	4	91.7%	10	357.7%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	141	2	1.4%	142	186	30.6%	242	70.1%	285	100.2%	671	370.8%
Editor	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Industrial Researchers	11	0	2.3%	12	15	27.9%	20	67.5%	23	96.4%	55	371.8%
Scientist	0	0	9.9%	0	0	18.4%	1	57.0%	1	81.6%	2	338.0%
Maintenance Engineer	333	9	2.6%	341	430	26.0%	572	67.4%	675	97.6%	1,606	370.4%
Civil Engineer	8	1	8.8%	9	11	20.1%	14	58.7%	16	85.0%	40	343.6%
Production Engineer	42	6	13.5%	47	55	15.9%	71	50.8%	85	79.3%	202	325.8%
Power distribution Engineer	162	22	13.8%	184	212	15.1%	277	50.0%	328	78.1%	782	324.1%
Construction Engineer	17	1	6.4%	18	22	21.7%	29	63.0%	34	91.5%	80	351.4%
Sales Exec	148	6	4.3%	155	194	25.3%	254	63.9%	301	94.2%	715	361.8%
Marketing Personnel	147	7	4.5%	154	194	26.2%	253	64.7%	297	93.1%	713	363.3%
General Semi Skilled Worker	320	3	0.9%	323	419	29.8%	549	69.8%	643	98.8%	1,527	372.4%
General Labour	412	0	0.0%	412	540	31.1%	706	71.2%	834	102.3%	1,981	380.3%
Other Employees	415	9	2.2%	424	539	27.1%	710	67.4%	831	95.9%	1,989	369.2%
Administrative workers	172	2	0.9%	174	224	29.1%	297	70.8%	346	99.4%	820	372.2%
Total	**3,602**	**123**	**3.4%**	**3,725**	**4,704**	**26.3%**	**6,184**	**66.0%**	**7,276**	**95.3%**	**17,311**	**364.7%**

Recovery and Recycling

	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	
SOC	# 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	72	26	36.6%	99	94	-4.6%	124	25.7%	146	48.2%	348	253.4%
Snr Management SME	92	17	18.4%	109	119	9.8%	158	44.8%	185	70.0%	445	308.6%
Supervisory	93	17	18.5%	110	120	9.5%	157	43.2%	186	69.7%	447	306.9%
Middle / Junior Management	90	16	18.4%	106	116	9.0%	155	46.0%	182	71.3%	425	301.0%
Designer / Developer	67	25	36.8%	91	87	-4.9%	115	25.7%	135	47.4%	321	251.0%
Clerical	44	0	0.4%	44	57	29.8%	75	70.8%	88	100.7%	210	377.2%
Self Employed	23	4	18.3%	27	30	10.8%	39	44.9%	46	71.4%	108	306.1%
Advisor or Agent	8	1	18.9%	9	10	9.2%	13	44.0%	15	70.9%	36	303.7%
Educator	0	0	17.4%	0	0	12.3%	1	43.6%	1	72.5%	2	308.5%
Specialist or Consultant	71	4	5.4%	74	92	23.2%	121	62.6%	143	92.3%	339	355.0%
Editor	3	0	3.7%	4	5	27.1%	6	67.7%	7	97.6%	17	365.2%
Industrial Researchers	20	2	9.1%	21	26	20.7%	34	57.9%	40	85.9%	95	342.5%
Scientist	18	7	37.4%	25	24	-4.6%	31	24.7%	36	46.0%	86	249.4%
Maintenance Engineer	118	13	11.0%	130	153	17.1%	202	55.1%	237	81.6%	564	332.2%
Civil Engineer	32	12	36.8%	44	42	-4.2%	56	25.3%	66	48.5%	156	252.6%
Production Engineer	39	22	56.3%	61	51	-16.4%	67	9.6%	79	29.5%	187	206.5%
Power distribution Engineer	62	34	54.3%	95	81	-15.4%	105	10.0%	124	29.9%	295	210.1%
Construction Engineer	34	9	27.8%	43	44	2.4%	58	34.5%	69	58.0%	163	276.1%
Sales Exec	72	13	18.3%	85	94	10.8%	123	44.5%	146	71.7%	345	306.2%
Marketing Personnel	58	11	18.3%	68	75	9.9%	99	45.1%	117	71.3%	279	309.5%
General Semi Skilled Worker	144	5	3.5%	149	186	25.1%	248	66.7%	292	95.7%	690	363.3%
General Labour	147	0	0.0%	147	192	30.5%	254	72.3%	297	101.5%	709	381.5%
Other Employees	113	10	9.0%	123	148	20.8%	193	56.9%	229	86.7%	537	337.1%
Administrative workers	65	2	3.7%	68	85	25.9%	111	64.1%	132	94.8%	315	364.8%
Total	**1,483**	**251**	**16.9%**	**1,734**	**1,932**	**11.4%**	**2,543**	**46.7%**	**2,997**	**72.9%**	**7,121**	**310.8%**

