

Skills Review of Priority Growth Sectors



York & North Yorkshire
**LOCAL ENTERPRISE
PARTNERSHIP**

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1. Executive Summary

Sector	Key Headline	Summary
Agriculture & Technology	<p>1. It is difficult to identify the specific skills requirements in relation to farm technology and innovation, as many farmers are not yet adapting to these opportunities, particularly due to capacity limitations and pressures from regulatory changes.</p>	<p>Businesses are at different stages of technology use (with many not yet utilising this within their farm), as it may not be their biggest priority and they may need other support to effect change. Changes in regulation, e.g. impacting on subsidies, rising costs and the net zero agenda may force farm businesses to look at efficiency measures, diversification, and the use of technology to support this.</p>
	<p>2. There is a distinct move by training providers to develop courses that include precision farming and the use of technology such as robotics, and for those to be flexible and hybrid. However, industry has sometimes felt a mismatch in provision previously, which raises questions around the appropriateness of current and future courses.</p>	<p>Previously 'in-work' skills have had a more traditional focus, supporting farmers with accreditations in pesticide use for example. This provision still exists but there is a move towards in-work skills, offering introductions to use of technology, more efficient use of machinery and also further advancements in technology, e.g. use of robotics and AI. But, how do we ensure that farm businesses engage with this provision and that providers are providing the courses they need in terms of content and format?</p>
	<p>3. There is a need for more people to enter the farming industry to help effect change and support the use of technology. This could also include growth in consultancy/support and supply chains.</p>	<p>A growing portion of provision is being tailored to agri-tech opportunities. However, students benefiting from those updated courses may not be aware of the different career pathways within agriculture and that not all outcomes have to be traditional farming. Equally, questions remain around whether people start agricultural courses with an eye on the future of farming and innovative advancements. Ultimately, the sector has a labour shortage and could benefit from younger people, and those with transferable skills from other industries, joining the sector and supporting technological changes.</p>
Green Construction	<p>1. Training providers are ready and willing to adapt to green construction needs, but something needs to drive the industry and get the industry ready for change as a matter of urgency (i.e. market change, regulations).</p>	<p>Industry needs to drive the green skills agenda forward, but this won't happen if the demand from consumers isn't there. Support from Government and supply chains would help to encourage a shift within the market as well as security and certainty that the green agenda is here to stay. Changes have already taken place elsewhere and driven demand, for example, in Scotland, all new houses must be built to Passivhaus specification. More support, funding and flexibility for retrofitting by Government could drive demand, increasing the need for training within supply chains.</p>

Sector	Key Headline	Summary
Green Construction	2. One priority for green construction is around upskilling and reskilling the current labour force, particularly to support labour shortage challenges.	The sector faces major challenges around labour shortages, which will be exacerbated by future demand around retrofitting. In order to plug this gap and support the transition to carbon negative within the sub-region, reskilling and upskilling will play a critical role. Equally, encouraging more younger people and diversity into the sector will help to stabilise a future pipeline of talent.
	3. Standards and accountability is critical in new construction methods.	Qualifications and standards within green construction methods will provide confidence to consumers, businesses and providers of training. It is important that these standards are embedded in regulation, clear and understood.
Cyber-Security	1. A range of training provision exists around cyber-security, but many businesses and individuals lack the awareness and time to identify what is applicable to them.	It's clear that cyber skills are a necessity, particularly to avoid financial and reputational costs to a business. But it can be difficult to engage businesses on this topic, with many struggling to get staff to realise that they need to do the cyber training (even if they're not within a cyber role). Time and capacity can also be a training barrier, meaning a one size fits all approach isn't necessarily the answer.
	2. As cyber security is ever-increasingly critical across all businesses, there will be growth opportunities for people within this field and developing future pipelines is needed, particularly ensuring diversity within the sector.	Cyber skills are required across all sectors, particularly as technology innovation advances, meaning that these skills are going to be in demand, both for in-house specialists and for external consultancy support. So, it is critical to ensure a future pipeline is developed to fill this gap, including career pathway guidance, retaining graduates and improving diversity. To ensure that training keeps pace with advances in cyber threats, a strong relationship between industry and providers is also needed.
Rail Innovation	1. An ageing workforce is a challenge for the sector and exacerbates labour shortages further. Upskilling and reskilling is needed to retain employees for longer.	New entrants are important but the current workforce can't be overlooked – they need to be encouraged to retire at a later stage, or stay in the sector for longer in a new role. There is a major opportunity around upskilling and retraining, including through an apprenticeship route and encouraging transferable skills from other sectors, particularly as the labour shortages are happening now and are not simply a potential, future risk.
	2. Jobs within the rail sector can be incredibly diverse, but these are often overlooked for traditional roles, particularly linked to engineering. These different opportunities need to be promoted further to young people and to increase diversity.	The majority of workers within the rail sector are male, white and above 40, which is primarily due to people lacking awareness of the career opportunities and the skills required for new and growing roles, particularly linked to sustainability and digitisation. More can be done to engage younger people, women and minorities, promoting the benefits of a career in rail, such as stable income, development opportunities and career progression, including the variety of roles. This will also help to support challenges linked to labour shortages.

Sector	Key Headline	Summary
Rail Innovation	3. Some sectoral training provision does exist, but more collaboration between academia and industry will ensure gaps are plugged and best practice is duplicated.	Across York and North Yorkshire, there is already strong skills provision to support the rail sector, and there are close links to neighbouring assets. Many providers are working closely with industry to develop the training, but there are still major labour shortages and collaboration needs to continue to ensure a future pipeline with the right skills, particularly with growth opportunities within sustainability and digitisation.
Film & TV	1. The sector has been complex to navigate with an incredibly broad range of roles and subsectors, so further mapping of career opportunities and pathways is required, particularly linked to increasing diversity.	Casting the net wide across this sector proved challenging to pinpoint a specific skills needs and intervention where the LEP could support. Training provision does exist and there are some links between academia and industry, but there were some mixed views on this and not a 'one size fits all' solution. It's unclear whether there is currently a mismatch between provision and industry, or rather a lack of awareness of the opportunities from industry. In particular, stakeholders emphasised a gap within new entrants to the sector and a pressure on people to be multi-skilled and adaptable.
Health & Life Sciences	1. Training provision exists for both health and life sciences, but some of the bigger challenges are linked to labour shortages.	Provision is focussed on training to enter the sector and develop careers within and covers more traditional healthcare professions and skills needs for life science careers. However, some stakeholders suggested that there was a 'people gap' rather than a 'skills gap' within the sector. The recruitment issues within the sector are also having an impact on the capacity of those working within the sector meaning training is often deprioritised and limited.
	2. Digital and data analytics are playing an increasingly larger role within life sciences.	Repeatedly, digital skills are highlighted as one of the most critical training areas, particularly due to a greater emphasis on developing technological solutions within this sector. This is advanced skills around data analytics and programming with a direct link to scientific experience. But there are challenges with losing these digital skills to other sector.
Bioeconomy	1. Greater collaboration between academia and industry is needed to ensure that academic expertise is aligned to commercial and business requirements, particularly within new entrants	The Bioeconomy can be difficult to define as it covers a range of sectors including: agriculture; forestry and fishing; production and manufacturing; construction; and professional, scientific and technical. Although there are multiple sub-sectors, there are two common threads across the Bioeconomy: scientific expertise sits at the core of the sector's professions, but multi-disciplinary skills, covering entrepreneurship and digital skills, are critical.
Sustainable Energy	1. There is training provision linked to the sustainability agenda in the early stages of delivery, with further courses in development. But providers have faced a number of barriers when developing courses to support the transition to a net zero economy.	Providers across the YNY area are starting to deliver and develop courses to support the transition to net-zero economy. But are businesses ready for this training and is it addressing some of the fundamental needs of the industry? OFFICIAL - SENSITIVE

Sector	Key Headline	Summary
Sustainable Energy	2. Digital, engineering skills are at the forefront of need in the renewables sector.	The need for digital skills are being flagged across a number sectors and that also applies to sustainable energy. The level of these skills are varying and cover both those operating in the industry and the end users. For example, responsive 2-way energy infrastructure (e.g. where solar farms can be switched on and off by a central team) will require digital infrastructure and skills to manage this.
	3. A 'Just transition' is highlighted as fundamental to delivering a net-zero economy but what provision is there is support this?	Swapping to sustainable energy sources is critical for the environment, but equally, there are economic benefits for businesses as well, such as enabling new customers and ensuring longevity. However, there is a risk that this transition could be detrimental to some individuals, particularly linked to limited diversity in the sector and the potential for lowered wages. Understanding how to overcome these challenges is critical for this sector.

2. Introduction

The York and North Yorkshire Local Enterprise Partnership (LEP) were awarded funding between April 22 to March 23, via their Skills Advisory Panel (SAP), to strengthen its analytical capability of the labour market and wider skills landscape.

The aim and objectives of the SAP grant for the financial year 2022 to 2023 were slightly different to previous years, as it must provide research and analysis that can support the development of Local Skills Improvement Plans.

In 2021, *The Skills for Jobs* White Paper set out an intention to put employers more firmly at the heart of the skills system through the introduction of new employer-led Local Skills Improvement Plans (LSIPs). Led by designated Employer Representative Bodies (ERBs), LSIPs are strategic plans that will set out a clear articulation of employers' skills needs and the priority changes required in a local area to help ensure post-16 technical education and skills provision is more responsive and flexible in meeting local labour market skills needs. The West and North Yorkshire Chamber of Commerce were confirmed as the designated ERB for York and North Yorkshire.

The expectation is that the funds will be deployed to meet two objectives:

1. Produce and make available robust analysis of skills needs and the local labour market.
2. Work collaboratively with the ERB in the development

of an LSIP for the area.

The LEP proposed that part of the funding would be allocated for deep dive research activity to support any specific sectoral or spatial dimensions that the ERB wishes to explore for evidence underpinning their LSIP. This included the decision to build on the LEP's previous sector analysis that concluded in March 2022.

The LEP previously published a [report from Kada Research](#) (on the LEP's behalf) that identified the high growth potential sectors across York and North Yorkshire. This research was based on gathering intelligence (official and commercial data) and insights from stakeholders to identify the key sectors, in particular, those that would contribute to a 'greener', 'fairer' and 'stronger' economy. The key sectors identified were:

1. Agri-Food Innovation
2. Sustainable Energy and Bioeconomy
3. Health, Pharma and Life Science Innovation
4. Digitech, Data and Creative Industries
5. Advanced Manufacturing

If these sectors are to grow within the sub-region, it was recognised that the skills agenda will be critical, particularly ensuring that the right people are available with the right skills. To enable that, this research has undertaken the following activity:

Provider engagement: a combination of interviews and surveys have been utilised with training providers to identify what current provision exists, future plans and

how this relates to the priority sectors, whilst also considering the barriers that providers are facing.

Industry engagement: to ensure the research is demanded, various interviews have been conducted with key businesses on the patch. They were questioned around their current skills demands and future needs. It was noted that some sectors had more willingness to engage and would like to continue to collaborate.

Throughout the process, the West and North Yorkshire Chamber of Commerce (as the ERB) were engaged to ensure that the research would contribute towards the LSIPs.

To avoid duplication, where applicable, other stakeholders were engaged in the process. For example, City of York Council around the rail sector and the North Yorkshire Cyber Cluster.

Literature Review: there was already a strong evidence base looking at existing skills gaps, covering a national, regional and local level. Where identified, this has been reviewed and supported this research.

Finally, the LEP also purchased the skills database Lightcast, which collates job posting information (including details on the skills requested), occupational and sector level insights. Funding for this was provided via the LEP, not via the SAP allocation.

Due to the broad nature of the original sectors identified, the LEP chose to break these down further into small specialisms, which included:

- Agriculture and Technology due to the rural nature of the patch and dominance of agriculture, but recognising the future opportunities around technology usage;
- Green Construction, primarily due to its links to manufacturing through modular builds, but equally, the critical role it plays in the transition to carbon negative;
- Cyber security, as part of Digitech, Data and Creative Industries, both as a sector within itself, but also a skillset required across all businesses;
- Rail Innovation, as part of Digitech, Data and Creative Industries, recognising the particular

opportunities of this sector within York;

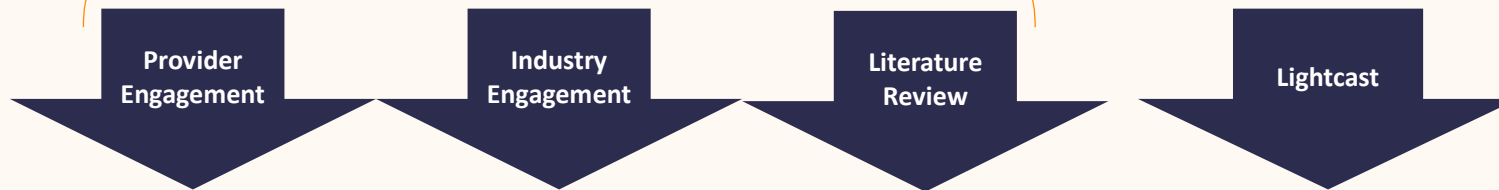
- Film & TV, as part of Digitech, Data and Creative Industries. This is not a sector that the LEP has previously prioritised, but there are opportunities to build on successes;
- Health & Life Sciences were both considered, but there are some nuances between the two, particularly linked to the role of the public VS private sector;
- Bioeconomy & Sustainable Energy are both critical to the transition to carbon negative and feed into ambitions around the [York and North Yorkshire's Devolution deal](#).



Summary of activity:

Qualitative data

Quantitative data



Key headline challenges and opportunities for each sector and recommendations on how industry and providers can be supported.

Support Local Skills Improvement Plans

Provide evidence for future funding opportunities, such as UK Shared Prosperity Fund and Devolution.

3. Agriculture & Technology

Introduction

Agri-tech has been highlighted as a sector specialism for York and North Yorkshire. However, there is some debate around how agri-tech is defined. The Department for International Trade includes agri-tech within a 'High Potential Opportunity' area for York and North Yorkshire, which covers Controlled Environment Agriculture (CEA), particularly as the demand for methods such as vertical farming is expected to increase rapidly, led by the popularity of organic food. However, there are also opportunities for traditional farmers to maximise technology to improve efficiencies and support upcoming requirements around environmental land management. This has primarily been the focus of this research. Consequently, to avoid any confusion, the priority sector has been labelled 'Agriculture & Technology'. Although the opportunities linked to inward investment should not be overlooked.



Key Headlines:

1. It is difficult to identify the specific skills requirements in relation to farm technology and innovation, as many farmers are not yet adapting to these opportunities, particularly due to capacity limitations and pressures from regulatory changes.

2. There is a distinct move by training providers to develop courses that include precision farming and the use of technology such as robotics, and for those to be flexible and hybrid. However, industry has sometimes felt a mismatch in provision previously, which raises questions around the appropriateness of current and future courses.

3. There is a need for more people to enter the farming industry to help effect change and support the use of technology. This could also include growth in consultancy/support and supply chains.

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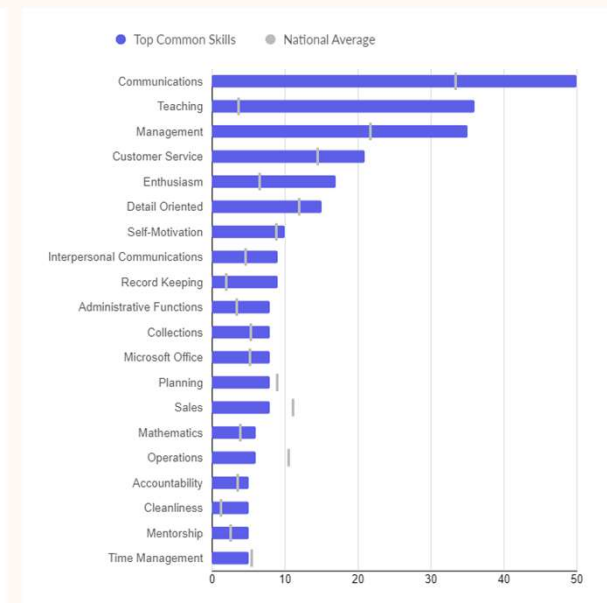
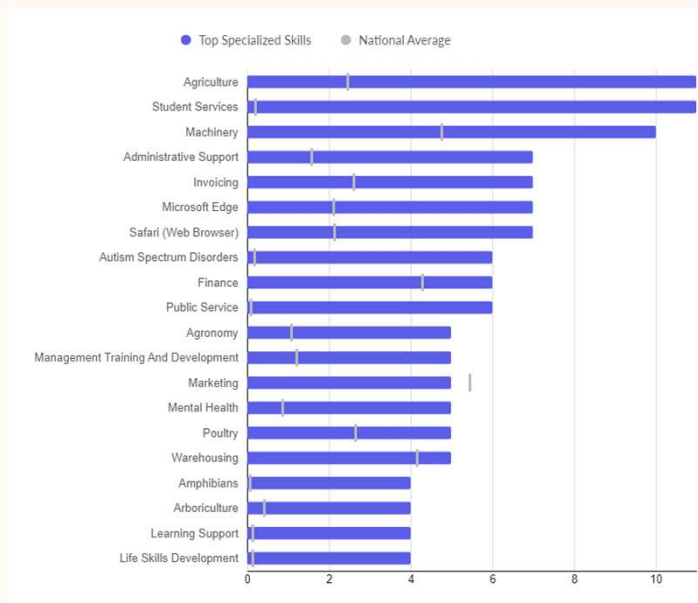
Businesses are at different stages of technology use (with many not yet utilising this within their farm), as it may not be their biggest priority and they may need other support to effect change. Changes in regulation, e.g. impacting on subsidies, rising costs and the net zero agenda may force farm businesses to look at efficiency measures, diversification, and the use of technology to support this.

There is a wide range of technology opportunities within the sector, from robotics and drones to GPS technology and sensors to monitor livestock and improve crop yield. According to stakeholders, the skills required for these techniques can broadly fall into two categories:

1. Operational skills: someone needs to be capable of setting-up, operating and maintaining the machinery;
2. Data analytic skills: the data collected by the technology will need to be interpreted and analysed, in order to have an impact and improve efficiencies. Agronomists and farm consultants will be mostly interested in this. Linked to this area, skills around Geographical Information Systems (GIS) would be useful, as a lot of the technology is linked to land-based data.

However, many farmers may not yet be considering the use of technology, or these associated skills, as demonstrated by the skills required in job postings in 2022 (none of which include technology usage).

