



Decarbonisation of large non-domestic buildings over 1,000m²

Workforce Foresighting Hub findings report in collaboration with Energy Systems Catapult and Department for Energy Security and Net Zero.

March 2025

Acknowledgements

The Workforce Foresighting process integrates data from the following international data sets:

Skills England Occupational Standards

ESCO – European Skills, Competencies, Qualifications & Occupations, EU

ONet – Occupational Networks Online, USA

In accordance with licence and publishing requirements of these organisations for the use of their data sets, the Workforce Foresighting Hub team states that –

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The method and process used in the Workforce Foresighting process is under development and there may be errors and omissions in the data provided.

This report was produced following workshops undertaken March – July 2025 using the data set and tools available at that time.

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Executive Summary

Executive Summary

This report outlines findings from the Workforce Foresighting cycle focussing on the decarbonisation of large non-domestic buildings over 1,000m². The study is sponsored by the Department of Energy and Net Zero Security (DESNZ) and conducted by the Energy Systems Catapult in collaboration with the Workforce Foresighting Hub, an Innovate UK initiative.

Workforce foresighting is a systemic approach to planning ahead and anticipating future skills and capability needs associated with new technologies and government transformation targets. It involves identifying and understanding the skills required for tomorrow's jobs, ensuring our education and training systems are prepared so that our workforce is ready to adopt new technologies and support future industrial growth.

This report sets out the findings of the workforce foresighting study and suggests the next recommended actions required by various stakeholders to ensure a workforce is created that is prepared to effectively implement these new technologies in the sector.

Workforce Foresighting Topic

The [Climate Change Act \(2008\)](#) is the UK's legislation underpinning action on climate change and commits the UK to meeting Net Zero by 2050. At the most basic level, emissions can be broken down into four areas: buildings, transport, industry, and agriculture and land use. There are approximately 2 million non-domestic buildings in the UK¹, with the majority being commercial buildings, as well as public sector and voluntary and community buildings.² In 2024, these buildings (including the processes from the businesses within them) produced 22 MtCO₂e - accounting for 27% of total UK emissions from the buildings sector.³ It is therefore critical to tackle these buildings in the coming years if we are to meet Net Zero targets.

Non-domestic buildings, buildings like offices, shops, hotels and restaurants as well as public sector buildings like courts, hospitals and prisons, can be large and complex. Buildings over 1000m² make up only around 7% of non-domestic buildings and [analysis](#) suggests they are responsible for over 60% electricity consumption and 70% of gas consumption. This means decarbonising these buildings will make a big dent in non-domestic building emissions.

Providing heat to large non-domestic buildings is challenging. The varied nature of the buildings stock in terms of age and use means there is no 'one size fits all' solution. A lot of large buildings will use fossil fuel heating for some or all of their heat, and this will need replacing with low-carbon alternatives, most likely a heat pump.

These multiple variables mean that designing a clean heat system for large non-domestic buildings is challenging, needs appropriate skills and experience and is currently not happening at the scale or pace required to be confident Net Zero targets will be achievable. Without properly detailed and technically robust plans, systems are unlikely to be installed correctly or work effectively and could then fail to deliver suitable internal conditions for occupants (i.e. the building not being warm enough in winter), carbon emissions savings or massively increase running costs.

Design skills are therefore a critical part of solving the challenge and are required before scaled delivery can commence. CIBSE, the Chartered Institute of Building Services,

¹ 2 million is an estimate based on 1.7 million buildings in England and Wales. [Non-domestic National Energy Efficiency Data Framework \(ND-NEED\), 2025 - GOV.UK](#)

² [Non-domestic National Energy Efficiency Data Framework \(ND-NEED\), 2025 - GOV.UK](#)

³ [Provisional UK greenhouse gas emissions statistics 2024 - GOV.UK](#)

recognised this challenge and in 2022 produced [guidance for large heat pump installations in non-domestic buildings](#) in partnership with Government. This Foresighting cycle builds on that work to help stakeholders understand the future workforce requirements.

Participants and stakeholders

Industry Participants	Skills Participants	Technology Participants
21Engineering Ltd	Cardiff University	Heat Pump Federation
Independent Energy & Buildings Consultant	Building Engineering Services Association (BESA)	Oakes Energy
D2i Management Ltd	Liverpool John Moores University	Building Engineering Services Association (BESA)
Deloitte		Independent Energy & Buildings Consultant
Derwent London		Mitsubishi Electric
		HI Group

The Findings and Insights

Decarbonising large non-domestic buildings is challenging, and design of the systems is only one part of the process. The cycle, with its engagement with experts, has demonstrated that more needs to be done to ensure there are the right skills and capabilities to deliver the design phase.

The key Future Occupational Profiles (FOPs) identified included two on the ‘client side’: Heads of Estate and Facilities Managers. These roles will sit on the building owner/occupier side and will be responsible for engaging with the supply chain to commission decarbonisation works as well as the day to day running of these buildings. There were particularly poor matches in existing provision for these FOPs suggesting a priority gap that should be addressed.

