REGENERIS

Sector Needs Assessment - Environmental Technologies

A Final Report by Regeneris Consulting

28 July 2017

The Marches LEP

Sector Needs Assessment - Environmental Technologies

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1. Introduction

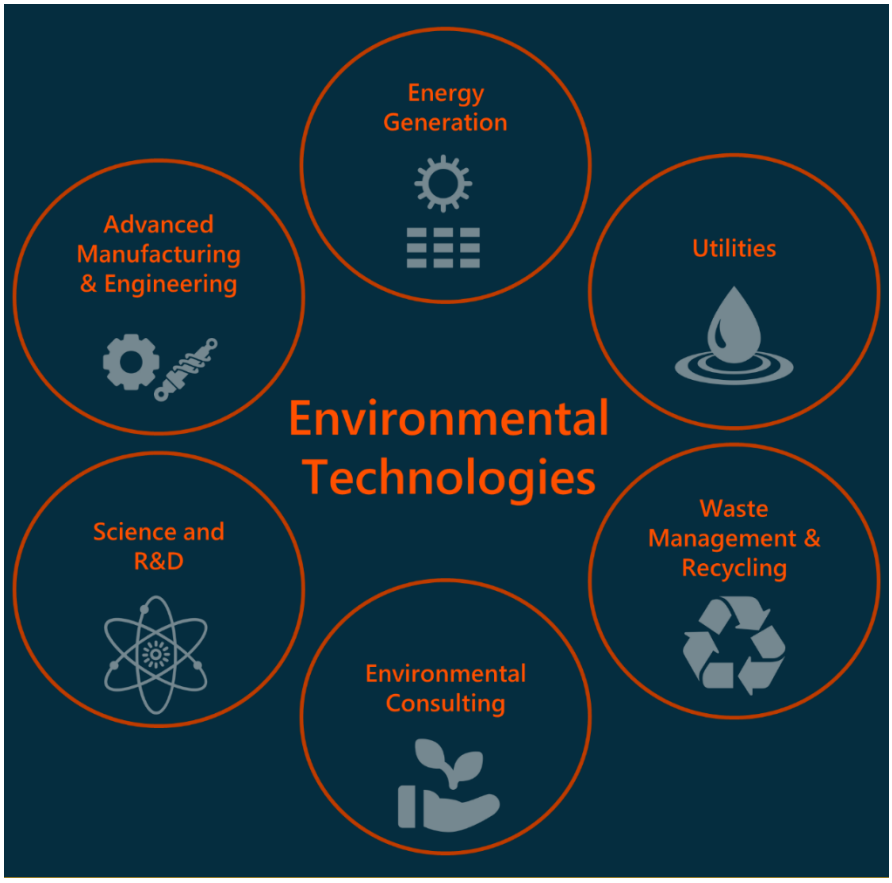
1.1 This report focuses on the Environmental Technologies (envirotech) sector in the Marches. The sector is one of Marches LEP's aspirational sectors, where the Marches has potential for growth.

1.2 Environmental technologies builds on the presence of natural assets, agricultural and manufacturing heritage in the Marches. It is a relatively new sector and cuts across elements of manufacturing, professional services, energy generation technologies and utilities.

1.3 In addition to being a sector in its own right, environmental technologies encompasses the drive towards efficiency and resourcefulness, as it captures the circular economy concept across other industries. Increasingly, businesses view the circular economy as an opportunity: it not only allows businesses to capture additional value from their products and materials, but also to mitigate risks from material price volatility and material supply. In short, it increases business profitability whilst improving business continuity.

1.4 As such, some of the sector's activities can be difficult to capture, as they occur internally within businesses as they strive towards better efficiency and resourcefulness. Other sector components such as energy technologies and environmental service activities can be reflected more accurately.

Figure 1.1 Environmental technologies sector definition



Source: Regeneris Consulting

Trends and drivers

1.5 Environmental technologies has gained momentum in light of commitments to climate change targets and technological drivers needed to achieve these (the Paris Agreement, Europe 2020, Climate Change Act 2008).

1.6 During the UK's 40-year membership of the EU, the EU has been very influential in the UK's energy and climate change policy. Equally the UK has been able to influence EU climate change policy to some degree. Participation in programmes such as Europe 2020 Growth Strategy, Resource Efficient Europe and Road Map 2050 which all share common narratives of increased resource efficient and reduced emissions of greenhouse gases have helped to shape the UK's energy landscape.

1.7 These concepts of resource efficiency and the circular economy are closely linked, and have become high profile issues in EU policy and strategy. In the UK, however, the picture is mixed – the UK currently does not have a specific position on the circular economy, nor a formally agreed policy direction.

1.8 With the announced exit from the EU, influence over the UK's climate change policy has become somewhat more uncertain. Although the UK will acquire more domestic policy control to shape its own energy and climate change agenda, the influence of the EU as a major trading partner will likely have some ongoing effect. The UK has been one of the leading countries on climate change policies, targets and legislation, and is likely to maintain this direction beyond EU membership.

Reducing emissions by 80% by 2050

1.9 The latest legally binding framework on tackling climate change in the UK is the 2008 Climate Change Act. It sets out the path to the reduction in emissions by introducing the 2050 Target: a commitment to reduce emissions by at least 80% by 2050 from 1990 levels.

1.10 The government department responsible for shaping the climate change policy in the UK is now the Department for Business, Energy & Industrial Strategy (BEIS). It recognises the need for the UK to stimulate its low carbon technologies development if it is to meet its environmental commitments.

1.11 To support energy innovation, the public sector supports a number of funding sources for businesses in the UK:

- BEIS Energy Entrepreneur's Fund is aimed at the development and demonstration of new products and processes in the areas of energy efficiency, power generation, heat and electricity storage and carbon capture and storage.
- Innovate UK provides three main funding mechanisms for the environmental technologies arena: Energy Catalyst, Catapults, Smart Awards and Collaborative R&D funding. The Catalyst targets collaborative projects with strong commercial potential, and ones that contribute to the three components of the energy trilemma. The Smart Award targets high growth SMEs and start- ups in any sector looking for funding. Finally, the Collaborative R&D is a call-based funding competition for innovations with strong commercial potential.

- Ofgem offers innovation funding in two ways, through the Network Innovation Competition, and through Network Innovation Allowance (NIA), both open to energy network operators or organisations working in partnership with them. These often partner with businesses and academia as well as large developers. The Competition runs annually to demonstrate new technologies with the goal of accelerating the development of the low carbon energy sector. NIA projects are usually smaller, aimed at delivering financial benefits to the network operators and their consumers.

1.12 However, Evaluation of the Environmental & Low Carbon Sector in the Marches and Worcestershire LEP Areas[1] published in 2015 identified a scaling back in Government's support for environmental and low carbon measures:

- Reduction in support for onshore wind generation
- Scrapping of the Code for Sustainable Home and Zero Carbon Buildings
- Early closure of the Green Deal.

1.13 The study sees this scaling back as a potential opportunity for local programmes and projects to be developed. Businesses in the Marches have access to the national initiatives outlined above, as well as projects delivered through the Local Growth Fund to bring forward developments that will boost the local economy.

1.14 The Energy and Climate Change Select Committee reported on 15 October 2016 on upcoming challenges for energy and climate policy. The committee recommended investment in energy storage on the supply side and in efficiency technologies that smooth out demand peaks, by switching devices off and on and running them at lower power during times of stress, for example.

1.15 A key implication for the Marches is the role of innovation in developing and promoting environmental technologies, utilising the expertise available locally in order to develop envirotech solutions which will help to meet environmental ambitions. More importantly, the big opportunity lies in the application of these environmental solutions by other sectors - including advanced manufacturing and engineering, construction and particularly the large SME-base in the Marches. The application and roll-out of envirotech solutions will help to fully realise the sector's potential. Such cross-sector implementation in the Marches (and across the UK) is what will be needed for maximum impact in order for the UK to meet its 2050 goal.

[1] Innovas (2015) *Evaluation of the Environmental & Low Carbon Sector in the Marches and Worcestershire LEP Areas*

1.16 This emphasises the role for Centres of Excellence and Business Environmental Networks, which will be needed to develop and promote environmental technologies and their application across other sectors.

Technological drivers

1.17 In addition to policy drivers, there are important commercial developments and business efficiency drivers that are stimulating the development of environmental technologies. The circular economy concept encompasses a number of these drivers, as business operations strive to move towards increasing resource efficiency and zero waste models. These principles are being championed in the UK by the Ellen MacArthur Foundation and Waste and Resource Action Programme (WRAP). Importantly, in the Marches the Environmental Business Networks are highly active in promoting resource efficiency concepts and their application by local businesses. This presents an opportunity for the Marches to capitalise on this knowledge held locally by accelerating the application of principles across a wider business base.

1.18 The drive towards achieving resource efficiency and zero waste principles is driven by the following factors, which have been summarised by the Ellen MacArthur Foundation. These factors distinguish between traditional linear ('take-make-dispose') and circular consumption concepts:

- **Economic losses and structural waste** – the current economy is surprisingly wasteful in its model of value creation. This is evidenced in material recycling and waste-based energy recovery in particular. Structural waste is also present in sectors that many would consider mature, such as car production, food consumption and office space productivity.
- **Price risks** – a linear system increases businesses' exposure to price volatility, which has a negative effect on economic performance, when there is a high reliance on external supply. This is relevant to resources such as metals and agricultural outputs, which have been subject very high levels of price volatility in the last decade, to the detriment of the economy.
- **Supply risks** – the EU and UK is reliant on a steady stream of imports in order to support economic outputs, which poses significant long-term risk. This relates to the supply of raw materials themselves, supply security, and also elaborate global supply chains.