Top Specialized & Common Skills Requirements:



Source: Lightcast, Job Postings Data, 2022

*Requirements may be skewed by job postings from training providers (i.e. Askham Bryan) which require sector specialists

This is likely due to a lot of critical changes taking place in the sector, including the EU Exit, Basic Payments starting to disappear and a shift to farmers being compensated for environmental land management. There are also a number of labour shortages within the sector, with a large reduction, since 2020, in the top 10 occupations within the sector, which includes (Source: Lightcast):

- Farm workers
- Farmers
- Managers
- Horticultural Trades
- Animal Care Services
- Agricultural Machinery Drivers
- Fishing and other elementary agricultural occupations

Within the top 20 occupations, there are a number of occupations which seem to suggest a future focus on technology including: Information Technology and Telecommunications Professionals, IT Specialists, Research and Development Managers and Biology and Scientists and Biochemists. However, there has been very little change in the numbers within these occupations since 2020 and predictions to 2031 show little change expected in these occupations. It is predicted that the more traditional occupations will see a further reduction.

Consequently, training opportunities (linked to technology or otherwise) may not be at the top of their

agenda. If farmers are investing in skills, they need to be clear on the financial benefits.

Consequently, before farmers' skills needs can even be considered, further engagement with the sector is required, in order to contextualise how the technology is relevant and can benefit the farmer. We need to use the change that is taking place in the sector to drive the use of technology, since many farmers have been forced to now think about diversification and alternative ways of farming. The energy crisis has also become a driver for farmers to make changes, such as considering regenerative farming techniques as this means less inputs.

In order to effect change within the sector, awareness-building and the language to do that, will be incredibly important. The terminology needs to be appropriate and relevant, otherwise it will be difficult to engage the sector. One of the reasons this sector focus changed to 'agriculture and technology' is because 'agri-tech' is often perceived differently and many farmers may not consider it relevant to them. One provider highlighted that the use of GPS guidance systems and electronic identification systems are now common-place on arable farms but some farmers don't necessarily appreciate these are examples of precision farming technology.

One stakeholder described it as the 'use of technology to develop data and use this to make informed decision on the farm'. Another suggested that the technology usage isn't a sector within itself, but rather a skills need and cross-cutting theme and the other is precision farming practices (e.g. Controlled Environment

Agriculture, hydroponics). It can also be challenging to define as one stakeholder highlighted: 'farms aren't one or the other [in terms of the techniques they use] and it's almost impossible to label exactly', as they're often using multiple techniques, some of which overlap with agri-tech. Even beyond technology, the industry is very diverse, with some farmers living in rural poverty and reliant on land agents for paperwork, whilst others are much larger and progressive farms. Job roles can be varied as well, i.e. Farm Finance Vs Agronomy Vs Food Manufacture, all of which require different skillsets and priorities. Consequently, a one-size fits all approach would not be appropriate.

[A survey was undertaken to engage farmers and full results can be found in the appendix](#)

Skills Needs:

- Understanding a farm's carbon footprint
- Health & Safety
- Farm Business Accounting
- Mental health & wellbeing
- Countryside Accreditation Education
- Food Producer Accreditation
- Operational skills for the technology
- Data analytics and interpretation
- Geographical Information Systems
- Leadership and management

Although awareness-building is required, the sector can be really challenging to engage, which was partly a barrier to this research. Farmers acting as advocates for the training and technology would help to establish trust and drive change. A combination of practical and peer to peer learning is a good approach for training and supporting farmers. Examples of this include C4DI, who have previously ran seminars with peers demonstrating their experiences with technology on their farms. Another channel to reach farmers is via trusted publications such as Farmers Weekly, which provides useful tips and events. Most farmers will receive this and see it as a reliable source.



2. There is a distinct move by training providers to develop courses that include precision farming and the use of technology such as robotics, and for those to be flexible and hybrid. However, industry has sometimes felt a mismatch in provision previously, which raises questions around the appropriateness of current and future courses.

Previously 'in-work' skills have had a more traditional focus, supporting farmers with accreditations in pesticide use for example. This provision still exists but there is a move towards in-work skills, offering introductions to use of technology, more efficient use of machinery and also further advancements in technology, e.g. use of robotics and AI. More traditional qualifications and career pathways now have use of technology embedded and offer modules on precision farming. But, how do we ensure that farm businesses engage with this provision and that providers are delivering the courses they need in terms of content and format?

Typically the training is geared towards traditional farming courses with modular additions focussed on technology. Most provision under 'agriculture, horticulture and animal care' is delivered through three further education colleges: Askham Bryan, Craven College and Bishop Burton (out of YNY area but within catchment for the population). This provision ranges from pre-entry to masters level, including apprenticeships and T Levels. Bespoke programmes, funded through ESF, also provide courses (part or fully funded) to support the agriculture sector.

Apprenticeships offered within the region by further education colleges include: Crop Technician, Livestock Unit Technician and Land Based Service Engineering Technician at levels 2 and 3. Crop Technician and Land Based Service Engineering Technician are all currently in revision in terms of the 'green' content.

In 2022, there were 1,208 enrolments in agriculture, horticulture and animal care in York and North Yorkshire and 310 enrolments in apprenticeships. Enrolments are concentrated at levels 1-2 with 757 enrolments across all

courses at this level and 617 at level 3. The majority of learners are under 19 (892) and 19-24yr olds (307), suggesting that this training is typically preferred by younger people, although the number of achievements across all courses has decreased from 2020.

There are a number of courses focussed on precision farming, both livestock and crops, which include at least one specialist module, e.g. precision crop technology, robotics and automated technology. Other courses that don't specify precision farming do focus on productivity and sustainability.

Some courses are awaiting validation for 2023 delivery and these have a focus on precision farming with a high degree of flexibility built in: hybrid learning offering some online course content, available 24/7 from any location, part-time options, lecture specific days to enable students to work in industry as well as completing their course. There are also flexibilities in the range of qualifications e.g. FdSc, top up courses, HNC where courses can be studied with options to continue to further qualifications e.g. BSc.

Wave 4 Skills Bootcamp development did include entrepreneurial skills for agricultural sector, covering the following skills sets: business planning, diversification planning, marketing and management. Procurement is ongoing and so yet to be decided if delivery will take place.

Future delivery includes a focus on the use of technology and in-work short courses reflecting the changing needs within the industry. The main drivers for future provision are: government strategy, regional and national skills agenda.

Craven College are going to be focussing on using technology in their courses through drones and a virtual immersive room using funding from IoT. Short drone technology courses for farming businesses will be provided, which could help increase efficiencies in how livestock is managed, pinpointing those animals who need extra support/medical treatment and reducing the need for a farmer to physically check all livestock.

Askham Bryan are providing a continuation of land-based specialisms, including increasing use of technology related to the sector, such as VR and drone-technology. A range of T-Levels will be available in agriculture which include industry placement and a range of industry relevant commercial qualifications that are in-demand in the sector.

Bishop Burton provide T-Levels in Agriculture (Level 3), short courses in Precision Agriculture & Robotics and HNC Engineering (Land-based) will include precision agriculture technologies.

In-Work Skills Short Courses will include L4 'Bite-Sized' Courses: Future Farming / Precision Technology, for current students and local agricultural businesses looking to gain an introduction to these advancing technologies and methods. Courses have been internally quality assured and will have an assessment at the end of the course to test understanding. This includes:

1. Agricultural Robotics: Robotics are becoming more advanced in agriculture. Some sectors of agriculture rely on robotics to fill labour shortages – the dairy and soft fruit industry in particular rely on robotics. As robotics become more advanced and operators understand more about their capabilities, further developments and enhancements will be made. This programme aims to introduce the foundations of robotics in agriculture, their operational scope and future developments in arable farming.

2. Agricultural Technology & Data Handling Communications: Modern agricultural systems for crops and livestock require the collection of data for efficient, sustainable production. Data is collected by Electronic

Identifications Tags (EID) from tractor systems using Global Navigation Satellite Systems (GNSS) and ISOBUS compatible equipment. For this data to be of use, it must be stored in software that can integrate with Farm Office systems, such as Farm Plan and Gate Keeper.

3. Agricultural Guidance Systems & Communications: Modern agriculture uses Global Navigation Satellite Systems (GSNN) for controlling a multitude of machinery. Machinery for drilling, spraying, fertiliser application and mechanical weed control are amongst the equipment used in precision agriculture. As technology advances, machinery will become more autonomous, requiring a more advanced knowledge for operators to facilitate procedures in the future. This programme will develop knowledge and skills from a basic start point, building up to a more advanced level.

Although there have been updates to provision to reflect agri-tech requirements, some of it continues to be tailored around traditional farming, as one provider highlighted, the basics of good crop and livestock husbandry remain unchanged and provide an essential foundation for further skills development. For example, the commercial and skills training courses offered through one Further Education institution are focussed on practical, more traditional farming needs: handling of pesticides, chainsaw maintenance, tree survey and inspection.

There are also a number of barriers that providers are facing around delivery and standards, especially of new courses. For example:

- Providers want to recruit industry professionals who are highly skilled in demand/growth sectors but providers cannot afford comparable salaries, due to funding

limitations in FES so there is competition in employees within the sector.

- Awarding bodies/qualifications are not always covering content that is future-focussed in regards to sustainability and green skills. It's often covering what is done in industry now as oppose to what students might be doing in the future.
- Apprenticeships in farming innovations is a difficult area. Whilst futureproofing of standards is encouraged, the impact on certain employers needs to be understood.
- Particularly in the farming sector, the cost of new equipment and digital technology is prohibitive for some small employers and others may wish to continue to use traditional farming methods.
- A number of issues have been raised with T Levels including: directing students to specialise too soon, e.g. into crop or livestock farming which restricts future career paths and removal of the 'science' base has led the animal management T Level to be delayed due to provider feedback and is due for delivery 2024.
- Business engagement in developing courses through SDF has been a struggle.

From a business perspective, challenges around accessing the training have also been raised, including:

- Cost of the training
- Location of the training provider
- Feeling the course is too academic
- Lack of time

There also may be a lack of awareness on the opportunities, as some stakeholders suggested that farms feel there is a gap in the provision, particularly linked to upskilling and reskilling. There is also often a cynicism from farmers about training provision.

Barriers are also linked to the technology usage. A lack of infrastructure and signal strength can cause limitations and an inability to even use the equipment. Where technology is implemented on the farm, it is often only required a few times a year, so lengthy training for this wouldn't be worthwhile. However, it does mean that it can often be time-consuming and

relearning of how to use the equipment and set it up is often required each time. Some farmers will want to stick to traditional methods of farming and be hands-on, particularly if the technology provides a solution to something that they don't view as a challenge.

Support aimed directly at industry, and not just new

entrants into the sector, also exists. For example, the [Agri-Tech Accelerator Programme](#) delivered through Barclays Eagle Labs and University of Lincoln provides a 10 week Accelerator programme supporting the growth of agri-tech businesses through mentoring and skills support based on specific business needs. This is online and accessible for businesses within York and North Yorkshire area.

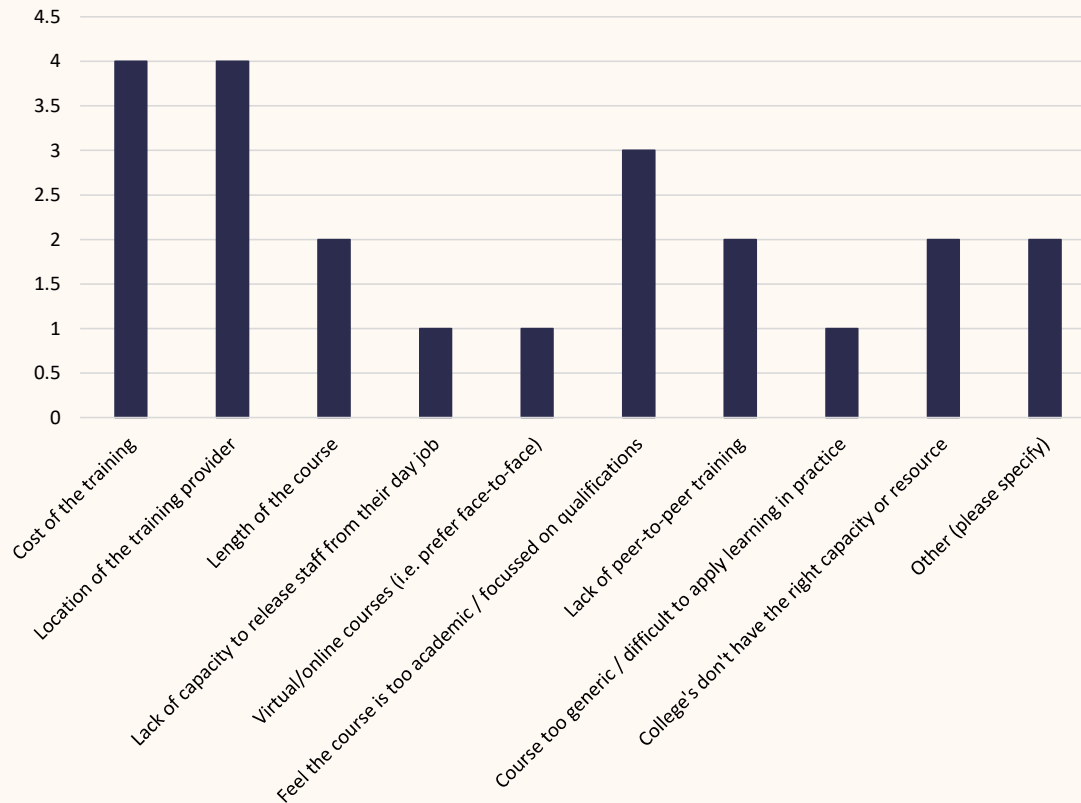
[Cultivate Programme](#) is delivered by Harper Adams University and Barclays Eagle Labs, the programme is fully funded and offers support for agri-food or agri-tech businesses to launch or grow through core training sessions; finance, purpose and sustainability and mentoring.

[Bespoke Skills Programme](#) also offers a range of rural and farming based qualifications and training for businesses. Some training is funded through ESF and can provide up to 60% funding. A number of these courses include support with using machinery more effectively including GPS machinery, IT skills, environmental awareness, leadership and management. A need for operational skills to set-up, operate and maintain the machinery was flagged by stakeholders and is covered here.

The range of digital provision available across YNY could also support the industry and offer transferrable skills.

Alongside the training provision, York and North Yorkshire is also home to multiple innovation assets supporting the sector, but there be some disconnect between academia and farming businesses.

Do any of the following factors limit you from accessing external training support? (Tick all that apply)



*Note: this was a small sample size of 5 farmers and they were able to choose multiple barriers.

The University of York is the location of the Centre for Novel Agricultural Products, the Green Chemistry Centre for Excellence and the Centre for Excellence in Livestock. The Centre for Novel Agricultural aims to realise the potential of plant, microbial and algal-based renewable resources through gene discovery. From developing sustainable food crops and biofuels to advancing plants for land decontamination, they maximise the value of plants without compromising food security.

York Crop Health and Protection (CHAP) facilities are a UK Agri-Tech Centre funded by Innovate UK, bringing together leading scientists, farmers, advisors, innovators and businesses to understand industry challenges, drive research and innovation and develop and trial solutions that transform crop systems.

They work with partners to translate and promote these solutions for market adoption and improved crop productivity. Their mandate is to increase crop productivity for future generations through the uptake of new technologies.

The Stockbridge Technology Centre was launched in 2001 to ensure continued technological developments for the horticultural industry. This grower-led initiative has created an independent horticultural centre of excellence supported by both the production and supply sectors of the industry.

The Biorenewables Development Centre bridges the gap between the world-class science base at the University of York and the needs of industry to develop and scale-up new greener processes and products.

York Biotech Campus is a proven facility for discovery, innovation and success. Situated a few miles north of York in an 80-acre parkland setting, the campus provides space for both entrepreneurs and start-ups through to scale-ups and established organisations in a flexible and unique scientific environment

N8 Agri-Food combines expertise and multiple disciplines from the 8 research intensive universities in the North of England – Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York. The programme takes a food systems approach to tackling the challenges facing food security. Through effective collaboration across the sector with industry, government, small to medium businesses, non-governmental organisations and charities, they aim to generate new knowledge and in turn take action to address these complex challenges.

Yorkshire and Humber Institute of Technology is one of twelve Institutes of Technology across England designed to increase access to higher level technical skills required by employers.

Fera Science Ltd is a joint Venture between Defra and Capita focused on supporting the agri-sector.

University Centre Askham Bryan has access to the 238-hectare Home Farm, which houses a milking herd of 200 cows, which are milked through a rapid exit parlour and a DeLaval Robot, a state-of-the-art high welfare precision beef facility in which students will actively participate in the use of the latest precision-livestock equipment,

research, and industry engagement. The Farm also features a new £2.4 million Agri-Tech Innovation Centre dedicated to advanced agricultural and engineering training.

Bishop Burton has a fully operational commercial farm, Centre for Precision Agricultural, Centre for Centre of Agriculture Innovation focusing on agricultural research and development.

Training is at various levels, some are introductions to these advancing technologies, others provide more in-depth support. Both new entrants and businesses can access this support and providers are keen to engage and collaborate with industry. So, the challenge is not a lack of skills support, but bridges may need to be built between academia and industry. Businesses either lack awareness of the training, lack the capacity to utilise the training, or the providers are potentially ahead of industry with technological advancements.

3. There is a need for more people to enter the farming industry to help effect change and support the use of technology. This could also include growth in consultancy/support and supply chains.

A growing portion of provision is being tailored to agri-tech opportunities. However, students benefiting from those updated courses may not be aware of the different career pathways within agriculture and that not all outcomes have to be traditional farming. Equally, questions remain around whether people start agricultural courses with an eye on the future of farming and innovative advancements. Ultimately, the sector has a labour shortage and could benefit from younger people, and those with transferable skills from other industries, joining the sector and supporting technological changes.

There are approximately 7,272 people employed within the agricultural sector within York and North Yorkshire, which is 129% above the National average (Lightcast, 2021). The sector is clearly a specialism within the sub-region, but it is male-dominated, typically with much older workers, and wages are generally low. The average wage per job is £19,731 (Lightcast, 2021) compared to the national average of £22,428. Linked to this, more people need to be encouraged into the sector who will also embrace technology, which could provide further opportunities around increased wages and support regulatory changes.