Waste Management

	Waste Management				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	60	8	13.4%	68	78	14.9%	102	49.9%	121	78.4%	290	326.3%
Snr Management SME	121	9	7.1%	130	158	21.8%	210	61.6%	248	91.2%	583	348.8%
Supervisory	129	9	6.8%	138	169	22.4%	222	61.4%	260	89.0%	618	348.8%
Middle / Junior Management	125	9	6.9%	134	164	22.8%	215	61.1%	254	89.8%	599	347.8%
Designer / Developer	27	4	13.9%	31	35	14.4%	46	50.1%	54	76.6%	130	323.4%
Clerical	64	0	0.1%	65	85	31.7%	111	71.3%	131	102.8%	311	382.5%
Self Employed	33	2	6.9%	35	43	22.8%	57	60.7%	67	89.1%	158	346.0%
Advisor or Agent	41	3	6.5%	44	54	22.6%	71	61.4%	83	88.5%	200	354.2%
Educator	3	0	6.0%	3	4	23.4%	5	66.2%	5	90.3%	13	355.5%
Specialist or Consultant	61	1	2.0%	63	80	27.9%	105	67.5%	125	98.9%	292	366.0%
Editor	7	0	1.3%	7	9	31.6%	12	71.8%	14	99.7%	32	372.4%
Industrial Researchers	61	2	3.3%	63	80	27.8%	105	66.7%	123	96.3%	294	367.9%
Scientist	12	2	13.8%	13	15	14.1%	20	51.7%	23	77.0%	56	321.2%
Maintenance Engineer	160	7	4.1%	166	210	26.3%	274	65.2%	321	93.2%	770	363.8%
Civil Engineer	23	3	13.7%	26	30	15.0%	39	50.3%	46	78.4%	110	324.1%
Production Engineer	26	5	20.0%	32	34	8.6%	45	42.5%	53	67.4%	127	301.7%
Power distribution Engineer	77	16	20.5%	93	102	9.1%	132	41.6%	156	66.9%	374	300.9%
Construction Engineer	30	3	10.1%	33	39	19.0%	51	55.4%	60	83.1%	144	336.3%
Sales Exec	59	4	6.8%	63	78	22.5%	102	61.3%	119	88.2%	284	348.6%
Marketing Personnel	56	4	6.7%	60	74	22.7%	96	59.8%	113	87.9%	269	347.6%
General Semi Skilled Worker	135	2	1.4%	137	175	28.1%	232	69.5%	271	98.0%	649	373.8%
General Labour	84	0	0.0%	84	110	31.0%	144	70.8%	170	101.9%	405	381.4%
Other Employees	175	6	3.4%	181	229	26.6%	298	64.9%	354	95.9%	841	365.6%
Administrative workers	86	1	1.3%	88	113	29.0%	149	70.4%	174	98.8%	417	376.0%
Total	**1,657**	**98**	**5.9%**	**1,755**	**2,169**	**23.6%**	**2,844**	**62.0%**	**3,347**	**90.7%**	**7,967**	**353.9%**