- **Natural systems degradation** – the linear model continues to impose significant environment damage, which is a significant threat to sustainable global wealth. This is now impacting on the productivity of economies, through the depletion of supply and natural amenity consequence, including climate change, loss of diversity and land degradation.
- **Regulatory trends** – regulators continue to tackle the environmental results of linear process. This includes price based levies targeting carbon emissions, climate change laws and landfill taxes. There is also a growing emphasis on the power of a progressive approach to business, such that circular systems thinking is perceived as a logical next step, offering a favourable alignment of technological and societal factors.
- **Advances in technology** – technology continues to evolve at an ever-greater pace, disrupting all aspects of society and business. Information and industrial technologies are now coming online or being deployed at scale, which more efficient collaboration and knowledge sharing, better tracking of materials, improved forward and reverse logistics set-ups, and increased use of renewable energy.
- **Acceptance of alternative business models** – new transaction models are evolving, which allows a move away from traditional ownership arrangements, to those which are better-suited to a circular approach. Rental, performance-based and sharing models, enabled by new technologies, are examples of this new transactional relationship.
- **Urbanisation** – with over 50% of the world' population residing in urban areas, alongside projections which suggest this will continue, there are natural incentives associated with Circular Economy associated costs of many of the asset-sharing services, reverse cycles, collecting and treating end-of-use materials will all benefit from higher drop-off and pick-up density, simpler logistics, and greater appeal and scale for service providers.

Anaerobic digestion

1.19 WRAP is another UK organisation which works with governments, businesses and communities to develop solutions to improve resource efficiency. Part of its remit is compiling an evidence base which will inform the vision for a circular economy in the UK in 2020.

1.20 WRAP compiles information on operational anaerobic digestion (AD) plants in the UK, which produce renewable energy from waste treatment. The Marches is home to 30 operational plants across Shropshire and Herefordshire out of 266 active plats in the UK.

1.21 In 2011 WRAP started the Driving Innovation in Anaerobic Digestion (DIAD) programme as part of Defra's AD Strategy and Action Plan. Shropshire-based company, Marches Biogas, was one of nine projects taken through to the demonstration phase of the programme and was selected as a technological innovation that could optimise AD systems in the UK. The opportunity for the Marches does not stop there, as the technology has wide application potential as well as demonstrating local engineering strengths.

Power generation and storage technologies

1.22 There are three innovations identified by the National Infrastructure Committee (NIC) report on Smart Power (2016)[2] which could save UK consumers up to £8bn a year by 2030. These are:

- By **interconnecting** the UK's electricity network with other countries it allows trade of electricity, which would bring a more flexible system. By shifting electricity between excess supply and high demand, interconnectors can act as additional generation capacity as well as an export opportunity. This has the potential to bring lower prices to consumers, improved investment cases for power stations and a move towards meeting the carbon targets.
- **Storage** technologies allow consumers to manage electricity consumption, buying when prices are low and using the power when most needed. The energy storage industry has seen significant advances over the last decade. The technologies have the potential to ease the constraints on grids, reduce the need for new power stations and deliver a favourable power mix to meeting climate change targets. However, the industry is facing significant barriers: with lack of information sharing and regulatory challenges, it is more difficult to establish a viable business model. These barriers are preventing the deployment of technologies, a market in which the UK could be a world leader.

[2] NIC (2016) Smart Power

- **Demand flexibility** solutions are aimed at shifting demand and flattening electricity prices for users during peak times. These can lead to lower costs for users and lower emissions. Importantly, demand flexibility can help to integrate different low carbon generation technologies, and reduce the need for managing supply.

1.23 A major innovation driver in the energy technologies sector in particular is the need to tackle the energy trilemma – the concept of balancing the trade-off between energy security, access and affordability, and energy sustainability. The UK currently performs well on balancing the three dimensions: the 2016 Energy Trilemma Index ranks the UK 11th out of 125, with the energy affordability and accessibility dimension letting down the score compared to the leading countries (Denmark, Switzerland and Sweden).[3]

1.24 In the context of the Marches, power generation and storage technologies present a diversification opportunity for local businesses, particularly manufacturers. There are already examples of SMEs diversifying from battery manufacturing to energy storage, which applies similar technologies in a different concept.

Policy Drivers for Change

National

Industrial Strategy Green Paper

1.25 Since coming into power Theresa May has signalled a more active approach to industrial strategy, the centre piece of which is the Green Paper "Building our Industrial Strategy[4]". The underlying motivation of the strategy is "to improve living standards and economic growth by driving productivity and growth across the whole country."[5]

1.26 The Government identifies 10 pillars to spur economic growth and prosperity, which focus on investing in science, research, innovation and infrastructure, access to finance and promotion of trade, inward investment, and cultivating world-leading sectors.

[3] Energy Trilemma Index 2016, (www.worldenergy.org/data/trilemma-index)

[4] Department for Business, Energy & Industrial Strategy, *Building our Industrial Strategy: 10 pillars,*2017

[5] Building our Industrial Strategy, January 2017, p.9

1.27 The industrial strategy commits the government to a series of sector deals, where pioneering sector leaders work with government to help reduce regulator barriers, increase competition and innovation, increase exports and drive up commercialisation of research. The government will also foster internationally competitive sectors by:

- undertaking deep dives into emerging sectors
- building on existing sector relationships, updating strategies, strengthening existing institutions and making best use of existing funding, coordinating thriving supply chains and creating long term institutions as key drivers of sectoral success.

1.28 The £4.7 billion Industrial Strategy Challenge Fund (ISCF) will accelerate the commercialisation of technologies in key sectors, many of which align with the sectoral priorities of the Marches LEP. A series of consultations are being undertaken to explore which technologies the Industrial Strategy Challenge Fund could support. These include:

- smart and clean energy technologies (such as storage and demand response grid technologies)
- robotics and artificial intelligence (including connected and autonomous vehicles and drones)
- satellites and space technologies
- manufacturing processes and materials of the future
- transformative digital technologies including supercomputing.

1.29 In the strategy, the government shows that it is still committed to continuing decarbonisation of the economy through the next generation of environmentally friendly technologies. Specifically, the government commits to:

- Setting out a long term road map in 2017 to minimise business energy costs by conducting a review of opportunities to reduce the cost of decarbonisation
- "To ensure that new energy technologies are developed here – and the UK benefits from global investment in this area – we have doubled support for energy innovation, and are already investing over £600 million in support to accelerate the transition to ultra low emission vehicles." (p20)

1.30 The strategy also features a stronger place-based narrative than in previous policy pieces, with seven references to the Midlands Engine. This reaffirms the government's commitment to rebalancing the economy and ensuring a more inclusive approach to economic growth.

Brexit

1.31 The UK's decision to leave the European Union could have a profound impact on the economy and certain sectors. Membership of the EU has had a significant impact on environmental legislation in the UK, and withdrawal from the EU will affect nearly every aspect of the UK's environmental policy. Some stakeholders are concerned that environmental protections and ambitions will be diminished.

1.32 EU environmental directives have had a significant effect on the envirotech sector particularly around green energy, recycling and air quality. This means businesses in the envirotech sector will be particularly susceptible to regulatory and legislative changes that may occur once Britain leaves the EU. In some cases, Britain's own targets are more challenging than the EU (i.e. carbon emissions) whilst in other cases (i.e. waste management) targets may not substantially change but would reduce the impetus to meet legislative targets within clear timeframes and remove the threat of legal challenge for any failure.

1.33 For UK environmental consultancy practices, there will be implications in terms of their EU national staff and access to EU work opportunities, as well as risks associated with demand, for example, recent growth in the environmental consultancy sector has been fuelled by major infrastructure projects (particularly in the energy and transport sectors). The demand for labour will be affected by changes in the availability of national infrastructure funding, and the potential for environmental regulations to be lessened could weaken the demand for climate change and energy services.

1.34 The nature of the UK's future relationship with the EU is currently unclear, however the government's negotiating objectives are that the UK will leave the single market and much of the Customs Union. This has implications for trade, as the UK would need to enter new agreements with the EU and will lose all its current trade deals which it enjoys as a member of the EU. Moreover, abandoning the free movement of people principle will make the UK government seek up new work permit or visa arrangements. These will inevitably have some impact upon the workforce of many UK industries at a time when the labour market is already tightening, as unemployment has fallen drastically, and Britain's population is ageing.

1.35 The Midlands has received a large share of European Regional Development Funding over the various programme periods. The government has said that it will consider an alternative funding arrangement as part of a post-Brexit settlement[6].

1.36 Overall outcomes will need to be negotiated and a transitionary phase of Britain's departure could help to smooth the impact of such changes. Nonetheless, Brexit is likely to have an impact in the short and long term for many sectors.

Local and regional policy

The Midlands Engine

1.37 The wider Midlands region has developed an overarching identity founded upon sector strengths that are internationally recognised, and which strongly align with the Marches' key sectoral strengths:

- manufacturing
- engineering and transport technologies
- agri-food and drink manufacturing and production
- energy and low carbon technologies
- creative, digital and design.

"As a Midlands resident and MP, I know the importance of the region to the country's economy – the heartland of our manufacturing sector." Rt Hon Sajid Javid MP

1.38 The Midlands Engine Strategy[7] demonstrates the government's commitments to making the Midlands a powerful engine for economic growth. It builds on the Industrial Strategy and the Midlands Engine for Growth prospectus[8], the strategy sets out actions to remove barriers to productivity, create more jobs and export more goods and services.