Typically to attract new employment, this is done via local communities, farmers events and word of mouth. Where advertisements are used, this is typically in farming publications. Farming roles often include accommodation, so there's a lot of pressure to provide this, otherwise people would not be interested in the role. With staff retention, going above and beyond to provide added value is often required, for example, creating a family

environment, providing meals and accommodation.

In terms of career pathways, those from agricultural courses are often varied with many returning to their home farm, managing other farms, taking careers in animal health or agronomy. Few take on roles linked to technology advancements and data analytics. The majority of agricultural roles are based within 'farm workers', 'farmers', 'managers and proprietors in agriculture and horticulture', 'elementary storage occupations' and 'horticultural trades' occupations. Although it should be noted, it is difficult to isolate the roles that relate to technology and analytics, as where these do exist, it is likely they are integrated into a traditional role. 'Information Technology and Telecommunications Professionals' and 'IT Specialist Managers' that are highlighted within the sector may relate to some specialist technology roles, but these are a low percentage of the total jobs in the industry, totalling at 0.7% and 0.6% (Lightcast, 2021).

Stakeholders felt that many join the industry to work outside and drive a tractor, rather than technology aspirations. Those young people who are upskilled in tech don't often stay in the sector due to a lack of support and opportunity. Some younger family members may often complete agricultural courses to enter the industry, but this is not seen as a necessity by the family, or even worthwhile in some cases. Where young people do have new skillsets and ideas, there are some questions around whether these are welcomed and implemented onto the farm.

It was highlighted that more younger people need to be encouraged into the industry, particularly those with transferable skills. One stakeholder suggested a 6 month programme of showing younger people all aspects of farming in small cohorts, in order to show them the diverse career opportunities, particularly linked to data and technology.

4. Green Construction

Introduction

Advanced manufacturing was flagged as a growth opportunity within York and North Yorkshire due to a range of strengths, covering agricultural equipment, construction, chemicals and plastics, pharma, and food and drink. Within this research, the focus is primarily concerned with green construction, which has a critical role to play in decarbonisation plans for the sub-region.

Within this context, green construction refers to the following methods:

- Passivhaus: an approach to delivering new and existing buildings that require very little energy for heating and cooling; consequently, lowering carbon emissions from the building. According to the [Passivhaus Trust](#), passivhaus is 'a whole house approach with clear measured targets focused on high quality construction, healthy indoor environments & low fuel bills'.
- Modular builds: unlike traditional construction, modular buildings are partially constructed in a factory, away from the building site, then transported and completed on site. Much of the process is more closely linked to manufacturing than construction.
- Retrofit: Retrofitting is a process of improving energy consumption within a building through changes to the existing infrastructure, for example heat pumps and the replacement of gas boilers. According to the [Carbon Abatement Pathways report](#), 'York and North Yorkshire has more off-gas buildings [~20%] and requires unprecedented rates of efficiency and low carbon heat retrofit'.



Key Headlines:

- 1. Training providers are ready and willing to adapt to green construction needs, but something needs to drive the industry and get the industry ready for change as a matter of urgency (i.e. market change, regulations).**
- 2. A priority for green construction is around upskilling and reskilling the current labour force, particularly due to current labour shortage challenges.**
- 3. Standards and accountability are critical to ensure that green construction methods are delivered appropriately.**

1. Training providers are ready and willing to adapt to green construction needs, but something needs to drive the industry and get the industry ready for change as a matter of urgency (i.e. market change, regulations)

Industry needs to drive the green skills agenda forward, but this won't happen if the demand from consumers isn't there. Support from Government and supply chains would help to encourage a shift within the market as well as security and certainty that the green agenda is here to stay. Changes have already taken place elsewhere and driven demand, for example, in Scotland, all new houses must be built to Passivhaus specification. More support, funding and flexibility for retrofitting by Government could drive demand, increasing the need for training within supply chains.

There is a range of training in green construction methods currently being delivered including: retrofit and Passivhaus, accessible to businesses in York and North Yorkshire area.

Free, online training (CPD) covering introductions to Passivhaus, heat recovery and ventilation, and retrofit is available, as a potential starting point for those in the construction industry.

A range of higher level, technical courses are available, specific to job roles, focussing on higher level roles such as designers, senior leaders and project Managers, who would drive the changes needed within a business or project. Courses include: level 3 retrofit advice, level 4 retrofit assessment, level 5 retrofit co-ordination and risk management, Passivhaus Designer.

The delivery of some role specific training is through those organisations and businesses within the industry e.g consultancies, organisations who develop sustainable products and those organisations who set and monitor industry standards. These are well established

organisations, out of the YNY area but who offer courses online or in house to businesses across the UK.

Cost of courses seems to range from £100 per person to £2,500 depending on the type of course. some are part funded or free funded through BEIS or can be discounted through membership organisations.

Caddick Construction, who are currently onsite with two projects delivering Passivhaus homes for the City of York Council, were new to Passivhaus methods and struggled to find training locally in YNY area. They have used a mix of online training as an introduction, followed by further development of their site team and M&E team through practical training by The Green Building Store. Completion of this training will help them to understand any further understand training needs and skills gaps.

Further Education Institutions within the YNY area are looking to develop and are starting to deliver training in green construction methods. These are focussed on trade specific training. This has been driven by capital and revenue through the Strategic Development Fund,

Skills Needs Summary:

- Passivhaus requirements, e.g. thermal modelling
- Quality control skills
 - Home insulation Ground and air source heat pumps
 - Hydrogen boiler installation and maintenance
 - Retrofit across trades and whole house retrofit
 - Resource efficiency
 - Air tightness, ventilation and thermal bridging
 - Comprehensive installer training
 - Retrofitting awareness
 - Carbon literacy
 - Sustainability knowledge
 - Project Management
 - MCS paperwork
 - Heat calculation course
 - Accredited qualifications
 - Introduction to passivhaus

Department for Education funded courses (bootcamps) and some local employer engagement. Examples of this training includes: free introductory level/awareness raising sessions on retrofit, solar PV and heat pumps installation, courses in Passivhaus standards, attracting those early adopters and courses aimed at specific roles within the industry e.g. designer and contractor courses and leaders/decision makers.

Overall, current training is often bite-sized, in the form of self-study, specific/bespoke to a business and modular, over a number of hours or days. It is flexible, focussed on those in industry, enabling them to work and learn and taking into account the issues around retention and recruitment and releasing employees for training.

Some of the future provision is focussed on trade specific training too, this was highlighted as a need by one provider and as it would be more practical hands on training, it needs to be locally accessible:

The Construction Skills Village in Scarborough is looking at three key elements moving forward into green construction skills including: heat pumps, solar PV and retrofitting. They're also exploring the different qualifications for heat pumps through NOCN and City & Guilds. Heat pump equipment has been donated by industry to support the development of these skills.

The national Wave 4 Skills Bootcamps offer has a range of green skills courses for construction for businesses to upskill current employees, for the self-employed and those currently unemployed. Procurement is ongoing in YNY area but intelligence gathered through the process did show a need for these locally. Skills bootcamps could include: air source heat pump installation, Passive House

Tradesperson skills,

Heart of Yorkshire Education Group are providing a two-fold approach in embedding green skills into current full time curriculum and developing courses for trade. They are currently developing a qualification aimed at those already employed in the sector that incorporates an awareness around Retrofit but then has a bolt on that makes it trade specific.

York College is looking to expand provision in retrofit and green skills. Investment in low carbon technologies will enable courses in low carbon heat sources including: solar, wind, ground and air. Infrared cameras attached to the drone provision will also allow for expansion in retrofit construction techniques.

Harrogate College are planning to offer: air source heat pump training, at L3 for 1 year, aimed at school leavers and adults and Passivhaus 4 Day intermediate course aimed at upskilling the current workforce. (Delivery March/April 2023)

Despite the efforts that have been made by providers to update provision, some planned specialist training was not delivered due to lack of demand.

To counteract this, some providers (FE) are looking at embedding, modular and bolt on specialisms to existing courses or are offering specific commercial courses for those working in industry.

Providers have also highlighted other barriers in developing new courses in the construction sector: The cost of equipment is a barrier. The equipment needed, e.g. heat pumps, solar pv, and the infrastructure

to enable hands on course delivery and skills training can be costly. However, some providers are looking at alternative options to access this equipment. For example, the Construction Village in Scarborough works with industry partners who donate equipment to support the skills training.

Funding is a huge barrier for providers, particularly as funding received per learner is not keeping pace with increased costs in construction, e.g. there has been large price increases in materials wood/plaster but the amount of funding has remained the same. The government is looking to provide an uplift in funding for joinery/carpentry courses of £1000, which may help to ease this issue in some areas.

There are issues around apprenticeships; SME understanding of what apprenticeships are and issues around course completion. Some apprentices are offered employment before course completion, attracted by the higher wages. This prevents them from continuing to gain qualifications and develop their careers in management for example.

One stakeholder felt that some apprenticeship courses weren't always appropriate for all construction sectors such as modular homes, particularly due to the site-based approach for learning.

With modular builds, it's a mix of on-site and factory based training that is needed. This may affect where a businesses sources their apprenticeship training from. Sometimes there are conflicts in what apprenticeships can offer versus what is needed from the business.

Despite some of the challenges flagged around apprenticeships, businesses were positive about the local provision and were keen to engage with local training providers. Although depending on the businesses location within York and North Yorkshire, “local” is not always within the regions boundaries – e.g. Teesside University provide construction apprenticeship degrees, which would be best placed for businesses at the northern tip of North Yorkshire.

Although training provision exists, businesses don’t currently see the value in retraining as demand still exists for traditional houses. Stakeholders also flagged that SMEs often perceive retrofitting opportunities as being led by larger providers and not relevant for them. Activity needs to take place to help change that mindset, supported by the removal of barriers for businesses to take up training e.g resource issues. But, ultimately, the change and drive needs to also come from consumers.

Businesses felt that potential consumers lack the information to make an informed judgement of the risks and benefits of retrofit. So, to drive change from a consumer perspective, consumers may need to be educated on the opportunities. The energy crisis and fuel poverty may accelerate this demand from consumers for change, although the cost implications associated with retrofitting may be off putting.

Smaller businesses, in particular, will only begin to adapt once there is clear demand from their customers. They need some reassurance that the work exists and there is a growth opportunities by investing in these skills. Perhaps this could be created by the businesses

themselves offering trustworthy advice and clear costings.

There was a suggestion made that a supply chain event would be useful to engage industry, particularly as some businesses felt that industry should be leading the development of skills, but they need an organisation, such as the LEP, to act in a coordinating role. The YNYLEP and The Supply Chain Network have recently hosted a Construction Summit for micro and Small construction businesses located in YNY, East Riding and Hull areas, to show them the opportunities available locally, how to tender for these and highlighting future skills needs in green construction.

Over, 100 businesses registered on the event and there was a wide range of trades, specialisms and organisations in attendance. Some feedback gained at the event in relation to green skills and construction sector in general included:

- A collaborative approach is needed to drive green construction methods.
- Training is needed for the public sector too including planners to ensure the systems can support the changes
- Need more funding for retrofit programmes, it is more costly than Passivhaus and locally we have more need to retrofit due to old housing stock. This will have a greater impact.
- Government regulation is focussed on new build properties and not older properties, this needs to change.
- Green construction methods need to be mandated and forced.

- Training and awareness is needed for customers to drive demand.
- The industry needs to change and quickly if we are to take hold of future opportunities.
- Real onsite training is needed, not classroom based. Courses need to be practical as construction is a practical industry

Similar findings were also reflected within research from [Wakefield College](#), which highlighted the demand for green skills training as being ‘stuck’ and that there is still work to be done to ‘make the market’ for low carbon technologies in construction. The report highlights a number of issues acting as a barrier:

- That retrofit is unappealing to homeowners due to cost and disruption and previous Government led initiatives e.g Green Homes Grant have been too short term to drive the industry
- There is no mandatory phase-out of gas boilers from existing homes and the cost of alternatives and lack of understanding around these is prohibitive
- Lack of clarity about future social housing standards.

(Wakefield College Green Curriculum Research Project 2022).

2. A priority for green construction is around upskilling and reskilling the current labour force, particularly due to current labour shortage challenges.

The sector faces major challenges around labour shortages, which will be exacerbated by future demand around retrofitting. In order to plug this gap and support the transition to carbon negative within the sub-region, reskilling and upskilling will play a critical role. Equally, encouraging more younger people and diversity into the sector will help to stabilise a future pipeline of talent.

Research from the [Construction Skills Network](#) (CSN) highlighted that an additional 17,800 workers will be needed in Yorkshire and the Humber from 2023 to 2027, particularly to support energy efficient homes and to tackle retrofitting. The occupations with the highest recruitment needs are forecasted to be 'other construction professionals and technical staff', 'non-construction professional, technical, IT and other office-based staff', and 'plasterers'. However, there are major challenges with achieving this as the sector is perceived as unattractive, in particular to women, minority ethnic groups and people with disabilities ([IPPR](#)). Within York and North Yorkshire, nearly 81% of employees are male within construction and this increases based on some of the occupations within the sector (i.e. 'electricians and electrical fitters' are 98% male and 'plumbers and heating and ventilating engineers' are 99.5% male) (Lightcast, 2021).

In order to support these growing recruitment needs, the CSN goes on to highlight high-level routes for recruitment, particularly focussed around the current workforce:

- Attract skilled workers who are already working elsewhere in the construction industry (although consideration needs to be made on whether this leads

to gaps elsewhere within the sector);

- Attract skilled workers back into the industry, i.e. those that are considered inactive;
- Recruit and train new entrants into construction through engagement with schools, higher education or migration;
- Improve the retention of workers within construction.

The [IPPR](#) anticipates that most jobs created via retrofitting needs will be in the repair, maintenance and improvement sector; which they define as the SIC codes presented on the graph on the next page.

However, labour shortages may become more restrictive within the 'Repair, Maintenance and Improvement' sector, as Lightcast predicts a decline in job roles, over the next five years (2023 to 2028), within some of the subsectors:

- Electrical installation decreases by 12.6%
- Plumbing, heat and air-conditioning installation decreases by 4.8%
- Other construction installation decreases by 14.2%
- Architectural activities decrease by 13.3%

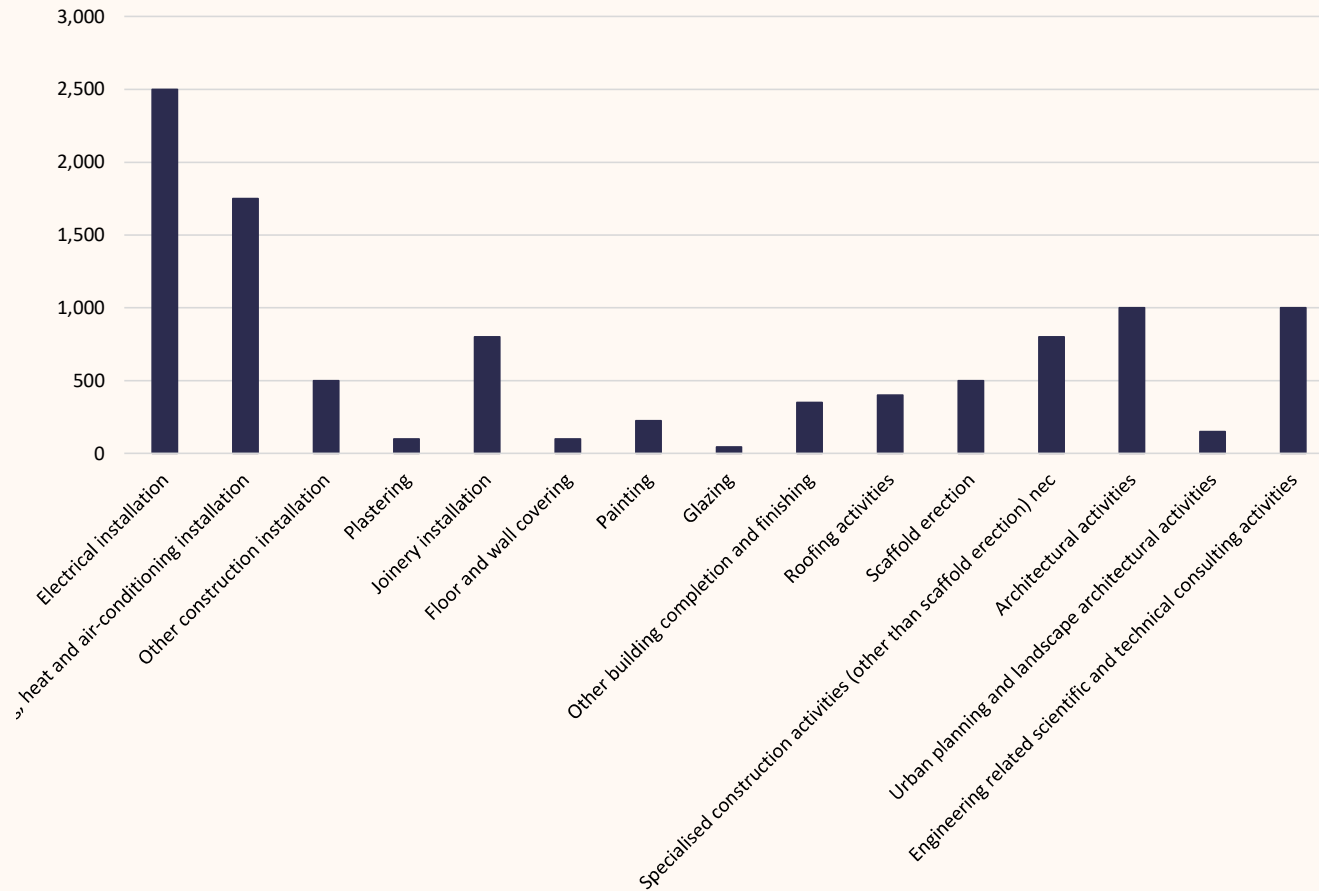
Comparatively, jobs within plastering, joinery installation, painting and glazing, other building completion and

finishing, roofing activities and specialised construction activities are expected to increase.

One business flagged that there are only ~1,000 registered heat pump installers currently, which is a limited amount that will be strained once demand for retrofitting begins to build. There is also a sense that those heat pump installers are very 'disparate' and 'working in isolation'. But, one positive reflection was that there are a lot of people available that could be upskilled and have transferable skills. For example, gas engineers could be trained to fill this gap, but the courses need to be accessible. Some of these retrofitting skills are also required with Passivhaus.