Water and Waste Water Treatment

	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	
SOC	# 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	92	8	8.9%	100	120	20.2%	157	57.2%	185	86.0%	438	339.8%
Snr Management SME	172	7	4.3%	179	226	26.1%	295	65.0%	347	94.0%	827	361.8%
Supervisory	168	8	4.5%	176	219	24.7%	289	64.3%	339	92.7%	812	361.4%
Middle / Junior Management	161	7	4.4%	168	211	25.3%	276	63.8%	327	94.1%	774	359.6%
Designer / Developer	39	3	9.0%	42	51	19.9%	67	58.4%	78	84.6%	188	344.2%
Clerical	79	0	0.1%	80	104	30.8%	137	72.2%	159	100.4%	380	377.7%
Self Employed	43	2	4.5%	45	56	24.9%	74	65.2%	87	93.4%	208	361.3%
Advisor or Agent	6	0	4.4%	6	7	23.6%	10	63.0%	11	92.8%	27	358.0%
Educator	0	0	4.4%	0	0	21.9%	0	61.7%	0	93.0%	1	366.2%
Specialist or Consultant	87	1	1.3%	89	115	29.7%	150	69.5%	176	99.1%	423	377.4%
Editor	3	0	0.9%	3	4	29.4%	5	70.5%	5	97.5%	13	370.7%
Industrial Researchers	7	0	2.3%	7	9	27.8%	12	66.8%	15	98.2%	34	368.6%
Scientist	3	0	9.1%	3	4	18.4%	5	55.8%	6	84.7%	15	333.8%
Maintenance Engineer	227	6	2.7%	234	299	27.9%	390	67.0%	460	96.9%	1,100	371.1%
Civil Engineer	26	2	8.9%	28	34	20.7%	44	58.3%	52	86.1%	123	340.5%
Production Engineer	47	6	13.0%	54	62	15.0%	81	51.8%	95	78.1%	227	323.7%
Power distribution Engineer	105	14	13.3%	119	137	14.9%	182	52.1%	212	77.5%	511	328.5%
Construction Engineer	37	2	6.6%	40	49	22.1%	64	61.3%	75	88.5%	179	348.2%
Sales Exec	69	3	4.7%	72	90	25.6%	117	62.6%	139	93.3%	331	361.6%
Marketing Personnel	68	3	4.5%	71	89	24.3%	116	62.8%	137	91.9%	328	359.6%
General Semi Skilled Worker	186	2	0.9%	187	243	29.6%	318	69.7%	376	100.7%	894	377.1%
General Labour	95	0	0.0%	95	124	30.4%	162	70.2%	192	101.5%	456	377.9%
Other Employees	223	5	2.3%	228	291	27.6%	383	67.7%	455	99.1%	1,068	367.8%
Administrative workers	103	1	0.9%	104	136	29.9%	176	69.2%	210	101.3%	496	375.3%
Total	**2,048**	**83**	**4.0%**	**2,131**	**2,679**	**25.7%**	**3,512**	**64.8%**	**4,141**	**94.3%**	**9,853**	**362.4%**

Wind

	Wind				Net Zero by 2030				Net Zero by 2050			
	Current Employment				Worst Case Scenario		Best Case Scenario		Worst Case Scenario		Best Case Scenario	
SOC	# 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	153	21	13.6%	174	202	16.0%	263	51.1%	309	77.8%	732	320.6%
Snr Management SME	516	36	7.0%	552	671	21.6%	889	61.0%	1,045	89.3%	2,462	345.8%
Supervisory	499	35	7.0%	534	649	21.5%	864	61.7%	1,014	89.9%	2,424	353.7%
Middle / Junior Management	488	33	6.8%	521	635	21.8%	840	61.2%	972	86.6%	2,339	349.0%
Designer / Developer	24	3	13.7%	28	31	13.2%	42	50.8%	49	76.4%	117	323.0%
Clerical	238	0	0.1%	238	314	32.0%	412	73.3%	478	100.8%	1,143	380.5%
Self Employed	38	3	6.8%	41	50	22.1%	65	60.3%	77	88.0%	183	348.8%
Advisor or Agent	4	0	7.0%	4	5	19.5%	7	59.3%	8	87.3%	19	362.9%
Educator	0	0	0.0%	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Specialist or Consultant	214	5	2.1%	219	281	28.2%	368	68.1%	436	98.9%	1,038	374.0%
Editor	1	0	1.5%	1	1	29.7%	1	68.3%	1	97.0%	3	356.1%
Industrial Researchers	6	0	3.9%	6	7	22.7%	10	64.7%	11	91.6%	27	355.2%
Scientist	1	0	13.4%	1	1	15.7%	2	49.0%	2	78.7%	6	330.1%
Maintenance Engineer	583	24	4.1%	607	767	26.4%	1,007	66.0%	1,182	94.9%	2,765	355.8%
Civil Engineer	18	2	13.4%	21	24	15.5%	31	51.4%	37	77.9%	88	325.8%
Production Engineer	82	17	20.9%	99	108	8.3%	141	41.7%	164	65.5%	396	299.2%
Power distribution Engineer	265	53	20.0%	318	349	9.8%	456	43.2%	542	70.4%	1,278	301.6%
Construction Engineer	54	5	9.9%	60	71	19.9%	93	55.4%	109	82.5%	261	337.8%
Sales Exec	214	14	6.7%	229	283	23.8%	367	60.7%	435	90.1%	1,047	358.0%
Marketing Personnel	215	14	6.6%	230	282	22.7%	371	61.5%	436	89.8%	1,038	352.1%
General Semi Skilled Worker	492	7	1.3%	498	633	27.1%	854	71.3%	998	100.4%	2,342	370.1%
General Labour	585	0	0.0%	585	766	30.9%	1,002	71.2%	1,174	100.6%	2,814	381.1%
Other Employees	692	23	3.3%	715	893	24.9%	1,177	64.7%	1,397	95.5%	3,336	366.8%
Administrative workers	279	4	1.4%	282	363	28.7%	480	70.0%	565	100.0%	1,353	379.1%
Total	**5,661**	**300**	**5.3%**	**5,961**	**7,386**	**23.9%**	**9,740**	**63.4%**	**11,440**	**91.9%**	**27,210**	**356.4%**