[6] Department for Business, Energy & Industrial Strategy, *Building our Industrial Strategy: 10 pillars,*2017

[7] Department for Communities and Local Government, HM Treasury, Department for Business, Energy & Industrial Strategy, Midlands Engine Strategy, 2017

[8] Department for Business, Innovation and Skills & Department for Communities and Local Government, The Midlands Engine for Growth: prospectus, 2015

1.39 The strategy outlines five key objectives: improving connectivity, strengthening skills, supporting enterprise and innovation, promoting the Midlands and enhancing quality of life. The strategy is a step toward government ambitions announced in 2015 that the Midlands economy could grow by £34 billion by 2030, if it matched the predicted growth rate for the UK. A further 300,000 jobs could be created in the Midlands by the end of this parliament.

1.40 The Strategy sets out the commitment to give the LEPs in the Midlands £392m to invest over the next four years, including £22m. For Marches LEP. The alignment of sectoral ambition between the Marches LEP and Midlands Engine presents an opportunity to develop its industries, including environmental technologies.

1.41 The Environmental Business Networks in the Marches are already major contributors to the development and application of sustainability aspects through their active association with Sustainability West Midlands. Sustainability West Midlands have developed a 2020 Roadmap which includes a set of sustainability priority actions for the West Midlands. The Roadmap outlines the following aspects of its 2020 vision:

- Business. West midlands as a hub for low-carbon technology innovation and an international supplier, increasing productivity by 30%.
- Community. The life expectancy gap has fallen to 6 years as a result of employment, less pollution and healthier lifestyles.
- Place. Regional direct carbon emissions reduced by around 30% from energy efficiency action and 20% of electricity from renewable sources.

The Marches LEP Strategic Economic Plan

1.42 The current Strategic Economic Plan (2014) establishes a vision:

"Our vision for the Marches is of a strong, diverse and enterprising business base, operating in an exceptional and connected environment, where the transfer of technology and skills foster innovation, investment and economic growth"

1.43 The SEP identifies a target to create 70,000 new homes and almost 40,000 new jobs over the next 20 years. This will be facilitated through strategic intervention framed around the following priorities:

- **Supporting Business:** We will create an exceptional business support environment for aspiring growth businesses through access to finance and incentives to innovate. We will promote the Marches as a business investment location

- **Physical Infrastructure** We will provide a compelling business investment offer with a progressive planning framework and infrastructure fit for tomorrow's business needs.
- **Skills Investment**: We will support employers to develop themselves and their workforce and to provide employment opportunities for young people.
- **Low Carbon Economy**: We will drive the transition to a high value, low carbon economy, maximising the opportunity in new technologies, reducing environmental costs to business and recognising our environment as an economic asset.
- **Social Inclusion**: We will support socially excluded and marginalised groups by removing barriers to their participation in activities that will improve their economic well-being

1.44 The SEP identified a number of important sectors which included food and drink, agri-technology, defence and security, advanced manufacturing, automotive manufacturing, tourism and leisure, environmental technology and services, and social enterprise.

1.45 A SEP refresh is underway, underpinned by an updated evidence base published in 2016. This analysis sharpens the focus on 'priority' sectors for the LEP and includes:

- Advanced manufacturing and engineering
- Food manufacturing and processing
- Defence and securities

1.46 Sector Needs Assessments are being developed for each of these priority sectors in addition to this Sector Needs Assessment for the aspirational sector of 'Environmental Technologies'.

Local Economic Development Strategies

Table 1.1 Relevant policies from local economic development strategies

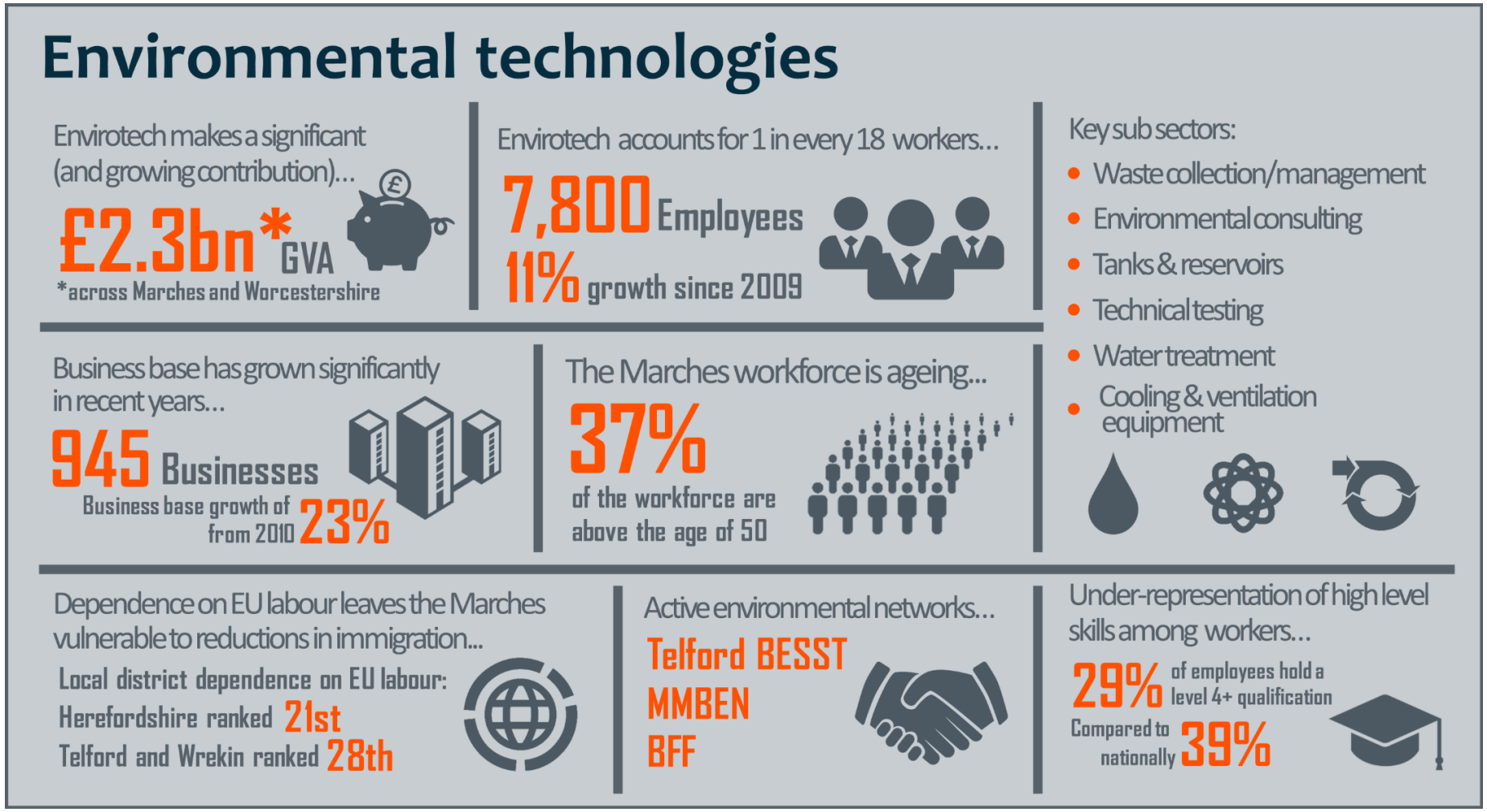
Shropshire Economic Growth Strategy 2017-21 DRAFT[9]	Herefordshire Invest Herefordshire Herefordshire's Economic Vision[10]	Telford and Wrekin Driving growth and prosperity: Economic Development Strategy 2016[11]
Six priority actions: 1. Target actions and resources where there are economic opportunities 2. Enable businesses to grow and succeed 3. Deliver infrastructure to support growth 4. Meet skills needs of businesses and people's aspirations for work 5. Promote Shropshire to investors 6. Build our reputation as a Council that is 'good to do business with'	Seven Key aims: 1. A Great Place for Business - Creating the conditions in Herefordshire to encourage new business start-ups and an increase in productivity leading to higher value employment and greater innovation. 2. A Great Place to Learn - Increasing the range of higher education provision and improving the balance between business demand and the supply of skills and qualifications. 3. A Great Place to Live 4. A Great Place to Visit 5. Great movement and accessibility 6. Countywide Ambition 7. A Great Environment	Six key actions: 1. Create business friendly conditions to increase the number of successful businesses. 2. Grow sectors around opportunities and support sectors that underpin employment across the Borough. 3. Stimulate and support innovation across all business sectors. 4. Improve the skills and talent pool of the Borough to make it business relevant. 5. Transform physical and digital connectivity. 6. Optimise all the assets of the Borough to make it a first-class place to live, work and invest

[9] Shropshire Council, Draft Economic Growth Strategy 2017-2021

[10] Invest Herefordshire, Invest Herefordshire Herefordshire's Economic Vision

[11] Telford Enterprise, Driving growth and prosperity: Economic Development Strategy 2016

Figure 1.2 Sector Needs Assessment Summary Infographic – Environmental Technologies



Source: Regeneris Consulting, see Appendix B – Glossary for other sources. Business Environmental Support Scheme for Telford (BESST), Meres & Mosses Business Environment Network (MMBEN), Business Futures Forum (BFF)

2. Sector Needs Assessment

2.1 Environmental technologies is a difficult sector to quantify using published datasets due to its cross-cutting nature and strong links with other sectors, including manufacturing. However, a best fit analysis can help show the scale and strengths of the sector.