Industry and providers within this research also concluded that the change from traditional forms of construction will be via those existing in the industry. For example, A retrofitting-specific skill needed is around heat calculations, which requires building fabric knowledge and software knowledge. Similar skills can be found in EPC assessors and they may be able to fill the gap with some upskilling. Online courses for this training, particularly due to the scale of need, were referenced.

Employee Levels within Repair, Maintenance and Improvement Sector within York and North Yorkshire



Source: Business Register and Employment Survey, ONS, 2021

Within top 10 occupations in construction YNY area

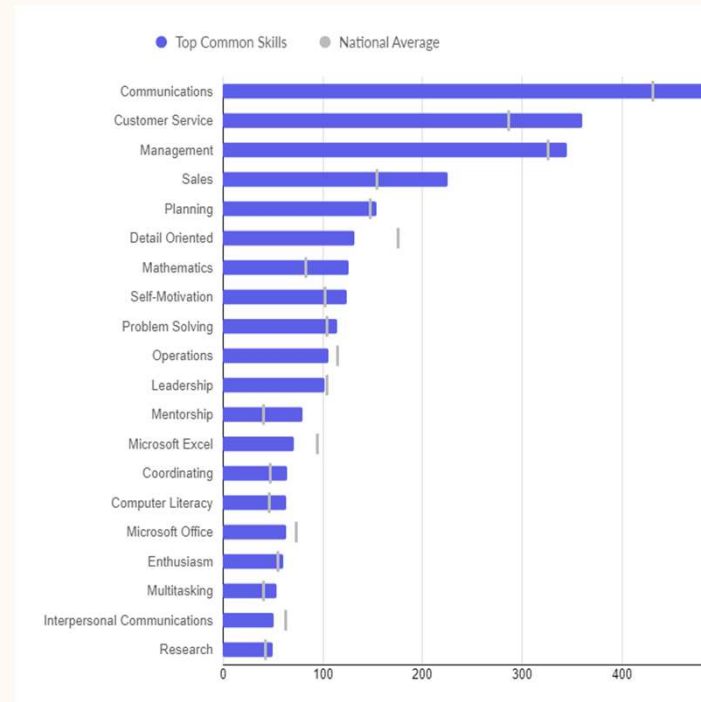
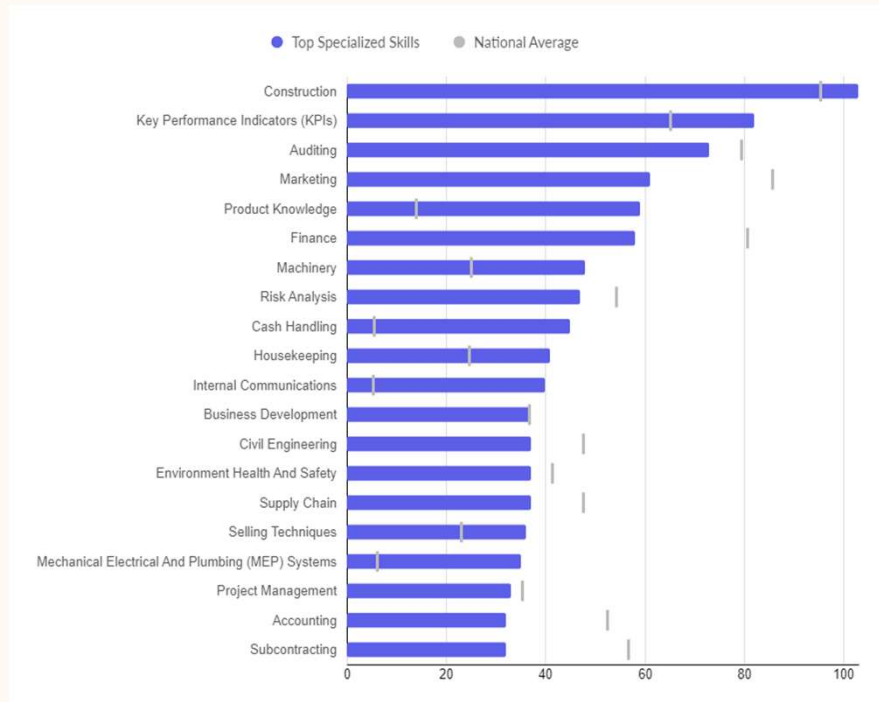
- Electricians and Electrical Fitters
- Carpenters and joiners
- Elementary Construction Occupations
- Managers in Construction
- Plumbers and heating, ventilation engineers
- Administration Occupations
- Construction and building trades
- Painters and Decorators
- Scaffolders, Stagers and Riggers

There are more traditional type roles within the top 10 occupations in construction in York and North Yorkshire area. The majority of these occupations has seen an increase in numbers, except for electricians, 7% decrease and scaffolders, 19% decrease in numbers since 2020. Future predictions to 2031 show this trend set to continue with further declines in numbers of electricians, plumbers and scaffolders. (Is this a reflection of the lack of younger people coming into the industry and those older workers retiring?) Plumbers and electricians will be vital in the move towards renewables, air and ground source heat pumps within green construction.

Source: Lightcast, 2023

Skills Snapshot:

Top Specialized & Common Skills Requirements



Source: Lightcast, 2022

- Skills Needs Summary:**
- Passivhaus requirements, e.g. thermal modelling
 - Quality control skills
 - Home insulation Ground and air source heat pumps
 - Hydrogen boiler installation and maintenance
 - Retrofit across trades and whole house retrofit
 - Resource efficiency
 - Air tightness, ventilation and thermal bridging
 - Comprehensive installer training
 - Retrofitting awareness
 - Carbon literacy
 - Sustainability knowledge
 - Project Management
 - MCS paperwork
 - Heat calculation course
 - Accredited qualifications
 - Introduction to passivhaus

The focus on traditional forms of construction in some courses locally offers an ideal base for upskilling and retraining in 'green' and new construction methods.

For example there is a range of traditional trade apprenticeships, higher level apprenticeships including Site Supervisor Level 4 and T Levels e.g Construction Design, Surveying & Planning, being delivered by Independent Training Providers and Further Education Colleges in YNY area.

IFATE have published a [Climate Change and Environmental Skills Strategy](#) to ensure that technical education and apprenticeships to help to achieve sustainable growth and net zero targets across the UK and a Sustainability Framework to guide trailblazers and route panels in the integration of sustainability into the development of new and updated apprenticeships and technical qualifications. So far, new occupational standards have been approved including Domestic Electrician, which now supports the training of people to maintain domestic heat pumps. The appetite for retrofit apprenticeships is currently being gauged.

There is a range of other provision too, although not directly delivering practical green construction training, they are offering training that could support business leaders and managers. One industry expert mentioned project management skills as a skills gap in their businesses. Other industry experts agree that a whole

organisation approach to embedding sustainability and so effective leadership and management is key.

Business Scale Up Programme offers part funded courses in Leadership and Management including: change management, project management, sustainability workshops for business leaders and L3 Design thinking for Innovation & Change which includes innovating for sustainability.

York St John University offers A Project Manager Degree Apprenticeship (Level 6) which includes developing stakeholder engagement and communication, responsible business practices, project fundamentals, practitioner development, risk management, planning and control, governance, finance, negotiation and influencing, procurement and supply chain, contractual and legal considerations, strategy and decision making, leadership innovation and change.

There is a range of assets that could be maximised further by businesses, in order to enable reskilling and upskilling needs:

- Construction Village Scarborough is an independent training provider working with industry partners to help address the growing skills gap in the construction sector. The village provides hands on, practical training across a range of trades including: plumbing, electrics, groundworks, plastering, bricklaying and joinery. Industry recognised qualifications, site

experience, work experience opportunities, training alongside qualified trades people and demand led.

- York College Upgrade to its Construction Centre in 2023 will provide 650sqm of practical workshop for brickwork and joinery and 650sqm of IT and teaching space. The extension will be complete with class leading facilities in sustainable and renewable technology for students and local businesses.
- Harrogate College mini Passivhaus classroom.
- Institute for Safe-Autonomy providing research and support for those industries looking to use AI and robotics.

The Construction Summit 2023 also gave further insight into the changes that are needed to attract a younger workforce into the construction industry to fulfil the skills needs of the future:

- The industry needs to be more appealing to younger people. Young people are often put off by the industry's reputation of long hours, poor pay.
- The industry needs to attract a more diverse workforce, appealing to more women for example
- Careers advice needs to show the diverse range of occupations within the industry including those requiring green and digital skills
- Promotion of the different career pathways e.g apprenticeships.

3. Standards and accountability are critical to ensure that green construction methods are delivered appropriately.

Qualifications and standards within green construction methods will provide confidence to consumers, businesses and providers of training. It is important that these standards are embedded in regulation, clear and understood.

Both providers and businesses raised concerns around the qualifications and standards around retrofitting and Passivhaus. It is important that such standards do not become a barrier for SMEs in adopting green construction practices.

Some stakeholders were concerned about 'doing the right thing' with regards to green construction methods. They felt that it was a risk and resource intensive to use such methods and they needed to be confident they understood the principals and what training need to be completed.

SMEs present at the Construction Summit highlighted other concerns around qualifications and regulations:

- Different regulations being asked for by local authorities/other contracts making it difficult to choose the qualifications/regulation to go for as an organisation
- Difficulty in finding qualifications, where do businesses go to access these, in particular if they don't have good relationships with FE/HE
- Qualifications/standards need to be mandatory, this will give all businesses a good chance to embed the skills needed and provide greater understanding in green construction.

One provider of green construction skills felt that mandating these regulations and standards was the key but that businesses would then need funding to support them with new training needs.

It was flagged by one stakeholder that SMEs need training on completing their [Microgeneration Certification Scheme \(MCS\) paperwork](#). According to MCS, the 'certificate is proof that your installation has been designed, installed & commissioned to the highest standard using only MCS certified products by an MCS certified installer'. Retrofitting products do not legally require an MCS certificate, but measures installed under any government supported initiatives, must be certified MCS certified. Similarly, Energy Company Obligation (ECO) is required for energy efficiency measures under government support initiatives.

So, what security/support do businesses have at the moment in terms of green construction methods?

- CITB currently provides a list of retrofit qualifications available for members as a guide to support their understanding.
- National, regional and local policies to reduce carbon emissions/net zero targets including York and North Yorkshire target for net zero by 2034 and carbon

negative by 2040 and UK governments target of 2050.

- Future Homes Standard, 2025 will require that Co2 emissions produced by new homes are 75-80% lower than those built to current standards.
- The government is proposing to make compliance with PAS 2035 mandatory for all public funded projects. PAS 2035 is a retrofit standards framework and details how to carry out quality energy retrofits of existing domestic buildings, alongside best practice guidance for implementing energy efficiency measures.
- PAS 2035 also identifies five key roles that are required:
 1. Retrofit Coordinator
 2. Retrofit Assessor
 3. Retrofit Designer
 4. Retrofit Installer
 5. Retrofit EvaluatorEach of these roles has recommended qualifications and accreditation.
- Passivhaus is an entirely voluntary building performance standard for those building a low-energy home, but The Passivhaus Institute acts as a training and certification centre.

5. Cyber-Security

Introduction

With a greater emphasis on the use of innovative technology and digitisation, this also means that businesses are open to greater cyber threats. Although cyber security can be a sector within itself and a service that is provided, this research also recognises the importance of cyber security across all businesses and that all employers need to implement it as a skillset. The challenges of living in a cyber work are recognised both locally and nationally. In 2022, Government launched a National Cyber Strategy to enable:

- A more digitally secure and resilient nation
- An innovative, prosperous digital economy, with opportunity more evenly spread across the country
- A Science and Tech Superpower, securely harnessing transformative technologies in support of a greener, healthier society
- A more influential and valued partner on the global stage

At a local level, Scarborough Borough Council have been working with Anglo American, Coventry University Scarborough, Plexal Limited and consulting with GCHQ Scarborough, to establish a Regional Cyber Security Cluster in Scarborough. The ambitions of that group are to achieve the following:

- To make Scarborough a safe and secure place to live and work, by raising awareness of online harms and cyber best practice
- To create a resilient, circular economy for up-skilling SMEs in digital skills and cyber security
- To make Scarborough a centre of excellence for Operational Technology security.

The cluster has been extended to key stakeholders, ranging from private and public sector, SMEs, anchor institutions and training providers (and not just limited to Scarborough). As such, to explore the cyber security needs within York and North Yorkshire, this research has engaged primarily with that growing group.



Key Headlines:

1. A range of training provision exists around cyber-security, but many businesses and individuals lack the awareness and time to identify what is applicable to them.

2. As cyber security is ever-increasingly critical across all businesses, there will be growth opportunities for people within this field and developing future pipelines is needed, particularly ensuring diversity within the sector.

1. A range of training provision exists around cyber-security, but many businesses lack the awareness, time and capacity to identify what is applicable to them.

It's clear that cyber skills are a necessity, particularly to avoid financial and reputational costs to a business. But it can be difficult to engage businesses on this topic, with many struggling to get staff to realise that they need to do the cyber training (even if they're not within a cyber role). Time and capacity can also be a training barrier, meaning a one size fits all approach isn't necessarily the answer.

In summary, there is a range of training that can support cyber-security development and support some of the skills needs that have been identified. It ranges from introductory level/awareness raising training for businesses to higher level foundation and degree level which supports new talent development.

Wave 3 skills bootcamps delivery did include cybersecurity at level 3; Cyber Security Foundation and Cyber Essential training at part of the range of Digital Core topics. The bootcamps offer flexible, employer led training for those unemployed, employed and self-employed. Although delivery ended in March 2023, Wave 4 bootcamps are in development and it is expected they will provide further courses in cyber security due to local employer demand.

There some apprenticeships standards available in Cyber Security roles through a number of ITP and employers (Anglo American). The ITPs are all based outside of YNY area but deliver within, apprenticeships include: cyber security technician, cyber security technologist and cyber security technical professional range of levels including 3, 4,7. One stakeholder from the NHS highlighted that apprentices need to be supported in the role, part of a

larger team and embedded into the business so they can understand the business and its systems to pinpoint where weaknesses could be. Otherwise, this is a huge responsibility for a young person or one person to take on.

The [National cyber security centre](#) provides certification to help guard organisations against cyber attacks. There are two levels of certification, including:

- Cyber Essentials- shows how to address basics and prevent the most common attacks.
- Cyber Essentials Plus in addition to Cyber Essentials a hands-on technical verification is carried out.

The ESF funded programme, Business Scale Up Programme, offers support to move businesses online. This includes an initial review identifying key areas of development including cyber security. This is a flexible offer, either face to face or online, taking around 3 hours to complete. There is potential for 40% funding for eligible businesses.

There is also a range of free online training and accreditation for businesses at different levels including introductory and role-specific courses. Central

Government offers [free online training](#) covering:

- Top Tips for Staff- understanding of the importance of cyber security and practical steps to protect against fraud and cyber crime. 30 minutes
- Cyber Security e-learning for procurement professionals- CIPS free online training to explain the relevance of cyber security in the procurement and supply chain function.
- Exercise in a Box- new online tool from NCSC to help organisations test and practise their response to a cyber attack.

Basic training packages are needed for the whole organisation, as cyber security doesn't just apply to a cyber security lead. Ongoing training is needed at all levels to upkeep these skills and adapt to advances in cyber threats, but it can be difficult to fund and there is a lack of capacity from employers.

This training is evermore critical for those businesses, particularly SMEs, that can't afford to take on cyber security lead (nor do they have an IT department to upskill). In these cases, the employers need to understand what's relevant for their business and where threats may occur. 1:1 diagnostic support may help to build that awareness and educate businesses on their priorities.

Scarborough Borough Cyber Security Network are focussing on the creation of a cyber cluster to counteract problems and create opportunities. Part of this initial work has been to develop and deliver a series of pilot programmes:

- Citizens awareness
- Citizen Science Challenge- linking the community and students to solve real world business challenges
- SME cyber accreditation support- fully funded support to gain Cyber Essentials Accreditation
- Industry engagement- working with larger businesses on key cyber issues.

Other assets in cyber include:

- York College provides practical, hands-on experience via their custom designed virtual cybersecurity lab.
- Scarborough Tec have a new Yorkshire & Humber Institute of Technology facility providing access to leading technology and innovative teaching spaces that include a Cyber IT Lab and Digital Learning Hub.

Although there is a range of training provision available, the challenge is that many businesses lack the resources and this typically relates to their size. The [Cyber Security Skills in the UK Labour Market 2022](#) report found most businesses (outside of the cyber security sector) don't typically have dedicated cyber professionals. Although larger businesses tend to be better resourced, they also have limitations. Interestingly the survey found that those who outsource aspects of cyber security typically had better resource in-house than those who do not,

suggesting that outsourcing is about expanding cyber capacity, rather than plugging a gap in their team.

Typically cyber security tasks are absorbed into an existing non-cyber related role, typically within IT, and their cyber duties are done on an informal basis. So, it's unsurprising that the top occupations within this sector in YNY, include (Source: Lightcast):

- Information Technology and Telecommunications Professionals
- Functional managers and Directors
- Chief executives and Senior Officials
- IT Business Analysts, Architects and System Designers
- Business and Finance Project Management Professionals

Transitioning staff from an IT role is seen as an easier solution than hiring someone to fill these skills gaps. This aligns with the stakeholder feedback of this research, which also highlighted that an employee with a current IT role or some IT experience is needed to understand how to tackle cyber security in a business. Therefore, it's unsurprising that most cyber job postings within 2022 primarily related to the following occupations: 'Information, Technology and Telecommunications Professionals' and 'IT Business Analysts, Architects and Systems Designers'. Both which are primarily male-dominated sectors, suggesting women may need to be better engaged on this role.

Even as businesses grow and their teams expand, the cyber knowledge and skillsets don't always grow with them. Businesses often don't know what they should be doing, or they assume they're not under threat.

Stakeholders acknowledged that a cyber champion is critical to push the need for cyber security otherwise there's a lack of longevity. It was felt that this should be the responsibility of senior colleagues within a business to ensure these practices are fully implemented within their teams.

Due to this, training may be best focussed on upskilling. However, it may be challenging to engage with smaller businesses that don't have any dedicated resource for cyber. Questions were raised around how we embed cyber security and make it a practical reality.

One stakeholder mentioned the importance of embedding cyber security into entrepreneurial training/start up business support, so that a business, from the outset, understands the importance of cyber security and has processes in place. If a business is looking to move to provide an online service e.g e-commerce then cyber security should be a part of any training provided.

If businesses do have the funding to recruit for a cyber role, finding the right people with the right skills is a challenge, even general IT resource is difficult to find. But someone needs to occupy this type of role as cyber threats are continuously changing.

Retaining staff, alongside recruitment, can also be difficult. People are often lost to larger businesses, particularly due to competition from Manchester and Leeds. There is an expectation that this job role has a high wage, which can be difficult to manage. From job posting analytics, the median advertised salary is £64.9k in 2022 (Lightcast).

Overall, there is a lack of confidence with cyber security requirements within businesses, with many unclear what is relevant for their needs. Greater emphasis often needs to be made on the relevancy of these skills across all employees, not just cyber professionals, and the need for ongoing training to upkeep these skills (although cost and a lack of capacity can pose a threat here). This is where leadership and ownership is important, as someone needs to champion the importance of cyber security for this to truly be implemented.



2. As cyber security is ever-increasingly critical across all businesses, there will be growth opportunities for people within this field and developing future pipelines is needed, particularly ensuring diversity within the sector.

Cyber skills are required across all sectors, particularly as technology innovation advances, meaning that these skills are going to be in demand, both for in-house specialists and for external consultancy support. So, it is critical to ensure a future pipeline is developed to fill this gap, including career pathway guidance, retaining graduates and improving diversity. To ensure that training keeps pace with advances in cyber threats, a strong relationship between industry and providers is also needed.

Cyber security is critical across all sectors. The top sectors with cyber skills and qualifications across York and North Yorkshire includes: Information Technology, Financial, Public Health, Higher Education, and the Armed Services (Source: Lightcast). These are large, national or regional organisation with these skillsets. But robust cyber security is not just important for businesses at the larger scale.

For SMEs, it's critical to protect their assets, but equally to enable new supply chain opportunities. Many large businesses now expect their supply chains to have a high level of accreditation for cyber security, otherwise they won't work with them. This could cause limitations for many SMEs that are looking to grow their markets. For example, they may now be required to have Certified Ethical Hacker and CREST certifications.

With these growing requirements, cyber skills and job roles are going to increase in demand, whether that's

greater roles in-house or the need for external support to grow. In order to maximise this growth opportunity, there is a need to have the right talent pipeline in place, especially as there is already a shortage of labour; and many businesses look to recruit from Leeds and Manchester.

Stakeholders suggested that education around cyber security needs to start young in schools, potentially being added to the curriculum to support future recruitment and promotion of career pathways to enter this sector. This would also help to inspire people at a young age and encourage cyber apprenticeships.

'Cyber First' was a pilot between the National Cyber Security Centre and Coventry University Scarborough to engage year 8s and 9s. Schools are eager to be involved in this activity, but the challenge is that it can be extremely expensive to run. Equally, short taster sessions only begin

Skills Needs Summary:

- Accreditation requirements, e.g. Certified Ethical Hackers, CREST accreditation
 - Confidence in basic cyber requirements
 - Advanced technical skills: penetration testing, forensic analysis, security architecture or engineering, threat intelligence, interpreting malicious code and user monitoring.
 - Cyber essentials accreditation
 - Cyber auditing
 - Cyber engineering
- Ability to look at attacks in real time and address this
 - Assess and forecast potential cyber impact
 - Basic IT knowledge
 - Basic cyber skills at all levels

to 'scratch the surface' and don't fully embed cyber security into students' education. It was proposed that leads from STEM, Universities and the LEP need to come together to provide capacity and support.

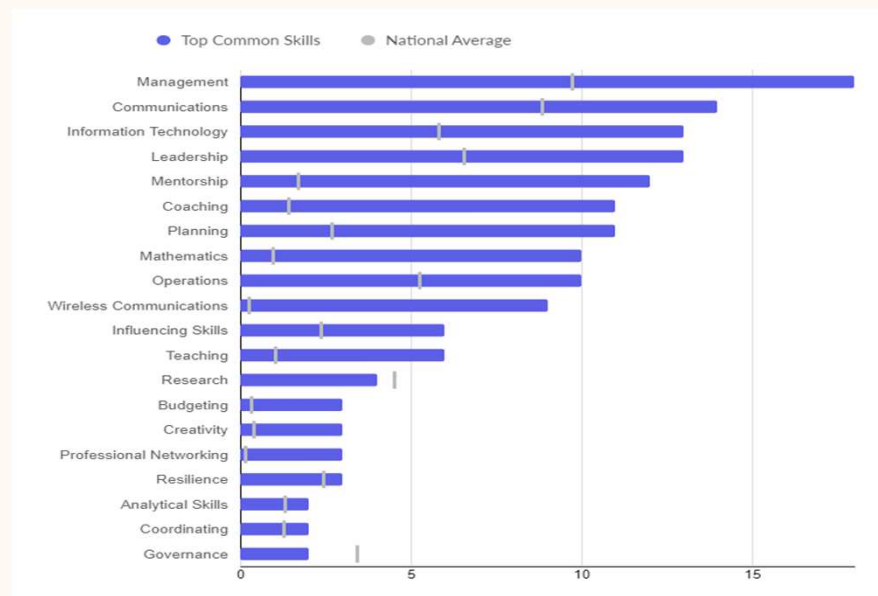
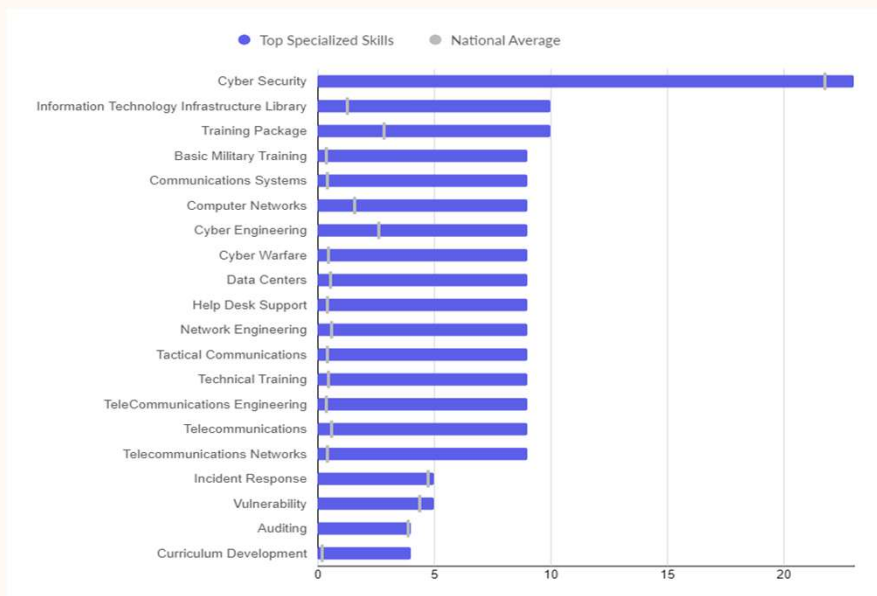
Higher education courses available include: FdSC in Cybersecurity, Foundation Degree in Digital Technology and HNC and HNC leading to BSc in Cyber Security. Course content includes: knowledge and skills in programming, networking, hardware, databases and security, a focus on problem solving, application of

digital technologies and industry standard technologies and approaches. One course includes seminars at the Y&H IoT Cyber IT Lab in the format of interactive demonstrations and another the option of a year in industry.

Although it should be noted that there are some limitations within the education system. The [Cyber Security Skills in the UK Labour Market 2022](#) report found ongoing concerns about further and higher education courses and modules in cyber security being

outdated. This was also reflected by stakeholders in this research. Consequently, ongoing engagement between academia and industry is needed to ensure education and training is able to keep pace.

Top Specialized & Common Skills Requirements



Source: Lightcast, 2022

6. Rail Innovation

Introduction

According to previous LEP research, “Rail sector specialisms are clustered in and around York. They include rail engineering and consultancy, signalling, transport software systems and digital rail innovation.”

Although the wider region has strong rail links (14% of all UK rail industry jobs are within Yorkshire and the North East (CYC)), this chapter is primarily concerned with York due to its strengths in rail digitisation and innovation, as opposed to a traditional engineering sub-sector. There are great opportunities within the rail supply chain, both due to its links to the carbon negative agenda, which is a major ambition of the sub-region, and through the [City of York Council's submission to be the new home for Great British Railways](#) (which was one of the six shortlisted locations).

Many railway businesses, from independent consultants through to Network Rail Eastern region, are based in the city. For example:

- Network Rail
- LNER
- Northern Rail
- Siemens Rail Maintenance Depot
- VolkerRail Signalling

The research within this chapter has been developed in collaboration with City of York Council (CYC), building on their knowledge and expertise, alongside recent research from the National Skills Academy for Rail and Huddersfield University (which includes the Institute of Railway Research). CYC already has strong sector engagement with key businesses and academic institutions (including a Rail Skills Working Group), which was instrumental in delivering this research.



Key Headlines:

1. An ageing workforce is a challenge for the sector and exacerbates labour shortages further. Upskilling and reskilling is needed to retain employees for longer.

2. Jobs within the rail sector can be incredibly diverse, but these are often overlooked for traditional roles, particularly linked to engineering. These different opportunities need to be promoted further to young people and to increase diversity.

3. Some sectoral training provision does exist, but more collaboration between academia and industry will ensure gaps are plugged and best practice is duplicated.

1. An ageing workforce is a challenge for the sector and exacerbates labour shortages further, so upskilling and reskilling, particularly to retain employees for longer, will be critical.

New entrants are important but the current workforce can't be overlooked – they need to be encouraged to retire at a later stage, or stay in the sector for longer in a new role. There is a major opportunity around upskilling and retraining, including through an apprenticeship route and encouraging transferable skills from other sectors, particularly as the labour shortages are happening now and are not simply a potential, future risk.

The average age of the UK's rail workforce was 44 in 2022 and has been increasing gradually over the past 6 years ([National Skills Academy for Rail, Annual Workforce Survey](#)). Consequently, nearly 50,000 rail industry employees are expected to retire by 2030 ([National Skills Academy for Rail](#) (NSAR)), with further analysis from the [City and Guilds](#) suggesting 15,000 will potentially retire by 2025. This high level of retirement creates tension with the current gaps in the labour force and the future talent pipeline that is needed. For example, the National Skills Academy proposed that the future workforce demands in the York region alone is around 6,500 on average between now and 2030. A quarter of those roles will be at skill level 6, with a fifth required at both skill level 5 and 3 – linked to this, stakeholders are already flagging the importance and need for individuals with engineering qualifications.

According to analysis from the National Skills Academy, the gaps that will need filling link to investment within signalling and telecoms, partly due to the upgrading of the signalling technology along the East Coast Mainline. There is a major drain of resources to large projects with many roles required now, particularly for the Trans Pennine

Route and HS2. According to the [City and Guilds](#), these 'short-term, project-based contracts tend to be one-dimensional and often result in longer term skills gaps and high recruitment costs'.

As a result, the roles in highest needs are linked to

engineering, including mechanical, electrical and digital disciplines. According to [NSAR](#), the increased use of technology will lead to 110,000 workers needing to be upskilled, 80,000 needing reskilling by 2030 across the UK. There is a need for highly skilled, but traditional, maintenance roles to adapt to these new techniques, in

Top specialised skills in 3 large train operators (Network Rail, LNER, Trans Pennine)

- Project Planning
- Contract Management
- Project Management
- Stakeholder Management
- Change Management
- Procurement
- Project Engineer
- Operations Management

Source: Lightcast

OFFICIAL - SENSITIVE

Top common skills in 3 large train operators (Network Rail, LNER, Trans Pennine)

- Management
- Customer Service
- Microsoft Office
- Planning
- Microsoft Excel
- Leadership
- Operations

Source: Lightcast

order for digital efficiencies to truly benefit the business.

The solution to filling these gap is not solely about increasing the level of younger workers. Where possible, upskilling should be prioritised, particularly to minimise displacing older workers that want to stay in employment. Other flexibilities could be offered to retain those older workers, including flexible work and reduced hours. Many businesses are starting to offer these opportunities, but it's unclear how well people are aware of this outside of the sector.

Inevitably some older employees will want to retire early, but this has created skills shortages linked to more experienced roles and industry experts, likely lost when older employees retire. It will be important for businesses to distil that knowledge from experienced staff into new entrants. One business has managed this through developing training courses that are delivered by older employees. They found that many workers don't want to fully retire and they're passionate and want to stay in the sector, particularly to support their mental health and well-being. This could be potentially replicated elsewhere, with some staff undertaking 'train the trainer' courses.

The level of attrition within the sector outweighs the number of new entrants, so opportunities around transferable skills should also be considered, alongside

retaining employees for longer. The [City and Guilds](#) proposes that this could be delivered through 'skills bridges' training courses, which helps to identify how current skills and technical abilities can apply to their new jobs, whilst equally plugging any gaps and developing new skills. However, this may need to be managed with competition from other sectors as rail is not the only one facing labour shortages. Growth opportunities within construction and the energy sector could cause challenges to this sector.



2. Jobs within the rail sector can be incredibly varied, but these are often overlooked for traditional roles, particularly linked to engineering. These different opportunities need to be promoted further to young people and to increase diversity in the workforce.

The majority of workers within the rail sector are male, white and above 40, which is primarily due to people lacking awareness of the career opportunities and the skills required for new and growing roles, particularly linked to sustainability and digitisation. More can be done to engage younger people, women and minorities, promoting the benefits of a career in rail, such as stable income, development opportunities and career progression, including the variety of roles. This will also help to support challenges linked to labour shortages.

Careers within the rail sector can be incredibly diverse, but generally people only consider the visible, traditional roles, such as train drivers and engineering requirements. Consequently, the sector is often viewed as unattractive to young people, with workers typically replaced with another older person. In fact, 'the proportion of under 25-year-olds in the rail industry has halved since 2016' ([NSAR](#)).

According to the [City and Guilds](#) research, there is much less awareness of jobs such as Telecommunications, Environmental protection, Electric vehicle charging and data analytics. The green agenda is going to become more prominent going forward, e.g. looking at how to change polluting fuels to green hydrogen, in order to support Government's ambitions for net zero, meaning there are growth opportunities within these roles. One business suggested this could cover careers for ecologists or water scientists, and, more broadly, those with strong communication skills to articulate social value are needed.

There will also be growth within digital-related roles. This is partly driven by the Integrated Rail Plan (IRP) and where investment is being made. For example, signalling will create increased demand for digital skills linked to the East Coast Mainline. Efficiency improvements in mind, digital technology will also be relevant for maintenance. [Recent research from the University of Huddersfield](#) reviewed future skills needs and identified software development as one of the core areas. It suggested that businesses are primarily looking for people in IT, software development and analytical roles; in order to support mobile app development, signalling data and routes to speed up algorithm production and system configuration.

Stakeholders have also put emphasis on this area, including automation and data analytics. However, it has also been acknowledged that some businesses are less concerned about the specific skillsets of employees and more focused on attracting the people with the right mind-set who are willing to learn and grow.

Despite a range of career pathways for new entrants, covering schools, colleges, graduates and apprenticeships, there is clearly more that needs to be done on building awareness, especially as 'just 32% of people would consider a career in rail, and 47% said that they would

Within top 10 occupations in 3 large train operators (Network Rail, LNER, Trans Pennine)

- Business and Financial Project Management Professionals
- Engineering Professionals
- Sales Accounts and Business Development Managers
- Rail Transport Operatives
- Design and Development Engineers
- Quality Control and Planning Engineers

Source: Lightcast

never consider working in the sector, despite offering the potential for career development and high salaries', according to a recent survey from the [City and Guilds](#). There may be challenges around the perception of the rail sector and whether it is seen as exciting and attractive, particularly with rail strikes taking place, suggesting instability with rail jobs.

These new and diverse roles could help to attract a younger generation to the sector and change mindsets, but this demographic needs to be engaged to understand those opportunities.

Some initiatives do currently exist to engage younger people within rail. For example, [Routes into Rail](#) from the National Skills Academy for Rail, looks at ways to engage with students on behalf of the industry to promote career opportunities via their website, social media channels and various other platforms.

Siemens, the National Railway Museum and City of York Council previously hosted events to engage schools, but they noted it could be a challenge to get the students there.

Network Rail is working with the National Railway Museum delivering the Wonder Wednesday STEM events, which attracts hundreds of primary aged school children and delivering the Primary Engineer rail project at 10 schools in York so that there are role models from across the rail sector talking about the breadth and depth of careers in rail.

The National Rail Museum are interested in how they can

promote careers in STEM further with a focus on rail. The museum has even proposed that their space could be used as a hub for career opportunities and to host events in the sector.

The lack of workforce diversity doesn't just relate to young workers. [NSAR's Annual Workforce Survey](#) showed that the 'female proportion of the workforce dropped to 14.6% in 2022, the lowest since 2018 (13.4% female, highest previous was 16.8% in 2021)'. Similarly, only 27% of BAME respondents to a [City and Guild survey](#) said they would consider a career in the sector, and only 2% of women would. The sector may be perceived as unattractive due to a belief that roles are always manual/physical work, inflexible and include the need to travel far from home ([City and Guilds](#)).

More needs to be done to attract women and minorities into the sector. For example, Siemens undertook a study around increasing applications from women and this showed a need to change the language and how they promote job roles. There is also a Women in Rail network which supports women in the sector. Stakeholders acknowledged that flexibility within roles may be required to attract a wider audience, e.g. opportunities for women to easily return from maternity leave. Women in Science and Engineering (WISE) deliver brilliant initiatives from inspiring girls into STEM and as well as supporting women in the workplace.

Network Rail has a programme called 'Just like me' which aims to inspire girls and young women to explore engineering.



3. Some sectoral training provision does exist, but more collaboration between academia and industry will ensure gaps are plugged and best practice is duplicated.

Across York and North Yorkshire, there is already strong skills provision to support the rail sector, and there are close links to neighbouring assets. Many providers are working closely with industry to develop the training, but there are still major labour shortages and collaboration needs to continue to ensure a future pipeline with the right skills, particularly with growth opportunities within sustainability and digitisation.

Courses range from HNC/HND level, Level 3 diplomas, T-Levels and apprenticeships, supporting skills for the rail sector. But one of the key opportunity areas is the link between industry and education. For example, York college is working in partnership with the National Training Academy for Rail (NTAR) on their apprenticeship programme, where NTAR are the main provider catering for the rail specific units and York College teach the general engineering units. York College also work with Siemens Mobility (Engineering rail components) on their engineering apprenticeships, where the skills sets are transferrable to the rail industry. A partnership between the University of York, Omnicom and Innovate UK produced AI technology to pinpoint areas requiring track inspection. Whilst Selby College has partnered directly with Siemens to deliver apprenticeships for Level 3 Rail Technician.