2.2 Given the challenges in accessing data which is tailored to envirotech, the needs assessment focuses on the sector where possible, in places drawing on performance of the Marches as a whole and the relevant broad industries to reflect the cross-cutting nature of the sector.

Productivity and economic contribution

Environmental technologies sector is worth £2.3bn in the Marches and Worcestershire…

2.3 Quantifying the wealth contribution of the envirotech sector in the Marches using published datasets is difficult. However, a 2015 study focusing on the environmental and low carbon sector in the Marches and Worcestershire LEP estimates that the sector was worth around £2.3bn across the two LEP areas in 2015, and has grown by 10% in two years. [12]

2.4 The sector was identified to have a strong growth potential, building on the trends and drivers that are influencing the industry such as renewable energy technologies and alternative fuel. It is forecast to increase by £147m between 2015 and 2016, and by £1bn overall between 2014 and 2020.

2.5 The sector can help move the Marches towards a high value economy. Currently, the Marches LEP area is underperforming on all productivity measures. The GVA per head of population is 23% below the national average. Labour productivity (as measured by GVA per FTE jobs) is also below the national average by 11%, although the Marches does perform better than the Midlands Engine.

[12] Innovas (2015) *Evaluation of the Environmental & Low Carbon Sector in the Marches and Worcestershire LEP Areas*

Table 2.1 Economic output across all sectors in the Marches, 2015

	The Marches	Midlands Engine	England
GVA	£13 billion	£218 billion	£1,433 billion
GVA per head	£20,170	£20,880	£26,160
All sector (average) GVA per FTE	£60,400	£57,800	£68,000

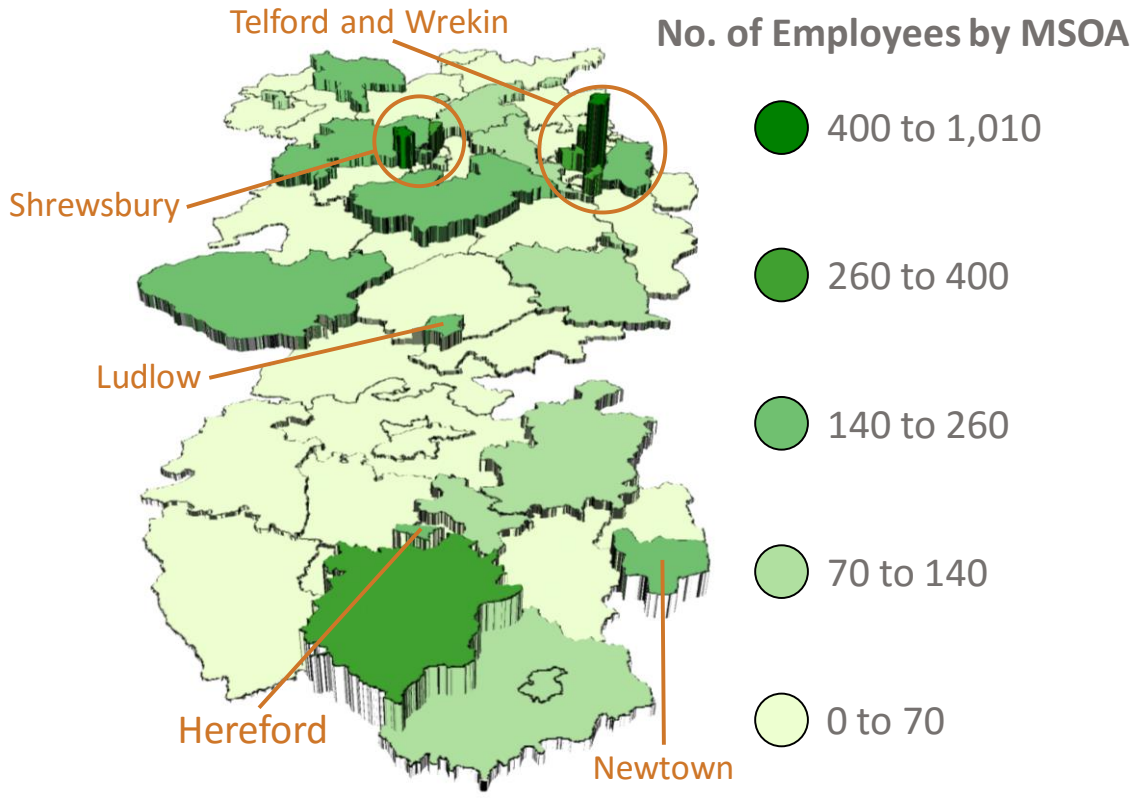
Source: ONS, 2016

Employment

Environmental technologies account for 1 in every 18 employees in the Marches...

2.6 The Marches is home to approximately 945 businesses employing 7,800 people across environmental technologies. The sector accounts for only 1% of employment in the Marches but this is growing. Figure 2.1 illustrates the spatial distribution of the employment in the sector. It highlights the concentration of employment in Telford and Wrekin, followed by Shrewsbury and Hereford.

Figure 2.1 Map of Environmental Technologies employment by MSOA, 2015



Source: ONS, BRES, 2015

2.7 Envirotech employment has grown by 11% across the Marches since 2009. However, there are some significant differences in the changes in the sector between the local authorities: employment in Telford and the Wrekin increased by more than a quarter, and in Shropshire by more than a fifth. This is a stark contrast to the 17% reduction in envirotech employment across Herefordshire (driven by a decrease in the water supply and management sub-sector).

2.8 Comparing employment growth to the change in business numbers suggests that growth has been driven by a large number of small firms: the number of businesses in the sector has increased substantially over the past five years (23%). This underlines the emergent nature of the sector, as many envirotech companies are start-ups that began to emerge over the last few years.

Table 2.2 Environmental technologies employment and business base

	Employment (2015)				Businesses (2016)	
	Number	Change (2009-2015)	IoS	% of Marches	Number	Change (2010-2016)
Herefordshire, County of	1,800	-17%	0.8	23%	280	22%
Telford and Wrekin	2,600	26%	1.0	34%	175	6%
Shropshire	3,400	22%	0.9	43%	490	31%
Marches LEP	7,800	11%	0.9	-	945	23%

Source: ONS, 2016. Note: the index of specialisation is calculated as the share of the sub-sectors employment in the Shropshire divided by the share of the sub-sectors employment in Great Britain.

Marches boasts a diverse range of envirotech sub-sectors...

2.9 The sector overall does not show a significant concentration of employment in the Marches (the Index of Specialisation is currently 0.9). However, analysis by sub-sector and by location reveals pockets of specialism in the area. Highly concentrated environmental technologies sub-sectors include:

- Manufacture of other tanks, reservoirs and containers of metal (IoS=4.4)
- Technical testing and analysis[13] (IoS=2.5)

[13] This class includes the performance of physical, chemical and other analytical testing of all types of materials and products, see appendix for further details.

- Water collection, treatment and supply (IoS=2.2)
- Manufacture of non-domestic cooling and ventilation equipment (IoS=2.1)
- Collection of non-hazardous waste (IoS=2.0)
- Recovery of sorted materials (IoS=1.5)
- Environmental consulting activities (IoS=1.5).

2.10 The aggregated sub-sectors are presented below to illustrate the range and concentration of activities as well as recent trends.

Table 2.3 Employment in top 10 envirotech sub-sectors in the Marches, 2015

Sub-sector	Number of employees	% of total	Change 2009 to 2015	Index of Specialisation
Other engineering activities	1,800	23%	(+) 110	0.9
Technical testing and analysis	1,270	16%	(+) 770	2.5
Collection of non-hazardous waste	970	12%	(+) 340	2.0
Water collection, treatment and supply	600	8%	(-) 500	2.2
Engineering related scientific and technical consulting activities	490	6%	(+) 120	0.8
Manufacture of non-domestic cooling and ventilation equipment	360	5%	(-) 30	2.1
Distribution of electricity	350	4%	(+) 290	0.9
Recovery of sorted materials	350	4%	(-) 230	1.5
Other research and experimental development on natural sciences and engineering	340	4%	(+) 70	0.3
Treatment and disposal of non-hazardous waste	250	3%	(+) 10	1.1
Total	**6,780**	**86%**	**(+) 955**	

Source: ONS, 2016. Note: the index of specialisation is calculated as the share of the sub-sectors employment in the Shropshire divided by the share of the sub-sectors employment in Great Britain.

Sub-sector strengths are concentrated geographically….

2.11 The spatial characteristics of envirotech sub-sectors in the Marches shows that certain sub-sector specialisations are concentrated within different local authority areas. The sub-sectors which are prominent across all three local authorities build on the Marches' engineering and manufacturing sector, highlighting the strong links between envirotech and other activities in the economy.

Table 2.4 Envirotech sub-sector strengths and number of employees by local authority area, 2015

Shropshire		Herefordshire		Telford and Wrekin	
Sub-sector	**No.**	**Sub-sector**	**No.**	**Sub-sector**	**No.**
Other engineering activities	900	Other engineering activities	300	Technical testing and analysis	700
Technical testing and analysis	500	Manufacturing of ventilation equipment	200	Other engineering activities	600
Water collection, treatment and supply	500	Other research and development	200	Collection of non-hazardous waste	500
Engineering related scientific and technical consulting activities	400	Engineering related scientific and technical consulting activities	200	Manufacture of electricity distribution and control apparatus	200

Source: ONS, 2016

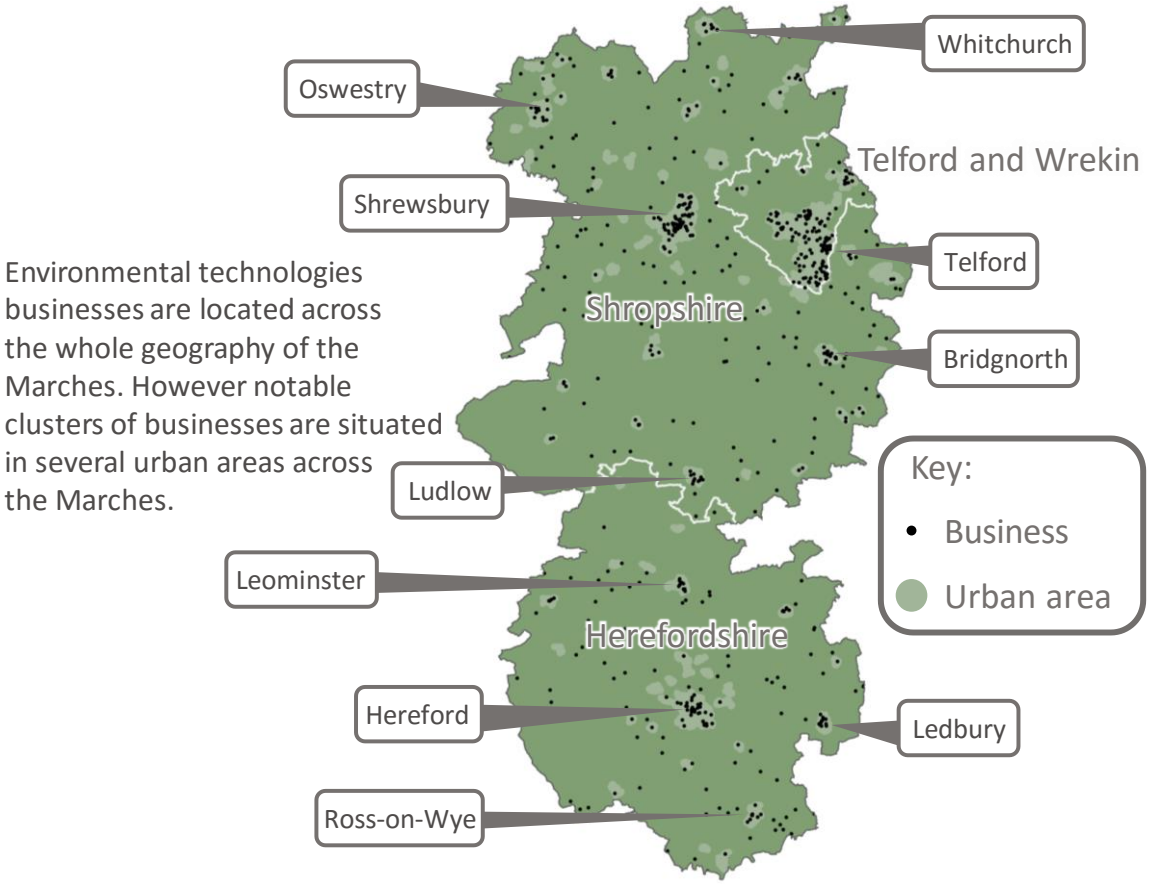
Envirotech Business Base

The Envirotech business base has grown significantly in recent years…

2.12 There are currently around 945 businesses in the envirotech sector in the Marches. The number of businesses has grown significantly over the last six years, increasing by 23% since 2010. This growth has been driven by businesses in Shropshire, where the number of firms has increased by almost a third. The sector is characterised by predominantly micro businesses with fewer than 9 employees (89%) and the analysis did not identify any large employers in the sector that are based in the area.

2.13 The spatial distribution of the sector business base is more stark than the spread of employment: more than half of businesses are based in Shropshire (52%) followed by Herefordshire (30%) and finally Telford and Wrekin (19%). FAME data shows the location of individual businesses and their distribution in the Marches, presented in Figure 2.2.

Figure 2.2 Location of Environmental Technologies Active and Locally Registered Businesses, 2017



Source: FAME Data, 2017

2.14 As set out in the trends and drivers section, the common strength across the different types of envirotech businesses is the application of technologies and solutions by businesses in other sectors. The implication is that the potential for growth in environmental technologies is vast, and reaches across other industries.

2.15 The diversity of the key envirotech employers in the area emphasises this point. These include Caplor Energy – installers of renewable energy technologies, Befesa – an international sustainability solution provider, and Arctic Circle – a manufacturer of low carbon solutions for heat transfer.

2.16 In addition to individual businesses in the Marches, the sector is further bolstered by the development of environmental and sustainability capabilities in businesses operating in other sectors. For example, Ricoh – a manufacturer of printing products – has a sustainability team which has been driving the concept of the circular economy and sharing this expertise. While difficult to capture in data analysis, such expertise is important in a sector as diverse as environmental technologies.

Table 2.5 AME sub-sector strengths and number of employees by local authority area, 2015

Shropshire	Herefordshire	Telford and Wrekin
• Befesa • AMEC • E 4 Environment • BiogenGreenfinch • Swegon Air Management Limited • Symeco Ltd • Daval Controls Limited • Zefyr Global Limited • ESI Ltd • Ecosac Limited	• Arctic Circle Ltd • Caplor Energy • Hydro-Logic • Envirogen Water Technologies Limited • Enviro Ability • Longma Clean Energy Ltd • Bioepic Ltd • Environmental Research Group Oxford Limited • Arad Metering Services (UK) Limited • De Leeuw Limited	• Aceon • Aktrion • Hager Engineering Ltd • Busch (UK) Ltd • Reconomy (UK) Limited • Filtermist International Limited • Telford Copper & Stainless Cylinders Limited • Rotech Laboratories Limited • Countrywide Waste Management Limited • Mistral Energy Products Limited

Source: FAME, 2016

Labour Force

The Marches workforce is ageing …

2.17 The workforce profile for envirotech is challenging to define using published datasets. The complexity of the sector definition makes the skills and labour market for the sector difficult to capture. However, there is merit in analysing the workforce in the Marches as a whole and by broad industry components to build the picture of the workforce envirotech might draw on.

2.18 The Marches faces demographic challenges and an ageing workforce. In the year ending June 2016, 37% of workforce across sectors relevant[14] to envirotech are over 50 years old. This is higher than in the Midlands Engine and across England. This age structure of the sector mirrors the workforce as a whole, where 64% of the Marches' workers are below the age of 50.

Table 2.6 Age profile of the environmental technologies sector workforce (Workplace), Oct 2015-Sept 2016

Age Group	The Marches	The Midlands Engine	England
16 to 19	*	1%	1%
20 to 24	6%	8%	8%
25 to 49	56%	58%	60%
50+	37%	33%	31%

Source: ONS, APS, 2016

Note: The largest value of each row is highlighted

Note: Estimated denoted * have been censored.

Note: Estimates are taken from a wider SIC code definition (B, D, E; C; K-N)

2.19 Analysis by sector reveals that the manufacturing element of the workforce is younger than average - 71% of Marches manufacturing workforce were under the age of 50 compared to 68% and 67% in the Midlands Engine and England respectively. Consultations indicated that the larger part of the workers within the age bracket 25 to 49 are towards the older end of the age bracket and suggest a retirement bulge will occur in Marches' manufacturing workforce in the next 20 years.

Underrepresentation of higher managerial and professional occupations in Marches...

2.20 Consultations with envirotech employers in the Marches suggest that the main challenges which are faced by businesses relate to soft skills of potential workers and the requirement for high level technical skills. This is especially the case in envirotech sub-sectors which draw on a workforce with skills related to advanced manufacturing and engineering.

2.21 While the availability of soft skills is difficult to capture using datasets, the under-representation of higher level skills is evident in the analysis of occupations and workforce skills.

[14] Where granular data is not available to capture the envirotech sector definition, the analysis uses a broad best-fit sector approach to capture the activities that are relevant to the sector.

2.22 At a broad level, around 26% of employees in the Marches area work in higher managerial and professional occupations in sectors relevant to environmental technologies. This is on par with the Midlands Engine, but seven percentage points less than in England. This under-representation of higher level occupations corresponds to an overrepresentation in low value jobs: the Marches has a notably high proportion of employees engaged in *Process, Plant and Machine Operative* related occupations and *Elementary,* 26% compared to the Midlands Engine (24%) and England (17%).