The University of York is home to the Institute of Railway Studies, a joint initiative between the university and the National Railway Museum; and the Institute for Safe Autonomy (which includes £30+m of research on Robotic,

Connected and Autonomous Systems from design to development to deployment).

York and North Yorkshire is also within close proximity of neighbouring institutions that are pioneers in rail research and facilities. At the northern end of the patch, there's links to the New Rail Newcastle Centre for Railway Research, a dedicated railway research centre with a vast range of expertise in diverse areas of the rail industry.

At the Southern ends of the sub-region, there's assets across Yorkshire. University of Hull's Logistics Institute has world-renowned expertise in logistics and supply chain management research and education. Previous projects have included the UK's first digital rail infrastructure platform, designed to optimise freight route planning for Network Rail.

The University of Leeds has the state-of-the-art Institute for High-Speed Rail and System Integration.

University of Huddersfield's Institute of Railway Research, Centre of Excellence in Rolling Stock and involvement in the UK's Rail Research and Innovation Network.

University of Sheffield's Rail Innovation & Technology Centre, a partnership with Network Rail, for collaborative research, particularly intelligent systems engineering involving detection, sensing, communication, materials, structures and software technologies.

Across the region, there is also the Yorkshire & Humber Institute of Technology, which delivers high quality, higher technical university-level qualifications with a focus on STEM (science, technology, engineering and mathematics) subjects which would include transferable skills for the sector.

Wave 4 Skills Bootcamp development does include rail track engineering covering: OLEC 2, on-track plant, OTP Op MEWP. Procurement is ongoing at present so we are not clear if this will be delivered.

With a greater shift towards digitisation, cyber security will also become critical for the sector. A range of provision does exist across York and North Yorkshire to support this requirement.

7. Film & TV

Introduction

Data, Digitech and Creative Industries was previously identified by LEP research as a growth opportunity sector. This is an incredibly broad and diverse sector with multiple specialisms sitting within it; one of which was identified as film and TV. The sub-region is a hotspot for TV and film productions, most notably period dramas, primarily thanks to its mixed geography, including the urban city of York, historical assets and the vast rural landscape (e.g. All Creatures Great and Small is filmed in the Yorkshire Dales). However, the sector is more than just a location opportunity, it covers a wide range of jobs, everything from working behind the camera to set design and make-up and costume. Previously, the LEP has not had strong engagement with the sector, but it is now being explored further and picked up by the Growth Hub team.



Key Headlines:

1. The sector has been complex to navigate with a incredibly broad range of roles and subsectors, so further mapping of career opportunities and pathways is required, particularly linked to increasing diversity.

1. The sector has been complex to navigate with a incredibly broad range of roles and subsectors, so further mapping of career opportunities and pathways is required, particularly linked to increasing diversity.

Casting the net wide across this sector proved challenging to pinpoint a specific skills needs and intervention where the LEP could support. Training provision does exist and there are some links between academia and industry, but there were some mixed views on this and not a 'one size fits all' solution. It's unclear whether there is currently a mismatch between provision and industry, or rather a lack of awareness of the opportunities from industry. In particular, stakeholders emphasised a gap within new entrants to the sector and a pressure on people to be multi-skilled and adaptable.

The Film & TV sector has been a complex sector to review, with mixed messages from stakeholders, and more questions being raised than answered. The first challenge faced was how to define this sector and the roles that sit within it. For film and TV, [ScreenSkills](#) categorises it by the following:

- Development department, e.g. casting assistant, screenwriter, director
- Production management department, e.g. assistant director, cashier, production accountant, floor runner
- Craft department, e.g. costume designer, construction manager, hair and make-up designer
- Technical department, e.g. camera trainee, director of photography, sound mixer, video assistant operator
- Post-production department: archivist, editor
- Sales and distribution department, e.g. distribution executive, marketing manager, publicist, sales agent

There is clearly a diverse range of career pathways. However, these don't easily fit into data classifications (e.g. SIC or SOC), so it is difficult to measure the level of

employment within York and North Yorkshire. These roles can also overlap with other sectors, e.g. marketing managers, accountants etc. According to the [British Film Institute](#), there is 'little reliable data on the number of film and TV workers in different roles and grades, and a lack of robust forecasting on the demand for production crew', so they're planning to trial a service to capture and quantify the availability and demand.

Lightcast is a database that provides information on job postings, which could demonstrate current demand. Based on the occupations outlined by ScreenSkills, the demand within film and tv appears to be very minor. The occupations listed either had zero job postings, or they were available within a different sector (e.g. production managers within a manufacturing context), further highlighting the challenge to disaggregate some of the data. This potential demand may be due to the nature of job entry into the sector. For example, some freelance roles and positions that are filled via word-of-mouth connections would not be captured here.

The [Screen Industry Growth Network](#) (SIGN) has already undertaken multiple research projects to identify skills needs and provision within the sector. One of the key challenges that they also identified was the variety of roles and opportunities within this sector. This led to a recommendation around clearly identifying the roles and mapping this against the different career pathways for each person. A hub that would provide careers advice and signposting to new entrants and the existing workforce would also be welcomed. This would help the sector 'move towards a more cohesive approach' (SIGN).

Stakeholder engagement in this research reinforces the need for this, as the skills needs in this sector appear complex and diverse – ranging from standard 'soft' skills to niche, specialist skills. There isn't a 'one-size fits all' approach, particularly depending on the career pathway that someone has taken (i.e. graduate, apprenticeship, self-taught/start-up etc.).

From engagement with businesses, it was difficult to pinpoint one key area of skills development for the sector. There appears to be pressure from the sector for people to be able to fill diverse roles that cover multiple disciplines and skills. The breadth of the career scope within this sector is massive. A range of training at different levels does exist to support new entrants and upskilling, but this offering can be complex and confusing for those to navigate.

FE/HE/ITP provision across YNY area includes academic and technical focussed courses; A Levels, T-Levels and apprenticeships through to degree level and MA level courses. Courses provide analysis of film and film history but equally practical technical skills development using a range of equipment and software packages. Courses often mention their industry focus and the careers expected upon completing the course.

York College's Film Studies at AS & A Level includes:

- Analysis of film and film production techniques
- Development of a film from pre to post-production
- Development of a film from script to screen using industry standard equipment.

Harrogate College runs Level 2 and 3 Digital Creative Media Production (available for 16-18 for free or adult at a cost). These are 1-2 year full time courses, which include multi-industry knowledge, using Adobe and Auto Desk. They also offer a Film/TV focus for level 3, including film editing, script editing. Career opportunities include film making.

Craven College offer a range of IT/Media qualifications at

level 1 to level 3, running T levels in Digital Production, Design & Development and also Content Creation & Production, through their vocational course range. These are aimed at career pathways linked to level 3 such as TV/film/video producer. Course content includes:

- Intro into Professional Practice in Creative Media Production
- Investigating audio and visual production and technology
- Developing a creative media production project.

Degree Level Courses are also available. York College offer a BA (Hons) Film Production and Professional Practice which develops skills for time management, critical and creative thinking, scheduling, planning and collaborative practice. Career progression includes independent filmmaking.

University of York provide a BSc (Hons) Film and Television Production (3yrs FT) (ScreenSkills Select Accreditation). Career pathways from alumni include: cinematographers, writers, film/studio directors, postproduction professionals. They also provide a BA (Hons) Business of the Creative Industries (3yrs FT), which combines advanced business knowledge with practical production and insight into film, TV, theatre, interactive media and a BA(Hons) Theatre: Writing, Directing and Performance (3yrs FT).

York St John University offer a BA (Hons) Film and Television Production includes: developing skills in story telling for drama documentaries and TV, Production Design, Production Management, Visual Post-Production. Alumni include BAFTA winners, careers at

ITV, BBC.

BA (Hons) Media Production supports the development of a range of production skills using a range of equipment and software packages. Content creation includes: short films, TV programmes. MA Media Production encourages an independent and entrepreneurial approach.

Many of the training providers within the sub-region have relevant industry technology and assets to support learning and development. For example: Craven College Media Studios have broadcast quality HD cameras, tracking, mobile lighting kits, auto-cue and mobile vision mixing facilities. There is a well-equipped industry-standard Mac Video Editing Suite with CS6, fully operational Radio Station, audio editing and production software to ensure an industry experience and a live TV Studio with a vision mixer.

Craven College are a partner institution of Screen Yorkshire's ground-breaking Connected Campus initiative that forges closer links between TV and Film professionals, production companies, broadcasters and the students trying to break into this competitive industry. By fostering stronger relationships between employers and educators, Connected Campus ensures that students on a variety of vocational Film and TV-related courses are fully equipped for the demands of a contemporary, rapidly-changing industry. Could something similar be replicated elsewhere?

York St John's Creative Centre, a purpose-built creative space, opened in 2022 and includes a 170-seat theatre with large stage and lighting and sounds systems and media and music production studios.

The University of York has a motion capture studio, audio and edit suites, post-production and interactive media rooms in a purpose-built £30m media complex.

The University of York has also established [XR Stories](#), which funds and supports research and development in digital storytelling. They also provide training on their equipment for businesses.

The Screen Industries Growth Network (SIGN) provides placements, work experience and careers guidance. Their current focus is on barriers to entry and lack of diversity, current talent and skills shortages, anticipating future skills needs, and sector resilience post-Covid. The project is led by the University of York, but draws on the screen industry expertise of 8 other regional universities.

[ScreenSkills](#) provides career information, mapping professional pathways to improve entry-level diversity and work readiness and supporting ongoing development within the sector.

A range of support and training at different levels is also available via [Screen Yorkshire](#). Within the sector, people often get accelerated into senior level roles quickly, so they provide leadership and management skills support. [Screen Yorkshire's Beyond Brontes](#), which provides industry masterclasses, CV and interview workshops, mentorships, 1:1 support and detailed career

information, could be replicated here. Craft courses are available for those working within lighting, hair and make-up and targeted at production assistants. A trainee hub is available to support people into entry level jobs through signposting and CV development. All of this training is practical and informed by industry.

Despite the range of available training, stakeholders flagged that graduates are typically the main route of entry into the sector. But they often lack the full scope of skills to be ready for the workplace and it can take a lot of time and pressure on the employer to develop graduates.

Some perceptions around graduate needs were mixed, with some suggesting further training is needed on basic requirements like animation capabilities, understanding images sizes, resolution and colour profiles. Although some young people can self-teach technical skills, there is a risk of the knowledge being "diluted" due to easily accessible platforms in the sector (i.e. Canva, Instagram, TikTok).

Soft skills have also been flagged as a need within the sector, particularly for graduates, such as team-working, communication and confidence-building, alongside awareness of how the industry operates. Further research from SIGN around [Skills Shortages and Gaps](#) had similar findings around interpersonal skills being required, although it was noted this is across workers at different stages of their careers (not just new entrants). It also added that development is needed around workers' practical knowledge of production, organisational processes and business development (e.g. scheduling production, managing cash flow, self-branding).

Another challenge tied to graduates is competition with Leeds, Manchester and London. Although greater retention of graduates is needed, further exploration of different career pathways could help to plug any gaps and increase diversity.

The lack of diversity within the sector has been flagged as a major issue and something, alongside inclusion, that can't be overlooked. The industry is typically middle class and white, so it can be difficult to recruit diverse people, as there is a perception that this career path is not for people that don't fit this profile. This is primarily because the cost of operating within this sector is one of the biggest barriers. For example, people need the right equipment to both learn and work such as a Macbook and licences for software.

Skills Needs:

- Team-working, communication, confidence
- Leadership, strategy
- Financial and people management
- Knowledge on how the industry operates
- Mental health support
- Production knowledge
- Business development (e.g. managing cash flow), entrepreneurial skills, project management
- Basic technical skills (e.g. animation, image sizes, resolution and colour profiles)
- Cyber security

Due to the equipment requirements and specialised knowledge on them, the typical route into the sector is via university. For those who cannot afford to go down the graduate route, what are the alternative pathways for careers?

This research only identified one apprenticeship course found to specifically support this sector; creative industries production manager, at level 7 and delivered outside of YNY area. This maybe why apprentices may not be fully maximised by the sector. One stakeholder suggested that there is too much work for a business to access an apprentice easily and that these are not tailored enough to the sector. It's unclear if this is an issue with the provision, or rather, a lack of awareness of these opportunities from businesses. Different entry points may need to be better promoted to the sector. Research from the [Screen Industry Growth network](#) (SIGN) highlighted the need to explore how 'a shared apprenticeship model might work for screen industries in Yorkshire and Humber which takes into account the needs of employee[s] and the regional requirements for the industry'.

Another diversity challenge is linked to perceptions of the film industry, particularly at a young age. It isn't always viewed as a serious career path for young people and they will often be steered away by teachers and parents. Engagement is needed within schools to demonstrate the opportunities and that it can be a realistic career option, alongside creating buy-in from parents. York St John University's Enterprise Centre are looking at AI and VR and how this is embedded within schools. They're also

engaging with parents so they understand the sector opportunities and will support their children in this career path.

Both universities on the patch are exploring how they can increase diversity within this sector – this is both via SIGN and York St John university are engaging with FE college students to create footage that can be archived with more diversity and contribute to future films. The [British Film Institute](#) also has a set of Diversity Standards.

Ultimately, further mapping of entry routes and career opportunities is something that should be considered, possibly in collaboration with the [Screen Industry Growth network](#) (SIGN), who have already begun some of this work. In particular, they have looked at freelance roles and the drop-off rate around this. They have also worked with under-represented groups (including NEETs) and offered training to engage them with the sector.



8. Health & Life Sciences

Introduction

Health, Pharma & Life Sciences is a wide sector to cover and there are nuances across each element. Much of the health side is led by the NHS and public sector with deeply ingrained challenges around recruitment and labour shortages, particularly linked to care homes and lower level roles. Many roles within healthcare are flagged on the government's [shortage occupations list](#).

Comparatively, Pharma and Life Sciences is primarily private sector-led, with businesses in the sub-region including Abingdon Health and LabCorp. According to the [Science Industry Partnership](#), the total employment of the Life Sciences sector in the UK is expected to grow 223,400 to just over 300,000 by 2030. Whilst [ABPI](#) highlights that 'the average life sciences employee in the UK has an annual gross pay greater than at least 71% of UK employees. The opportunities within Life Sciences are massive.

There is some tension between which sub-sector takes priority and where the LEP can have the most influence and impact.



Key Headlines:

1. Training provision exists for both health and life sciences, but some of the bigger challenges are linked to labour shortages.

2. Digital and data analytics are playing an increasingly larger role within life sciences.

1. Training provision exists for both health and life sciences, but some of the bigger challenges are linked to labour shortages.

Provision is focussed on training to enter the sector and develop careers within and covers more traditional healthcare professions and skills needs for life science careers. However, some stakeholders suggested that there was a 'people gap' rather than a 'skills gap' within the sector. The recruitment issues within the sector are also having an impact on the capacity of those working within the sector meaning training is often deprioritised and limited.

There is a wide range of training in health and science across the region, although these are typically focussed on 'traditional' health care roles. For example, apprenticeships focus on: Adult Care Worker, Dental Nurse, Early Years Practitioner typically at levels 2 and 3 with higher levels offered to those in management/lead roles.

There is a much smaller range of apprenticeships in the sectors of science and maths, and these are at a higher level. A Bioscience Degree Apprenticeships (Level 6): Laboratory Science and Healthcare Science Practitioner includes: development of technical laboratory skills, research skills and discipline-specific skills (with the Healthcare Science Practitioner standard only open to colleagues in labs accredited by the Institute of Biomedical Science - IBMS).

A Data Science Degree Apprenticeship at Level 6 is also offered and includes statistics and data analysis, computer science, modelling and systems, visualisation and communication, AI and advanced data applications.

According to local NHS colleagues, they're seeing a growth in the use of apprenticeships to develop existing

Professionals (AHPs), Health Care Scientists). However, there are challenges associated with this, primarily the level of work involved and the amount of supervision needed (and a lack of capacity to provide this). According to the apprenticeships team, an employability pathway, supporting people with IT literacy and, in some cases, Maths and English, would help young people to fulfil the requirements of the available roles. But, this would require help from other agencies to deliver.

T-Levels offer a work focussed alternative to A-Levels and a Health T-Level is currently being delivered in the area; which has a core content in human health, managing information and data and core science concepts. Specialisms in the Health T Level include: supporting a number of healthcare teams and dental nursing. There are concerns with T-Levels as part of the level 3 reform, these include: low awareness of the qualification among employers and students, accessibility for students with educational needs and low attainment, further pressure on need for placements, specialisation within the course, restricted subject areas.

There are also various Health & Social Care Certificate/Extended Diplomas available at levels 2 and 3.

Degree courses include: BSc Hons Biomedical Science, BSc Biochemistry-option to add a year in industry, BSc Biotechnology, BSc Genetics. A number of providers highlighted a future focus in delivery in health sciences, stating health as a priority growth area for them, using LMI as a basis for the provision:

A number of providers offer courses that encourage people to enter the health sector and develop their careers, including 'Employability Practitioner' apprenticeships, aimed at supporting those out of work into the healthcare sector and access to HE in Health courses - a fast track to degree courses, with the focus on further study to nursing, social work and physiotherapy.

For in-work skills development, the following support exists:

- Some fully funded online short courses and masterclasses have been developed for the development of healthcare professions through the University of Sunderland. The courses include: recognition of academic credit and to promote CPD of healthcare professionals, support preparation for future study and development of basic skills and advanced level ECG interpretation.

- Wave 4 Skills Bootcamps are under development and procurement but a number were put forward to support the healthcare sector including: care skills aimed at those outside the industry wishing to progress into the sector from another sector or from unemployment, care skills for those within the sector and a leadership and management bootcamp in social care and early years. A number of opportunities were also put forward to support the skills need for data analysis and data science training.

However, employers not having the capacity to release staff is becoming more of an issue - courses can be provided but it does not mean that employees can attend.

Skills Needs:

- Sector specific skills**, such as immunology and genomics, chemometrics, formulation science, physiological modelling, computational chemistry and pharmacokinetic/pharmacodynamics modelling; Chemistry, biology, genetics (although applied science is more critical than academic science)
- Sector-wide**, such as digital/computational skills, statistical literacy, leadership and effective communication and improving commercialisation of ideas; project management
- Computer science and AI, data analytics and modelling and programming

Unsurprisingly, stakeholders emphasised the labour shortages within the sector. This is across multiple disciplines – from technical staff to work in the NHS’ Estates and Facilities department (e.g. electricians), radiographers and IT staff to domestic and catering staff and within the administration sector. The administrative roles are a particular challenge. Often, external recruitment will be utilised but current market conditions are making this increasingly difficult.

The recruitment challenge in the care sector is a national issue. One stakeholder cited it as a shortage and gap in the workforce, not a skills issue. Reasons cited, particularly in care roles, included poor pay, discrepancies around travel pay, and the need to be able to drive. This has also been worsened by the cost of living and fuel crisis.

Reputation for the sector can often be a blockage as well and activity to change perceptions is underway. For example, there is cross-sector progression opportunities, i.e. occupational therapy, nursing after working in a care home. It could also provide part-time work for industry-specific students.

One of the largest gaps in employees is at entry level, despite promotion of no prior experience or qualifications being required. Some stakeholders have undertaken various activity to encourage more people into the sector. For example, a campaign focussed on values based recruitment as opposed to qualifications and experience. The campaign has tried to change the reputation of the industry and focussed on younger people through schools, colleges and universities - highlighting career opportunities and developing work experience as a starting point for such careers.

The gap in employees also leads to other issues, including limited time for training or to support apprenticeships. Also managers often need to complete some of the care work as opposed to managing staff. International recruitment has been a focus and this has worked for some higher level/higher paid professions within the industry. Whole welcome packages are put together to support these workers to become accustomed to British culture and local areas. Unfortunately, this form of recruitment cannot work at present for entry level posts as they don’t meet the minimum wage regulations for migration – the sector needs this to change.

Underrepresented groups, in particular men, are being targeted as well to fill the gaps.

One of the key challenges that drives this sector, and is linked to labour shortages, is a ageing population; particularly as healthy life expectancy has not kept pace. This is particularly relevant in North Yorkshire, where those aged 15-64 decreased by 2.6% between 2011 and 2021, whilst those 65+ increased by 24.9% (Census 2011 and 2021). According to the [Skills for Care’s Workforce Intelligence Team](#), ‘if the number of adult social care posts grows proportionally to the projected number of people aged 65 and over in the population between 2021 and 2035, in Yorkshire and the Humber an increase of 25% (43,000 extra posts) would be required by 2035’.

Consequently, a key priority for this sector, like many others, will be understanding how labour gaps can be filled, particularly tied to finding experienced staff. The [ABPI's survey](#) suggested that demand for labour is currently outstripping supply, and, although there are skills needs, the shortages in the sector may be a bigger issue than a lack of quality in candidates.

Similarly, the Life Science sector also faces labour shortages. Close links between private sector businesses and the NHS sometimes means that graduates are lost to the public health sector, particularly as universities will often promote these as an easy route into a job. Similarly, low level access roles will often go into care homes. Overall, it was felt that the labour market is often decreasing for private businesses due to people going into social/health care.

Entry routes into sector are typically via the following pathways: academic education, apprenticeships, transferable skills from other sectors (e.g. the health service, advanced manufacturing, software development and gaming) or international talent with relevant experience, according to the Science Industry Partnership. Attracting and retaining a global and diverse talent pool is critical for this sector.



2. Digital and data analytics are playing an increasingly larger role within life sciences.

Repeatedly, digital skills are highlighted as one of the most critical training areas, particularly due to a greater emphasis on developing technological solutions within this sector. This is advanced skills around data analytics and programming with a direct link to scientific experience. But there are challenges with losing these digital skills to other sector.

According to a survey from the Association of the British Pharmaceutical Industry (ABPI), the top priorities for the sector are 'informatics, computational, mathematical, and statistical disciplines, which reflects the increasing role data and digital is playing within life sciences'.

Repeatedly, digital skills are highlighted as one of the most critical training areas, particularly due to a greater emphasis on developing technological solutions within this sector and ensuring the UK remains competitive.

Digital skills within this sector are not just about a basic understanding but relate to areas such as computer science and AI, data analytics and modelling and programming; preferably with a direct link to scientific experience (i.e. computational chemistry). These digital skills are important within new staff, but equally upskilling current staff and ensuring ongoing learning, in order to keep pace with technological advances. The ABPI also suggests that learning needs to start early, such as supporting schools to ensure science teaching is considering technological development.

Recruitment from different sectors could help support the digital shortages within Life Sciences. However, there is a lack of awareness from graduates with technology degrees of the opportunities within this sector, whilst there is equally competition from large technology companies that can often provide higher salaries (ABPI).

The sector often has to contend with misconceptions around what it means to work within Life Sciences. It is often perceived as a 'laboratory with white coat wearing individuals', according to one stakeholder, despite much of the work taking place in a factory. Equally, this creates expectations that only individuals with Science PHD/Masters can enter this field. Although this is relevant for some of the top occupations within the sector (e.g. Laboratory Technicians, Biological Scientists and Biochemists) and Chemistry, biology, genetics and post graduates are key to the industry, there are other opportunities and roles within the sector. Business and Financial Project Management Professionals is also in the top occupations for pharmaceutical organisations.

Top Occupations Pharma organisations

Laboratory Technicians

Biological Scientists and Biochemists

Natural and Social Science Professionals

Business and Financial Project Management Professionals

QA Technicians

Advertising and PR Directors

A key challenge is that individuals often lack business awareness and practical experience. Digital skills, project management qualifications and NHS experience, where possible, is considered vital. However, if employees move from the NHS to the private sector (often due to better wages and opportunities), this can create gaps in the NHS.

One stakeholder suggested that it's not hard to hire people with the academic science experience, but it is difficult to find the right practical skills. The key is teaching applied science, not academic science. To combat this, industry engagement with providers and graduates is critical, particularly through providing 'real-world' training opportunities. There are also challenges with silo learning in academic institutes, which doesn't align with the crossover skills needed in the sector, so engagement between the two is incredibly important (ABPI).

One life science business has created it's own apprenticeship scheme to provide employees with 'extra' skills needed over and above the science based qualifications. This training includes project management training and transferrable skills to help them develop the right behaviours for the workplace. They felt that some science based courses were not providing students with the workplace skills needed in the industry.

Source: Lightcast

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Concerns were also raised about changes to qualification funding structures as this could upset some career pathways and create gaps in provision.

There is a range of digital provision across YNY area. For example, Skills bootcamps, which provide flexible, employer-led courses in data analysis could be the key to filling the digital skills gaps for this sector.



9. Bioeconomy

Introduction

York and North Yorkshire has bioeconomy strengths linked to food and drink, agriculture and chemicals. Recognising this opportunity, the bioeconomy was included within the [York and North Yorkshire Devolution Deal](#), published in August 2022, which outlined: “Innovate UK (IUK) and broader UK Research and Innovation (UKRI) will work with the York and North Yorkshire Combined Authority to formally recognise and seek opportunities to support “BioYorkshire” – a cluster of excellence for the bioeconomy, delivering innovation, inward investment and high value jobs supporting both the UK levelling up objectives and delivering on national net zero ambitions. BioYorkshire is being led and championed locally by Fera Science Ltd., Askham Bryan College and the University of York.” Linked to these ambitions, skills will play a critical role.



Key Headlines:

1. Greater collaboration between academia and industry is needed to ensure that academic expertise is aligned to commercial and business requirements, particularly within new entrants.

1. Both technical and transferable skills, particularly linked to commercial awareness, are required within the sector. Greater collaboration between academia and industry could help to enable this.

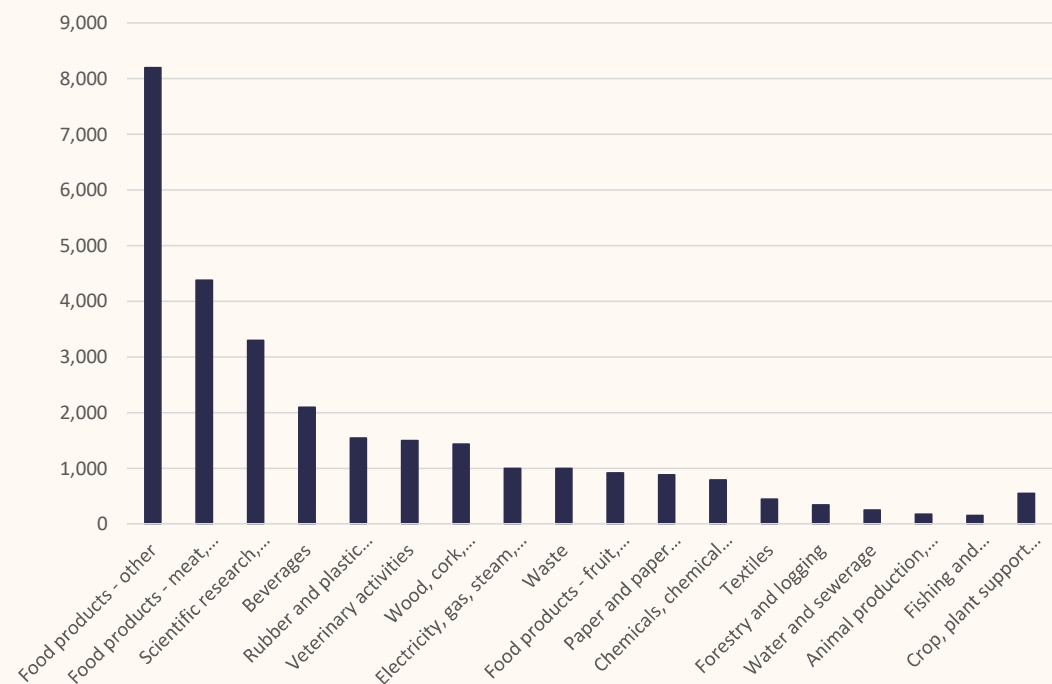
The Bioeconomy can be difficult to define as it covers a range of sectors including: agriculture; forestry and fishing; production and manufacturing; construction; and professional, scientific and technical. Although there are multiple sub-sectors, there are two common threads across the Bioeconomy: scientific expertise sits at the core of the sector's professions, but multi-disciplinary skills, covering entrepreneurship and digital skills, are critical.

Bioeconomy skills can be varied, due to the range of sub-sectors that it covers: agriculture, pharmaceuticals, food and drink manufacturing (a specialism within YNY), and energy. Despite this variation, scientific expertise is a general requirement across all roles, which is why STEM subjects are particularly important for the sector. A lack of graduates within these disciplines would be detrimental to the sector.

Research from the [University of York](#) highlighted that there's a national shortage of skilled technicians, which will require skills within chemical, biological and engineering to manage complex equipment and analyse data. Within York and North Yorkshire, STEM apprenticeship starts fell during 2020/21 as a result of the pandemic but grew by a third between 2020/21 and 2021/22, returning to their pre-pandemic level of 2018/19.

Research also showed there were some nuances between large and smaller businesses, but this typically related to technical skills.

Number of employees by sectors that could be categorised as the bioeconomy



Source: ONS, Business Register and Employment Survey

Occupation Examples within the Sector:

Description	Employed in Industry Group (2022)	Change (2017 - 2022)	% Change (2017 - 2022)	Median Hourly Wages	Education Level
Biological Scientists and Biochemists	492	-110	-18%	£16.17	Honours, Bachelor's degree
Laboratory Technicians	201	-22	-10%	£10.49	Level 4 NVQ; Intermediate, DipHE, DipFE
Natural and Social Science Professionals n.e.c.	136	-38	-22%	£18.60	Honours, Bachelor's degree
Physical Scientists	95	-17	-15%	£18.83	Honours, Bachelor's degree
Social and Humanities Scientists	88	-18	-17%	£25.66	Honours, Bachelor's degree
Environment Professionals	65	9	17%	£14.31	Honours, Bachelor's degree
Conservation Professionals	15	-3	-17%	£12.09	Honours, Bachelor's degree

Source: Lightcast

*Note: Bioeconomy occupations can be difficult to identify as they sit within multiple sectors

Whilst subject knowledge was less important in larger businesses (if the graduate studied a relevant discipline, e.g. chemistry/science, technology, and engineering and mathematics graduates), smaller businesses typically had higher expectations from graduates as they would need to be flexible within their role ([University of Hull](#)).

Beyond the scientific needs, the need for transferable skills and entrepreneurship has come up repeatedly by stakeholders and research. For example, [research from the University of Hull](#) found that employers within the bioeconomy are looking for traditional, transferable skills, including: communication, teamwork, project management, organisation and problem-solving. Linked

to this, commercial awareness and understanding profitability is a key gap. According to the [Bioeconomy in the North of England report](#), from the University of York, there is a strong base of technical skills, but commercial and entrepreneurial skills are much weaker and upskilling this area is critical across the whole workforce. Similarly, [research](#) that looks beyond York and North Yorkshire and considers the sector more widely across Europe recognised the need for 'critical thinking, collaboration, planning (and project management skills), adaptability and readiness for continuous learning'.

In particular, the ability to identify funding sources and develop applications is needed in the sector. Consequently, any technical/specialist training should be coupled with commercial development - this will be critical to transform innovative ideas into a reality.

Training has previously been offered around this topic area from BioVale and the Biorenewables Development Centre, which could potentially be explored further. But, equally, these requirements need to be built into early education around the sector, with modules taking a multi-disciplinary skills approach, encompassing both the scientific needs and the entrepreneurship. There are also emerging and growing skills requirements which need to be factored in, including digital and data literacy skills, ethical and legal considerations when using biological resources, and finance skills linked to commercialisation ([European Commission, Directorate-General for Research and Innovation, Graaf, I., Papadimitriou, A., Peijl, S., et al.](#)).

Skills Needs Summary:

- Commercial knowledge
- STEM subjects
- Digital and data analytics
- Communication, teamwork, project management, organisation, problem-solving
- Ability to identify funding and develop applications
 - Basic microbiology and hygiene
 - Biochemical engineers
 - Anaerobic digestion (particularly a lack of formal qualification)
 - Industrial biotechnology
 - Experts in agronomy, animal and plant health, agri-engineering and precision agriculture
 - Nutrition, food science and processing skills in the food and drink industry

With these increasing and changing skill needs of the bioeconomy, ongoing collaboration is needed between academia and the sector to ensure provision aligns with changing demands. To ensure demand for the training, students also need to be aware of the opportunities and encouraged to take this forward, which could be delivered through embedding this within careers guidance.



10. Sustainable Energy

Introduction

The energy sector plays an equally important role, especially around targets to become carbon negative. Through the government's Community Renewal Fund, the LEP was able to coordinate funding for the development of [Local Area Energy Plans](#), which identified an approach to energy systems transition. This covered various decarbonisation requirements, covering energy efficiency upgrades to housing and alternative sources of energy (e.g. heat pumps). To deliver those requirements, having the right skillsets and talent is going to be critical (this equally applies to the Green construction chapter).



Key Headlines:

1. There is training provision linked to the sustainability agenda in the early stages of delivery, with further courses in development. But providers have faced a number of barriers when developing courses to support the transition to a net zero economy.
2. Digital, engineering skills are at the forefront of need in the renewables sector.
3. A 'Just transition' is highlighted as fundamental to delivering a net-zero economy but what provision is there is support this?

1. There is training provision linked to the sustainability agenda in the early stages of delivery, with further courses in development. But providers have faced a number of barriers when developing courses to support the transition to a net zero economy.

Are businesses ready for this training and is it addressing some of the fundamental needs of the industry?

In 2020 Central Government produced a Ten Point Plan for a Green Industrial Revolution. It highlighted the different areas of the economy that would be a focus to support green jobs and the net zero economy. A number of the focus areas are:

- Advancing offshore wind
- Driving the growth of low carbon and hydrogen
- Accelerating the shift to zero emission vehicles
- Greener buildings
- Investing in carbon capture, usage and storage

Providers across the YNY area are starting to deliver and develop courses to support the transition to a net zero economy, some of which overlap with sectors beyond sustainable energy. For example:

Heart of Yorkshire Education Group are developing courses on heat recovery and transfer, which is to include: Intro level (capturing waste heat and re using), Intermediate level (how to maintain systems), and Advanced level (designing systems). Courses will support a range of sectors, such as construction, and be accessible to both SMEs and large businesses.

The Construction Skills Village plans include a 3 day

commercial course in solar PV fitting and removal using a rig housing the solar panels.

University of York are starting to look at green courses through current expertise and departments.

York College are looking at different methods of delivery of green courses. Due to a lack of demand for specific courses, they are now looking at bolt-on courses instead.

Craven College are looking to grow the sustainable construction and energy offering.

Scarborough Tech are considering T levels in plumbing and electrical installation covering elements of environmental technologies and would like to move into adult/business delivery of short courses in renewables.

Harrogate College are looking to offer EV network installation and maintenance (4 day course, upskilling experienced staff), solar and wind installation and maintenance (full time for 16-18 and adult upskilling), L2 and L3 maintenance of EV vehicles (for school leavers, and adult upskilling opportunities). The college would like to provide more in relation to renewables and hydrogen.

Bishop Burton College plans include short courses in Green Energy covering solar, wind and anaerobic digestion. These will be available online with recorded presentations and

course material aimed at an audience of current students and local businesses looking to gain an intro into advancing technologies.

Skills Bootcamps wave 4 provision is currently being developed/procured. Intelligence gathered through this process has highlighted the need for green skills, including green power- wind and solar and EV charging installation skills.

In terms of apprenticeships, the Green Apprenticeship Advisory Panel (GAAP) is working with the Green Jobs Taskforce to develop an action plan for creating green jobs and skills. The panel is looking at apprenticeships in two ways: how to enhance current apprenticeships to support the needs of employers within the growing green economy and how to create new apprenticeships to reflect new occupations.

The GAAP has currently endorsed 44 existing apprenticeship standards, including those less overtly green standards such as data analyst and project manager. The newly approved Domestic Electrician will enable people to be trained in the maintenance of domestic heat pumps, solar panels and EV charging points. Other current apprenticeships such as Engineering Fitter naturally fits within the wind turbine industry.

Apprenticeships currently in development include: Battery Manufacturing Technician as batteries will play a key role in providing storage for renewable energy and power to electric vehicles. The Installation Electrician and Maintenance Electrician apprenticeships are also being revised to add crucial skills, e.g. installation and maintenance of EV charging points. A number of the providers in YNY are already delivering a number of the standards in revision.