Table 2.7 Occupational profile of the envirotech-related sectors (Residents), Oct 2015-Sep 2016

Occupation	The Marches	The Midlands Engine	England
Managers, Directors and Senior Officials	13%	12%	14%
Professional Occupations	13%	14%	19%
Associate Prof & Tech Occupations	17%	17%	20%
Administrative and Secretarial Occupations	13%	13%	13%
Skilled Trades Occupations	13%	14%	11%
Caring, Leisure and Other Service Occupations	1%	2%	2%
Sales and Customer Service Occupations	3%	4%	4%
Process, Plant and Machine Operatives	14%	13%	8%
Elementary occupations	12%	11%	9%

Source: ONS, 2016

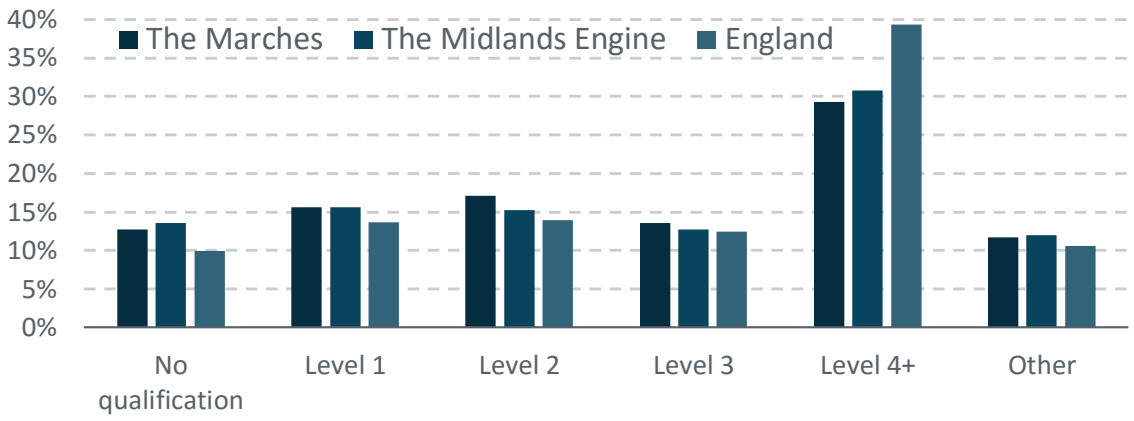
Note: The largest value of each row is highlighted

Note: Estimates are taken from a wider SIC code definition (B, D, E; C; K-N)

Higher level skills are underrepresented within the Marches ...

2.23 The skills profile of Marches' envirotech sector mirrors the trends observed in the occupational profile. That is, Marches has relatively a low proportion of workers with higher level qualifications compared to nationally and regionally, which echoes the consultation messages with sector representatives and employers.

Figure 2.3 Skills profile of the environmental technologies sector, 2011



Source: ONS, Census 2011

Note: Data is based on a broader SIC code definition (sections A,B,D,E,C,M)

2.24 Moreover, the Marches skills profile by broad relevant sector shows that across relevant industries, the proportion of population with higher level skills is lagging behind the national average (despite over 60% of employees in professional services sector having higher level skills, which is still below England).

Table 2.8 Skills profile of Marches envirotech sector, 2011

Highest held qualification	A, B, D, E Agriculture, energy and water	C Manufacturing	M Professional, scientific and technical activities
No qualification	17%	15%	3%
Level 1	18%	17%	9%
Level 2	18%	18%	12%
Level 3	14%	14%	11%
Level 4+	19%	21%	61%
Other	13%	14%	4%

Source: ONS, Census 2011

Note: Data is based on a broader SIC code definition

2.25 Over the next decade over 155,500 jobs need to be filled in the Marches across all sectors. The majority of these will require higher level qualifications as the economy moves towards higher value jobs which will be even more pronounced across emerging sectors such as envirotech.

2.26 Given the current skills profile of residents and the difficulties recruiting faced by employers, meeting the requirement could be a challenge – to put this into perspective, the projected higher level qualifications demand represents a 76% increase from the current level of high skill qualifications.

Table 2.9 Projected requirement by skill level in the Marches, 2012-24

Qualification	2014 - 2024	Change from 2014
Level 4+	83,300	+76%
Level 3	32,500	+44%
Level 2	34,100	+48%
Level 1	9,000	+17%
No qualification	-3,600	-12%
Total requirement	**155,500**	**+46%**

Source: Working Futures

The Marches has lower labour costs than the rest of the West Midlands...

2.27 The median wage in the Marches is £25,800 for residents, and £24,800 for people working in the area. This could indicate that the Marches is a desirable place to live but higher paid jobs in the region are to be found elsewhere. Compared to the West Midlands, the Marches is an attractive place to do business as labour costs are cheaper than the average across the region.

Table 2.10 Median wage by area (all sectors), 2016

Area and sector	Median Wage
West Midlands	£26,400
Marches residents	£25,800
Marches workplace	£24,800

Source: ONS, ASHE, 2016

Dependence on EU labour leaves the Marches vulnerable to reductions in migration...

2.28 A recent report[15] indicates the extent to which local economies are exposed the effects of Brexit exposure is driven mainly by three key aspects of a local economies character:

[15] My Local Economy, *Brexit: Potential Impacts for Local Economies*, 2017

- How exposed local industrial specialisations are to changing trade relationships (of which it identifies manufacturing and financial services and the industries where changing trade relationships will have the biggest effect)
- Reliance on EU migrant labour
- Local average earnings (areas with lower earnings will be hit harder by price inflation)

Table 2.11 Local authority dependence on EU labour (rank 1 indicates the most vulnerable)

Rank	LA Unitary/District	Employment quotient for industries more dependent on EU labour than the all-industry average
21	Herefordshire	1.56
28	Telford and Wrekin	1.78

Source: My Local Economy, Brexit: Potential Impacts for Local Economies, 2017 * Shropshire data not provided

2.29 The report indicates that the Marches economy is somewhat vulnerable to Brexit. The main driver of this vulnerability is the area's dependence on non-UK migrant labour, with Herefordshire and Telford and Wrekin ranked 21st and 28th respectively in terms of vulnerability driven by dependence on EU labour. The report does not provide detailed figures for Shropshire as it only includes the 30 most vulnerable local authorities, however it is anticipated that this is a LEP-wide challenge.

2.30 BREXIT may affect the pool of workers for envirotech by restricting the pool of migrant workers in the sector. However, the extent to which this may happen is difficult to predict. Consultations with employers did not identify significant risks for envirotech and did not identify large reliance on EU labour. The businesses which did rely on EU labour, did not see Brexit as a risk at this stage as their workers were highly skilled and less likely to be at risk.

2.31 Another concern is the knock-on effect which legislation and regulation may have on envirotech businesses. The policy section outlined the uncertainty which BREXIT may have on UK environmental regulations, which in turn may impact on businesses. For example, an unfavourable policy environment may reduce the attractiveness of developing certain technologies. This can make or break sub-sectors that are reliant on government support, particularly those at early stages (battery storage, for example).

SWOT

2.32 The following infographic summarises the strengths, weaknesses, opportunities and threats facing the environmental technologies sector in the Marches.

Figure 2.4 Summary SWOT for the Environmental Technologies Sector

Source: Regeneris Consulting

Assessment of Competitiveness

2.33 This section builds on the earlier analysis of the sector, combining desk-based research and consultation messages to form a picture of Marches' performance in the sector.

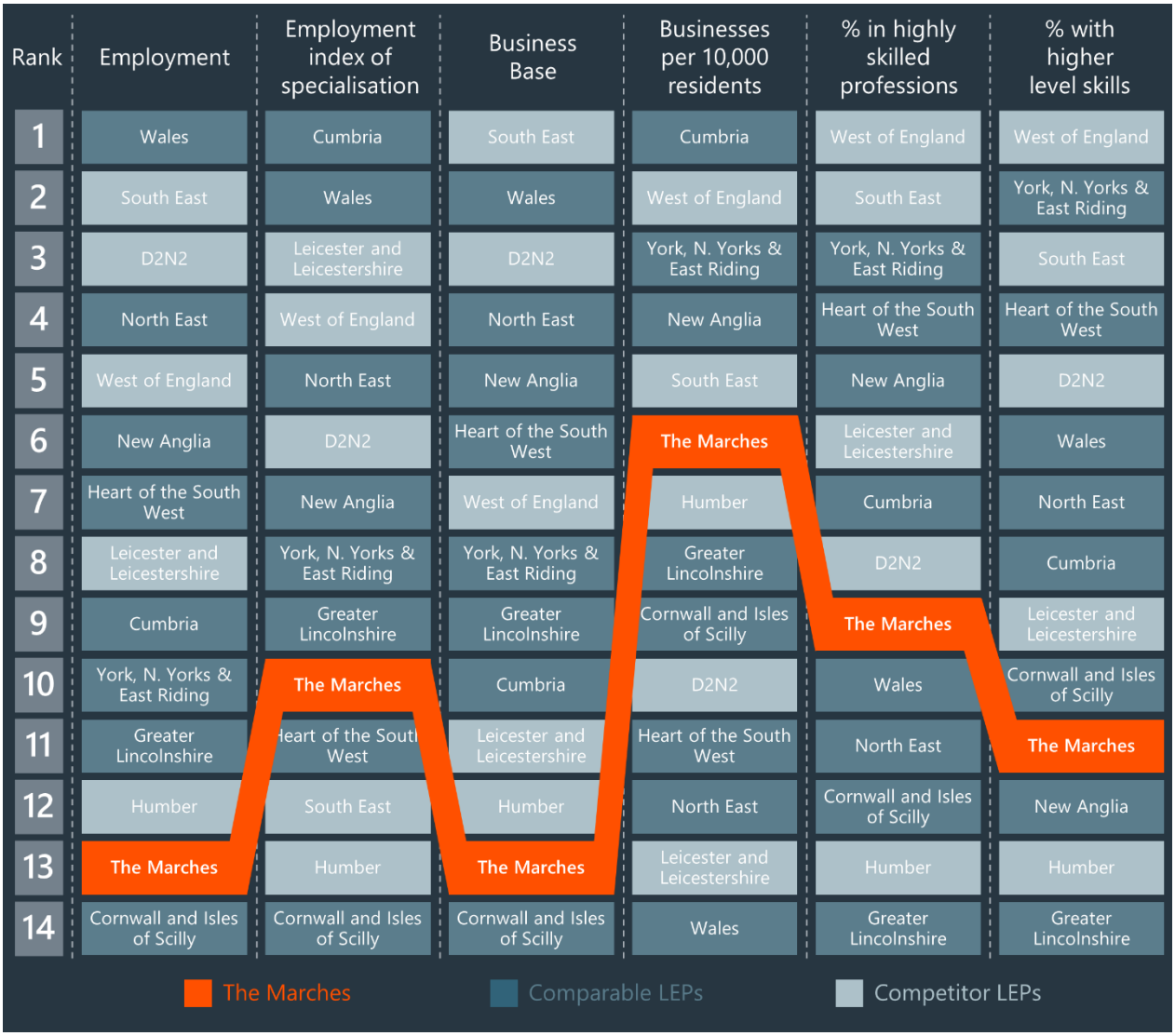
2.34 The analysis below shows the Marches' comparative performance with other LEPs to give an indication of its strengths and weaknesses across indicators that define sector strengths. Comparator LEPs have been chosen based on several criteria:

- Firstly, comparators include other rural LEPs that Marches previously benchmarked against to account for similarities in demographics and challenges that come with rural locations. These comparators are Cornwall and Isles of Scilly, Cumbria, Greater Lincolnshire, Heart of the South West, New Anglia, North Yorkshire and York, and North East.
- Secondly, the additional comparators include LEP areas which also exhibit strengths in environmental technologies and low carbon-related sectors and identify the sector as a priority. The Marches could be competing with these LEP areas as a potential location for businesses, so it is important to reflect on how Marches benchmarks against these. Additional LEPs therefore include: Leicester and Leicestershire, D2N2, South East, West of England, and Humber.

2.35 Figure 2.5 summarises the Marches' performance against comparators, and shows the Marches:

- ranks low on absolute employment in the sector and the employment index of specialisation, as the overall performance does not reflect the sub-sector specialisms that exist in the Marches (14th)
- has 143 businesses per 100,000 residents, ranking the sub-region 14th out of comparator locations
- has comparatively few highly skilled professionals.

Figure 2.5 LEP competitiveness in environmental technologies



Source: ONS, 2016

Note: GVA, GVA per FTE, % in higher managerial professions and % with higher level skills are based on broader SIC code definitions

2.36 The following assessment of competitiveness provides a qualitative analysis of Marches position against comparator locations considering key attributes taking into account data analysis and consultation insights. The performance of Marches is categorised as follows:

- GREEN - to mark areas of competitive advantage in the Marches
- ORANGE - to mark no clear advantage or disadvantage
- RED - to denote a disadvantage.

Skills and labour market

Key attribute	Marches Performance
Skills are a key challenge for the sector. The envirotech businesses that are product manufacturers echo the skills concerns of advanced manufacturing and engineering companies: skills shortages are reported at all levels of occupations. Consultations point to a shortage of soft skills, such as attitude and team work. Engineering occupations are also in shortage. Looking ahead employers recognise an increased demand for higher level skills capable of implementing new technologies and ways of working.	
Skills issues are holding back business growth: envirotech companies face high demands from clients, but struggle to meet it due to difficulties recruiting the right types of skills and expanding the business.	
Envirotech manufacturing businesses are able to draw on skills provision linked with the manufacturing and engineering sector, such as the Herefordshire Group Training Association (HGTA). However, consultations with envirotech employers suggest that graduates tend to be recruited from outside the area as HE provision is lacking in the Marches.	
Median annual wages in the Marches are below the national and regional averages, which make it attractive for employers as labour costs are cheaper.	

Innovating Firms

Key attribute	Marches Performance
Demand for low carbon equipment and new technologies is driving the development of new products. Businesses are investing and diversifying from existing markets to take up these opportunities. The Marches has a strong manufacturing presence in the area, which is an enabler for diversification into low carbon technologies. Examples include Aceon – a battery manufacturer, which diversified into energy storage products.	
Businesses such as Arctic Circle have excellent R&D facilities internally and develop their own products. While there might be limited scope to share the technology, these organisations can encourage smaller firms to gain confidence to innovate.	

Overall innovation indicators for the LEP are somewhat outdated and are based on the 2012 UK Innovation Survey. The findings show innovation among businesses in the Marches is lagging behind other Local Economic Areas (LEAs). This geography of analysis includes 45 LEAs including 39 LEP areas in England (as of 2012); three areas in Scotland (Eastern, South West and Highlands and Islands & the North East); two areas in Wales (East Wales and West Wales and the Valleys); and, Northern Ireland. • The Marches ranks 38th out of 45 for product and service innovation, with 15% of businesses active in these activities • Marches came 35th for R&D engagement, with 14% of firms engaging in R&D. • Furthermore, 20% of firms engage in collaboration for innovation, and 8% engage in process innovation. The Midlands Engine Science and Innovation Audit is an important step in better understanding the Marches' sector assets. In tandem with the Midlands Engine Partnership, opportunities to strengthen the presence of innovation should be maximised.	

Assets

Key attribute	Marches Performance
I**nnovation and research assets** include the University of Wolverhampton's Telford Innovation Campus which is based in the Marches, Harper Adams University (although primarily focused on agricultural technologies). There are currently no sector-specific innovation assets in the area, but a Centre of Excellence involving HE institutions is under discussion (see below). Nationally, research and innovation assets for low carbon technologies include the Energy Systems Catapult (in Birmingham), the Energy Technologies Institute (Loughborough), University of Cumbria Renewable Energy Test Centre (RETEC) and other university-based centres.	
A Centre of Excellence for the sector is being discussed between strategy makers, the industry and providers. The Centre would bring together the research institutions (University of Wolverhampton, Harper Adams, University Centre Shrewsbury) with businesses (through networks) and strategic decision makers (the LEP and local authorities). The aim would be to create a central point to demonstrate best practice, launch projects, coordinate inputs, engage in R&D, support small businesses and start-ups. A research facility	

such as this could help with development of new products, sharing ideas and commercialisation. It would also reinforce the Marches position as a key location for the sector.	
Business assets include: • Caplor Energy - one of the region's biggest installers of renewable energy technologies • Befesa - a leading international company that provides innovative sustainable solutions for the management and recycling of industrial residues • Arctic Circle - a manufacturer of low carbon solutions for the heat transfer market • AMEC - with a UK base in Shrewsbury, AMEC is one of the world's top five companies for sustainability in the oil equipment and services sector • Hydro-Logic – a leading provider of consultancy services and products in hydrometry, field monitoring, water resources and hydrology.	
Business networks operating in the area are an important asset for the sector as they bring together the business cluster and encourage growth of the sector. These networks have a common aim, which is to help businesses to improve their environmental performance and reduce their carbon footprint, whilst helping to boost their competitiveness. These include: • The Business Environmental Support Scheme for Telford (BESST) • Business Futures Forum (BFF) • The Meres and Mosses Business Environment Network (MMBEN).	
Skills and training assets for envirotech are strongly linked with the manufacturing sector, particularly drawing on engineering skills. Assets therefore include the Herefordshire Group Training Association, which was established to address the engineering skills needs of local employers, having expanded to now provide other commercial courses and business management qualifications. The sector will also be able to benefit from the New Model in Technology and Engineering (NMiTE) when it opens in 2019. The institution will focus on delivering engineering skills for the Marches priority sectors, including environmental technologies.	

Business support

Key attribute	Marches Performance
The Marches has several sector-focused business networks in the Marches that engage and bring together businesses. These include Telford BESST, BFF, MMBEN. The strength of networks is an asset in itself for the sector. The three networks are focused on improving efficiency within businesses.	
Business perceptions are mixed on business support. Businesses report a lack of awareness of what services are available. There is a perception that support providers could be more proactive at engaging with businesses, recognising that this may be challenging due to a large number of SMEs and start-ups in the sector. Consultations suggest that business support needs are around staff and skills issues (ie knowing where to go to recruit or work with training providers, apprentices, placements). Access to finance and help applying for funding was also mentioned.	

Infrastructure

Key attribute	Marches Performance
The picture on connectivity is mixed depending on location within the Marches. Telford and Wrekin has good connectivity by road and is in close proximity to an airport and the M54, which links to the rest of the national motorway network. Other areas more difficult and report poor public transport links.	
The Marches has a strong sites and premises offer in Telford and Wrekin. Herefordshire is home to the Skylon Park Enterprise Zone, which offers high quality premises for businesses in priority sectors. The feedback on the premises offer in Shropshire is mixed: consultations suggest that the quality of premises is weaker in Shropshire, especially in rural locations. Clustering of envirotech businesses can be observed in Shrewsbury (Shrewsbury Business Park especially).	
Digital connectivity is perceived as a barrier to growth, however some businesses report recent improvements. The average superfast broadband coverage across premises in England is 93%. In the Marches this is much lower, and there is significant disparity between the local authorities: from 77% in Shropshire, 81% in Herefordshire to	

92% in Telford and Wrekin. (Source: ThinkBroadband, Local Broadband Information, 2017)	

Supply Chains

Key attribute	Marches Performance
Envirotech business types in the Marches link to the agricultural heritage in the area, farming association, emerging technologies and construction-related environmental businesses (start-ups), plus many environmental consultancies. The sector has a diverse base and the presence of manufacturing poses an opportunity for businesses to diversity into the sector. For example, equipment and battery manufacturers entering the energy storage market (like Aceon Group).	
Some of the envirotech sector is closely linked with manufacturing industries, as well as being in the supply chain for automotive manufacturers. Businesses in this segment of the sector are able to benefit from proximity to markets, including JLR.	
The link between the envirotech and the automotive sector exposes the sector to concerns over Brexit through knock-on effects on the supply chain. If car manufacturers experience a downturn in business performance post Brexit (for example, through exporting barriers), this could be a threat to the envirotech industry.	
Brexit may present a threat to envirotech supply chains, particularly for SMEs. Legislative and regulatory changes may affect supply chain businesses who provide the support required by other firms and to meet regulations and environmental standards. This is particularly relevant to environmental consultancies, waste management and treatment, and technical testing businesses of which there is a cluster in the Marches.	