However, from provider perspective, there are barriers with delivering some of the training. In part, providers don't yet understand fully what is needed, particularly linked to qualifications and careers pathways. Other traditional qualifications (e.g. working at heights) will also need to be factored into many of the roles linked to these sectors. Accreditation bodies are only just introducing qualifications in green skills.

Some providers have also found a lack of engagement with businesses when they have tried to deliver specific green courses. Demand can often fluctuate, as many businesses are at a different stage to the provision and only now beginning this journey into sustainable energy. Equally, some haven't even considered the opportunities of pivoting to renewable energy production.

One business flagged that there needs to be a change in mindsets first, particularly from "traditional" workers and from management to drive that change, otherwise there won't be an appetite for this training. In one case, another stakeholder explained that they promoted these opportunities as improving efficiencies and money-saving (e.g. linked to heat recovery). However, communicating

these benefits can be a challenge as there are many different terms linked to this agenda (i.e. low carbon, green, sustainable etc.).

Another blockage raised is that there's often short-notice on training due to the way they are funded. Releasing staff from their day jobs to train can be a major issue, particularly for the energy sector whilst there's been energy shortages and a greater emphasis on renewables. Short, modular courses would be welcomed.

There are also resource issues associated with capital equipment needed to provide the technical/practical courses and staff upskilling.

Despite the efforts made by providers, one business flagged that there are still some gaps in the type of training available, especially linked to engineering. Within the energy sector, many of the skills required overlap with a standard electrical engineer (a role that already has shortages). Multiskilled engineering courses including mechanical and electrical was highlighted as a need as well as commercial electrical training. But this needs to be funded and flexible to enable it to fit around work/business commitments. One business had found some part funded, flexible training in commercial electrical training which involved a weeks hands on training in Leeds and some virtual sessions with flexible dates. The total cost to the business was £500, the course cost was £2000.

They also highlighted a lack of renewables training in North Yorkshire, with more support readily available in Hull, Leeds and Middlesbrough. This business had their

own apprenticeship scheme to ensure they gained the right skills for their employees. Candidates recruited to the apprenticeship scheme were between 17-27 and were recruited on attitude and willingness to learn.

It's not an easy task, but there will be a massive skills demand in this sector that needs to be tackled. For example, according to the Offshore Wind Intelligence Report, by 2030, UK Offshore Wind is forecast to employ 97,465 jobs, with 61,361 being direct jobs and 36,104 indirect jobs. The report highlighted several skills gaps and shortages which need to be addressed, including:

- High level electrical skills including Senior Authorised Persons
- Consenting skills, particularly amongst SNCBs and regulators but increasingly within the industry.

Over the longer term, anticipated skills shortages include electrical technical and engineering skills (particularly substations, HV and cables) and the ability to manage significant sized projects and multiple contractors.

One business said that it was difficult to recruit employees in some parts of the YNY, they felt this was due to a lack of opportunity in the area, so people find work elsewhere or train elsewhere. The business often recruits graduate engineers from London based universities e.g. Imperial. This may need to be explored further to understand the specific gap and whether current provision is actually providing this.

Recruiting apprenticeships was also an issue, one business felt there was a mismatch between the expectation of what an apprenticeship is and involves and the reality. They felt that more careers advice was important to raise awareness of the different careers in the industry, technical pathways and to attract more females. A successful working relationship with NYBEP and projects such as Scarborough Engineering Week were highlighted as providing candidates to the industry and developing talent pipelines.

As well as more engagement between providers and employers needed, one business highlighted some fundamental energy grid issues were holding the industry back locally but that some developments such as Dogger Bank would really support the skills development and boost the industry locally.

**Top Posted Jobs Titles in renewables sector
YNY 2022:**

- Solar Pv Installers
- Renewable Energy Consultants
- Renewable Energy Analysts
- Renewable Energy Engineers
- Solar Installers
- Solar Electricians
- Solar Engineers
- Solar Project Managers

Source: Lightcast, 2022

2. Digital, engineering skills are at the forefront of need in the renewables sector.

The need for digital skills are being flagged across a number sectors and that also applies to sustainable energy. The level of these skills are varying and cover both those operating in the industry and the end users. For example, responsive 2-way energy infrastructure (e.g. where solar farms can be switched on and off by a central team) will require digital infrastructure and skills to manage this.

According to the [Green Jobs Taskforce](#), digital skills will be critical for the sector as 'renewable electricity generation sources are intermittent and managing this will require storage and flexibility across local and national systems. This will require better use of data and digitisation skills to enable smart grid infrastructure to deliver a reliable system' and the 'increasing use of digital twin technology could help improve efficiencies across many sectors from energy production in wind farms'. For many sectors, the use of data and digitisation is very closely linked with improving efficiencies.

More broadly, these needs translate into skills around data analytics, engineers with an understanding of data analysis and presentation, AI, robotics, SCADA related skills and software development, specialist solar software skills needed for PVSOLV, design software (Pegasus Search info). For those looking to upskill and reskill, some general digital literacy may also be required.

Digital skills will be transferable from other sectors, but there are risks around competition (this has already been flagged in the rail sector which equally requires digital skills).

As mentioned in other areas of this research, there is a range of digital and project management provision available including: part funded shorter courses for businesses, higher level apprenticeships, skills bootcamps and T Levels. Further exploration of these courses needs to be completed to understand how these can support the energy industry in the skills gaps mentioned.

Despite the clear need for digital skills, it was not massively highlighted during the sector engagement, with much of the focus being on engineering skills. Consequently, further engagement with businesses would be recommended to better understanding on how these skills and needs are reflected at a local level.

3. A 'Just transition' is highlighted as fundamental to delivering a net-zero economy but what provision is there to support this?

Swapping to sustainable energy sources is critical for the environment, but equally, there are economic benefits for businesses as well, such as enabling new customers and ensuring longevity. However, there is a risk that this transition could be detrimental to some individuals, particularly linked to limited diversity in the sector and the potential for lowered wages. Understanding how to overcome these challenges is critical for this sector.

According to the [New Economic Foundation report, Skills for a New Economy](#), one of the most significant issues is that the UK skills levels for the average worker are below those needed in the green economy, the lowest being those in the North. The NEF report states that the average worker will need between '6-18 months additional work-related training to access existing green jobs'. In YNY, there are high-levels of qualifications attained (particularly compared to the rest of the North), but, in the YNY area, there has been a decline in levels of adults in education and training, with many people facing significant barriers to accessing this. These barriers are numerous and can be complex.

The report also highlights that, as a high proportion of the 2030 workforce is in the labour market currently, a just transition for workers is vital. Those at significant risk of being left behind by the transition include: low skilled, low paid workers, those in high carbon industries, and older workers.

Ensuring people remain in employment is one step, but

it's equally important to ensure these new jobs are decent and well-paid. For some current fossil fuel workers, they are on high wages. Showing individuals that they won't be worst off will also enable a smoother transition and generate buy-in.

Diversity, especially for women, also needs to be targeted in the sector. In terms of solar energy, the International Energy Agency (IEA) has revealed through its [Renewables 2022](#) report, while nearly a fifth (19%) of those working in offshore wind are women, there's still room for improvement as the industry hopes to achieve its target of 33% by 2030. In the solar PV industry, an International Renewable Energy Agency (IRENA) report showed how the number of full-time women employees has reached 40%.

So, what is currently being delivered to support these needs and what needs to be done?

There is a range of support to help those with barriers to learning and to support upskilling of workers. The majority of these programmes will come to an end in 2023, as they

are currently ESF-funded, so several programmes through the UKSPF will aim to continue some of this support and will include:

- Engaging and Inspiring People Programme to provide key worker support and interventions for inactive individuals; IAG, work based and employability skills.
- Developing Progression Pathways Programme to provide holistic, wrap around support for those in work to enable them to reskill and upskill.
- Supporting Older and Younger People to provide tailored support to help people to access, sustain and progress in training and employment.
- Green Skills Programme to support access to employment in the green economy including training, IAG.

One stakeholder highlighted a number of needs to enable a just transition to happen:

- Collaboration is key. For example, social partnerships including communities, industry and education
- Investment in barriers to training and education
- Support for small businesses
- Support for FE/training providers e.g train the trainer, CPD for staff.
- Green skills needs to be embedded in all courses to be accessed by people at all ages and levels.



11. Barriers for Training Providers



As part of the exercise to map current provision, surveys were completed by a range of providers to understand the drivers behind provision development and the types of barriers that they may be facing with delivery. The majority of providers who responded were further education and higher education institutions, a small number of independent training providers did also respond.

In terms of drivers for future provision, over 75% linked this to local need, just under 17% to new funding, whilst under 8% developed training to respond to government policy/strategy.

Key Barriers

Barrier type	Not a barrier	Somewhat	Barrier
Staff training	14%	72%	14%
Knowledge/expert	7%	86%	7%
Cost	7%	57%	36%
Infrastructure	14%	50%	36%
Demand worries	8%	69%	23%

As flagged within the priority sectors, training providers also have challenges around staffing, demand worries, costs and regulatory pressures.

In terms of staff there are issues around shortages due to the loss of staff particularly due to competition around wages and issues around terms and conditions.

Use of agency staff to fill gaps is costly and can have an

impact on consistency and quality of provision.

Wage competition is also an issue when trying to recruit from industry. Providers want to recruit industry professionals who are highly skilled in demand/growth sectors, but are unable to compete with salaries received in their current industry roles. One independent training provider said that they just had to pay a higher salary to gain the expertise needed.

Some providers have looked at recruiting retirees/older workers from industry but have found that they only want to work 1 or 2 days and do not want the commitment of another full time position. There may also be some upskilling needed here to enable them to feel confident to teach.

These shortage pressures also impact if staff need to have further training; trying to cover existing workload may mean this isn't possible.

Another key challenge is around demand worries. There are declining numbers of adults taking up level 2 and 3 training. A drop in take-up of some courses and apprenticeships for some providers has led to withdrawals and changes to enrolment.

Ultimately, demand from businesses needs to be the driver to development and delivery of courses and with the introduction of the Skills white paper and LSIPS, the government is mandating that employers are put at the heart of the skills agenda. However, providers have sighted difficulties in employer engagement, employer fatigue (as everyone is trying to speak to and survey employers) and often employers are not sure what they need.

Cost was also cited as a barrier to delivery of new courses. New equipment, is often extremely expensive but is vital to provide practical and worthwhile training. There has been a number of funding pots available including through YYLEP, SDF and IoT which has supported purchase of capital equipment and development of infrastructure for a number of providers across the area. One provider mentioned that they have good links with industry who provide materials for their students to use- obviously there is a reciprocal relationship here, as the students could become future employees.

Funding is not without its issues though, it is linked to targets and KPIs which often involve evidencing improved student numbers not just providing a better experience for current students. A number of providers said that they always consider these targets before applying for any funding.

Regulation around skills budgets was also raised as a major barrier. Funding changes can impact on delivery significantly e.g. the current level 3 reform could impact on a high percentage of providers in the YNY area. Policy changes, such as the loss of traineeships will have a greater adverse effect on those providers in the North of England. Issues around apprenticeships including: schools highlighting them as a career path for students, quality issues around EPA, changes to funding and red tape can put providers off from delivering and also businesses from recruiting apprentices.

Reduced FES budgets and those for adult provision has an impact on what can be delivered too.

12. Conclusion & Next Steps



Conclusion

Although there are nuances across each sector, there were some common threads throughout, both linked to skills requirements and the barriers that businesses and providers are facing. The following skills were identified as core:

1. **STEM, particularly digital / data analytics**
2. **Leadership and management**
3. **Sustainability**
4. **Project management**

1. STEM

All of the sectors require Science, Technology, Engineering and Mathematics (STEM) skills in a variety of ways. For example, the Bioeconomy needs specialist scientific skills, such as microbiology, whilst technology is cross-cutting over all of the sectors, and linked to this, mathematic skills are critical for data analytics and maximising data collected from the technology. Some STEM engagement is already taking place across the sectors, e.g. businesses within rail are running events to attract more girls into STEM subjects. This type of activity needs to be continued.

Digital / Data Analytics

Data and digital skills are incredibly broad as a category, with some requirements sector-specific, whilst others are transferable and are less driven by the sector. For example:

- Within agriculture, these skillsets link to the use of implementing new technology on the farm (e.g. robotics, drones). To maximise this and improve efficiencies on the farm, the data collected will need to be interpreted and analysed.
- With cyber security, digital skills are interlinked with every aspect of this. But there is specific accreditation requirements and advanced technical skills (e.g. forensic analysis, penetration testing etc.), alongside basic IT knowledge.
- Digital skills are also primarily driven by efficiency improvements, particularly for rail, with requirements around software development and data analysis.
- Data and digital skills are playing an increasing role within life sciences, particularly linked to delivering digital services. These are not just basic skills, but cover computer science and AI, data analytics, modelling and programming, preferably with a direct link to scientific experience.

2. Leadership and Management

The purpose of this skills is fairly similar across all sectors. Clear leadership and management abilities are needed, in order to ensure the following are considered: succession, labour force development, future trends and changes to the sector, and sustainability requirements. Change will only be embedded within the sector if this is in place.

3. Sustainability

Sustainability or “green” skills are becoming increasingly more critical across multiple sectors. Within agriculture, this is primarily driven by regulation changes and the need to understand a carbon’s footprint, but this is where there are overlaps between these themes as technology could support sustainability changes. The construction sector needs to adapt to this agenda, building up their carbon literacy expertise and retrofitting awareness, to name a few. Within the rail sector, there are diverse jobs opportunities beyond engineering, which specifically link to sustainability expertise, such as ecologists.

4. Project Management / Transferable Skills

Project management was another skill reflected across most of the sectors, with many prioritising this over sectoral experience.

Alongside these core skills trends, a number of common challenges/barriers have also been identified:

1. Low demand for provision

Reviewing current provision has shown that multiple sector specific opportunities do exist, and where there are gaps, providers are currently developing provision. So, the solution is not necessarily about creating further training.

Lot of providers are ahead of the curve, thinking about future opportunities (particularly linked to sustainability and technology advancements), but there is a lack of demand. Some of this may be a lack of awareness within businesses. But, equally, businesses are facing wider challenges that deprioritise training and future-proofing of skills, e.g. health has more demanding issues around capacity so they can’t afford to lose people to training, whilst agriculture is more concerned with pressing challenges around changes to subsidies.

Whilst other sectors, such as construction, aren’t

adapting whilst consumer demand is still there for traditional methods. Awareness-building is required, but other sectors will be more challenging and dependent on consumer and regulation changes.

2. Labour shortages

There are multiple nuances to why labour shortages occurring. This is partly linked to an ageing workforce and high levels of retirement. As there are low levels of unemployment within York and North Yorkshire, retaining that talent for longer is one solution through upskilling and reskilling. But this only part of the solution and that knowledge and expertise needs to be passed onto future employees.

There are also challenges around diversity, which could help to plug some gaps. Most of the growth sectors identified within this research are stereotypically male-dominated fields.

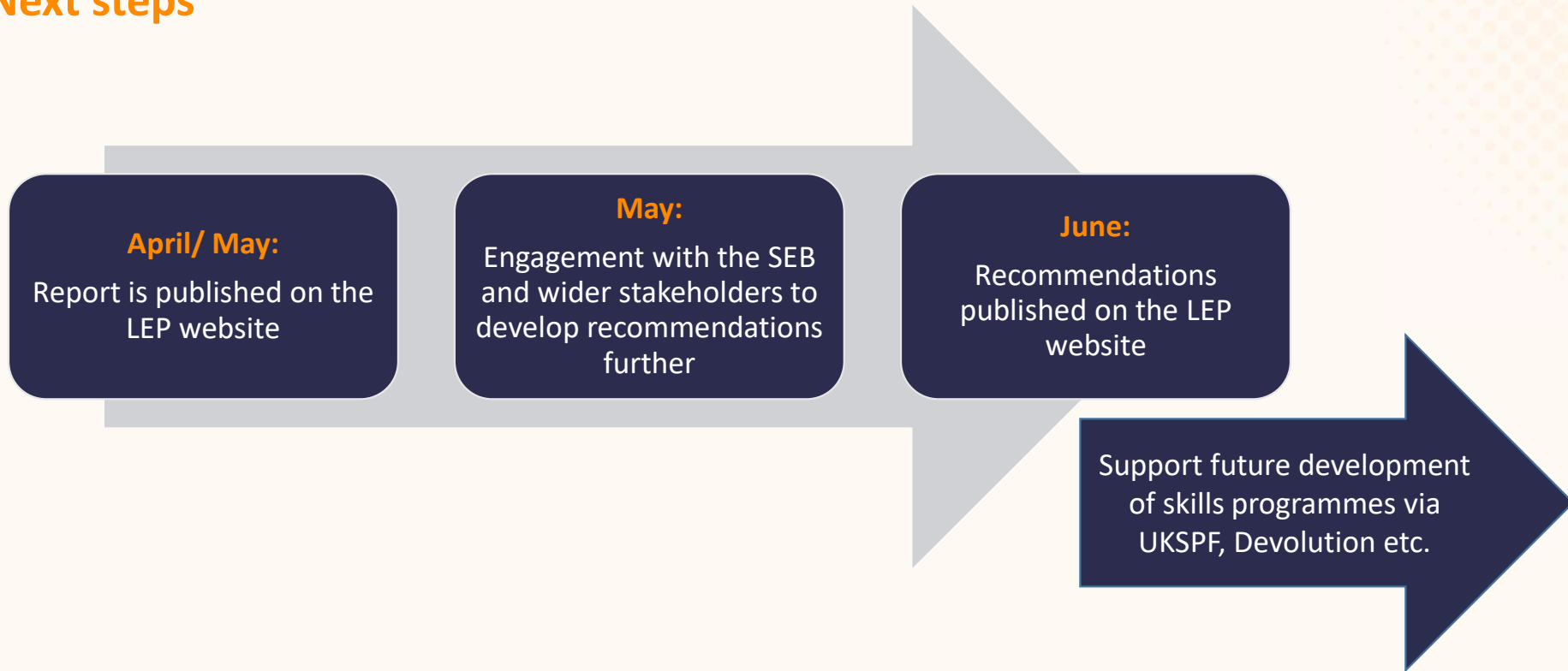
Finally, career pathways and promoting job opportunities will help to develop the future pipeline of

talent. Many of the sectors have a wide range of careers available, which young people may not be aware of.

3. Strong collaboration needed between academia and industry

To ensure courses remain demand-driven and are relevant and up-to-date as things change (i.e. technology advancements), collaboration between academia and industry is critical.

Next steps



Note: dates are indicative