Quality of Life

Key attribute	Marches Performance
One of the main attractions of the Marches is that it is a nice place to live, work and visit which is facilitating investment interest.	
The ONS Quality of Life Index shows the Marches local authorities have higher than average life satisfaction and happiness ratings: • Life satisfaction: average 7.7 compared to UK average of 7.6 • Happiness: 7.6 compared to national 7.5	

3. Conclusions

3.1 This study has further developed understanding of the scale, character, and support needs of the Environmental Technologies sector. It reinforces the sector's potential for the Marches and its inter-relationship with other sub-sectors (e.g. advanced manufacturing). Envirotech in the Marches is represented by around 945 businesses employing 7,800 people. However, the true extent of the sector may be much larger, as other sectors apply environmental solutions. As highlighted in this chapter, it is the application of environmental technologies which may unlock the true potential of the sector. The contribution and the sector's growth potential highlights the important role Marches plays in economic collaborations such as the Midlands Engine through contributing to the growth and prosperity of a sector which is strategically important to the wider sub-region and the UK economy. The Marches needs to align its strategic response with these wider initiatives and take advantage of the ripple effect from major investment occurring both within, and outside, the sub-region.

3.2 The sector needs assessment provides a steer on the rationale for intervention to facilitate growth in the sector through targeted engagement, support and investment. These can be summarised under four themes for intervention.

Supporting Business

Rationale

The envirotech sector makes a growing contribution to the Marches economy but there is potential to do more. There is a role for Marches LEP in engaging with businesses and raising awareness of the business support offer, building on the work of Environmental Business Networks. This provides an established platform for engagement, which can be used to ensure businesses' needs are heard.

Employment and Skills

Rationale

A retirement bulge is expected to occur in Marches' manufacturing workforce in the next 20 years and there is an imperative to attract young and new entrants to the workforce to meet identified demands. The changing shape of skills needs and the disruption caused by the introduction of new technologies means the Marches must boost the productivity of the workforce and competitive position. This includes increasing the representation of higher level occupations and skills whilst maintaining a good stock of intermediate skills to meet replacement demands. It also requires an emphasis on digital skills, and attributes such as adaptability and creativity.

Innovation

Rationale

The Midlands Engine Science and Innovation Audit (2016) identifies the environmental technologies as one of the Midlands Engine's Four Market Driven Priorities.

The Marches has an opportunity to capitalise on the knowledge and skills held locally to drive innovation and application of environmental technologies. In particular, this relates to local expertise on driving resource efficiency and movement towards zero waste, where Marches has a competitive advantage.

There is a gap in our innovation assets currently as we do not currently have any established Excellence Centres in the area meaning our businesses have to leave the area to access this type of provision.

Physical Infrastructure

Rationale

Physical infrastructure in the Marches varies considerably by location and infrastructure type, however common themes include:

- Poor internal connectivity within the sub-region by road.
- Digital connectivity for business is challenging, with mobile blackspots, poor broadband and very expensive ultrafast connectivity.

- Limited availability of good quality sites which are genuinely developable and shovel ready.
- Viability challenges in both brownfield and greenfield locations due to the costs of delivering major infrastructure and the risks associated with speculative development.

3.3 The overarching Sector Action Plan provides a strategic response to the identified issues contained within the four Sector Needs Assessments and identifies broad areas for intervention which will be developed by Marches LEP in partnership with key stakeholders.

Appendix A - Sector Definition

A.1 The Standard Industrial Classification (SIC) definition of the Environmental Technologies sector was provided by Marches LEP as follows.

Activities	Sub-sector	2007 SIC (5 digit)
Processing of nuclear fuel	Processing of nuclear fuel	24460
Man. Of other electric components	Manufacture of central heating radiators and boilers	25210
Man. Of tanks and reservoirs	Manufacture of other tanks, reservoirs and containers of metal	25290
Man. of steam generators	Manufacture of steam generators, except central heating hot water boilers	25300
Man. Of other electric components	Manufacture of electric motors, generators and transformers	27110
Man. Of electricity distribution & control	Manufacture of electricity distribution and control apparatus	27120
Man. Of other electric components	Manufacture of batteries and accumulators	27200
Man. Of pumps, compressors & other equipment	Manufacture of fluid power equipment	28120
Man. Of pumps, compressors & other equipment	Manufacture of pumps	28131
Man. Of pumps, compressors & other equipment	Manufacture of compressors	28132
Man. Of pumps, compressors & other equipment	Manufacture of non-domestic cooling and ventilation equipment	28250
Other manufacturing	Other manufacturing nec	32990
Electricity production & distribution	Production of electricity	35110
Electricity production & distribution	Transmission of electricity	35120

Electricity production & distribution	Distribution of electricity	35130
Electricity production & distribution	Trade of electricity	35140
Gas & steam	Manufacture of gas	35210
Gas & steam	Distribution of gaseous fuels through mains	35220
Gas & steam	Trade of gas through mains	35230
Gas & steam	Steam and air conditioning supply	35300
Water supply and management	Water collection, treatment and supply	36000
Waste management	Sewerage	37000
Waste management	Collection of non-hazardous waste	38110
Waste management	Collection of hazardous waste	38120
Waste management	Treatment and disposal of non-hazardous waste	38210
Waste management	Treatment and disposal of hazardous waste	38220
Waste management	Dismantling of wrecks	38310
Waste management	Recovery of sorted materials	38320
Waste management	Remediation activities and other waste management services	39000
Engineering & technical activities	Engineering related scientific and technical consulting activities	71122
Engineering & technical activities	Other engineering activities (not including engineering design for industrial process and production or engineering related scientific and technical consulting activities)	71129
Engineering & technical activities	Technical testing and analysis	71200
R&D	Research and experimental development on biotechnology	72110
R&D	Other research and experimental development on natural sciences and engineering	72190
Environmental consulting	Environmental consulting activities	74901

A.2 **Technical testing and analysis** (SIC 7120) - This class includes the performance of physical, chemical and other analytical testing of all types of materials and products, such as:

- acoustics and vibration testing
- testing of composition and purity of minerals etc.

  - testing activities in the field of food hygiene, including veterinary testing and control in relation to food production
  - testing of physical characteristics and performance of materials, such as strength, thickness, durability, radioactivity etc.
  - qualification and reliability testing
  - performance testing of complete machinery: motors, automobiles, electronic equipment etc.
  - radiographic testing of welds and joints
  - failure analysis
  - testing and measuring of environmental indicators: air and water pollution etc.
- certification of products, including consumer goods, motor vehicles, aircraft, pressurised containers, nuclear plants etc.
- periodic road-safety testing of motor vehicles
- testing with use of models or mock-ups (e.g. of aircraft, ships, dams etc.)
- operation of police laboratories

Appendix B - Glossary

Table B.1 Glossary Table

Acronym	Definition
4IR	Fourth Industrial Revolution
AME	Advanced Manufacturing and Engineering
APS	Annual Population Survey
ASHE	Annual Survey of Hours and Earnings
ATWA	Agri-tech West Alliance
BIS	Department for Business Innovation & Skills
BRES	Business Register and Employment Survey
BRIC	Brazil, Russia, India and China
D2N2	Derby, Derbyshire, Nottingham Nottinghamshire
DiT	Department of International Trade
DS	Defence and Security
ERDF	European Regional Development Funding
ET	Environmental Technologies
EU	European Union
FAME	Financial Analysis Made Easy
FDI	Foreign Direct Investment
FMP	Food Manufacturing and Processing
FTE	Full Time Equivalent
GM	Greater Manchester
Golden Triangle	Harper Adams University Regional Food Academy in Newport, Reaseheath College Food and Dairy processing facilities in Nantwich and the NOW food testing centre at University of Chester in Chester.
GVA	Gross Value Added
HAU	Harper Adams University
HMRC	Her Majesty's Revenue and Customs
HWGTA	Herefordshire and Worcester Group Training Association
IoS	Index of specialisation
ISCF	Industrial Strategy Challenge Fund
LA	Local Authority
LEP	Local Enterprise Partnership
LSOA	Lower Layer Super Output Area
MCMT	Marches Centre for Manufacturing and Technology

MEIF	Midland Engine Investment Fund
MGH	Marches Growth Hub
MSOA	Middle Layer Super Output Area
NEET	Not in education, employment or training
NMiTE	New Model in Technology & Engineering
NPIF	National Productivity Investment Fund
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
SIC	Standard Industrial Classification
SME	Small and medium enterprise
STEM	Science, Technology, Engineering and Maths
SWOT	Strength, Weakness, Opportunity, Threats
TWC	Telford and Wrekin Council
UA	Unitary Authority
UKBC	UK Business Counts
UKCES	United Kingdom Commission for Employment and Skills
UKEF	United Kingdom Export Finance
WTO	World Trade Organisation
BESST	Business Environmental Support Scheme for Telford
MMBEN	Meres & Mosses Business Environment Network
BFF	Business Futures Forum
WRAP	Waste and Resource Action Programme
DIAD	Driving Innovation in Anaerobic Digestion (DIAD)
NIC	National Infrastructure Committee

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