For those FOPs related to the ‘supply side’ (building services engineers, mechanical, heating and ventilation engineers), those providing the design services to the large building owners and operators, two apprenticeship standards were a reasonably good match. These were the Building services engineer and Low carbon heating technician. However, there were significant gaps, so adapting these standards, or developing new modules or other continuing professional development routes that cover large non-domestic buildings would be beneficial and support relevant skills development in the sector.

This [Visualisation Tool](#) supports this study. How to use the tool is set out in the Appendix.

The Next Steps

This study has produced the following next steps:

Undertake further engagement with the sector to understand the challenges and requirements in more depth, including testing and validating our findings.

Explore the value of bespoke provision for those commissioning and overseeing these types of works and what that training provision should look like and cover.

If further engagement validates the findings that there are significant gaps, next steps may include:

- Adapting or creating additional modules for the Low carbon heating and Buildings services standards that address the skills required to deal with large non-domestic buildings.
- Creating the bespoke provision for those commissioning and overseeing the decarbonisation of large non-domestic buildings.
- Exploring the role of creating Continuing Professional Development courses either instead of, or in addition to additional modules or full standards.

There should be further engagement with key industry bodies such as CIBSE, who continue to develop best practice in this area to make sure that any activity is informed by leading technical experts.

Further work investigating degree level provision could be considered and how that addresses the particular challenges of large complex non-domestic buildings.

Other cycles looking at different parts of the process of retrofitting large non-domestic buildings with heat pumps could also be beneficial, for example when designs are passed to contractors for installation, the installation phase itself, commissioning and handover stages and on to operation and maintenance.

1. Introduction

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1.1 Background to Workforce Foresighting

The report “Manufacturing the Future Workforce” (Collier et al., 2020) recommended the Skills Value Chain as an approach to avoid shortfalls in workforce capabilities relating to future innovations (see Figure 1). This is the genesis of the workforce foresighting programme, which is sponsored by Innovate UK and delivered through the Innovate UK Catapult Network.

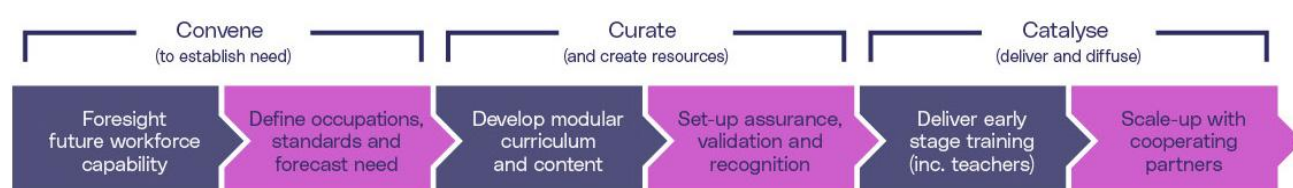


Figure 1: The Skills Value Chain

The first step of the skills value chain is to “Foresight future workforce capability”: This calls for technology, industry, education, and training partners to convene using government as a focal point, to “foresight and articulate future skills needs, standards and qualifications associated with emerging technologies” (Collier et al., 2020).

1.2 Workforce Foresighting - Process Overview

The core of workforce foresighting is convening three groups of relevant specialists to conduct structured, Delphi-style, facilitated workshops to capture and discuss the set of organisational capabilities that will be required to respond to and exploit technology innovation.

Organisational capabilities are captured using a bespoke classification that has been developed by the Workforce Foresighting Hub. The classification uses a structured common language to enable cross sector and cross centre collaboration and integration of data. Additionally, the classification enables data from a number of other national and international open-source workforce datasets to be integrated through the same common language. The data is held in a cloud based “data-cube” that is dynamically growing as each workforce foresighting cycle adds to the shared data relating to future workforce capabilities.

Using cutting edge AI and Large Language Model data tools, the data-cube is used to undertake detailed analysis to ‘map’ future workforce capability requirements against the current education and training provision to identify where existing provision can be used and where new provision, CPD or qualifications are required.

As an agile development project, the Workforce Foresighting Hub team are constantly evolving and improving the detailed workshop process and workshop approach, but always consists of the following stages:

Considering – Clarifying the Challenge to be met (the ‘what’ and the ‘when’) and collating solutions (the ‘how’) as foresighting topic suggestions align with strategic priorities

Identifying – Gain clarity and consensus about the solutions to be put forward – make the case for foresighting

Preparing – The convening of specialists and scheduling of workshops

Carrying out – Run foresighting workshops with experts, collate and analyse data

Communicating – Insights, findings and recommendations gathered from all research in report

Causing action – The driving of action based on the recommendations (promoting progress down the rest of the skills value chain) built on the findings and recommendations of foresighting

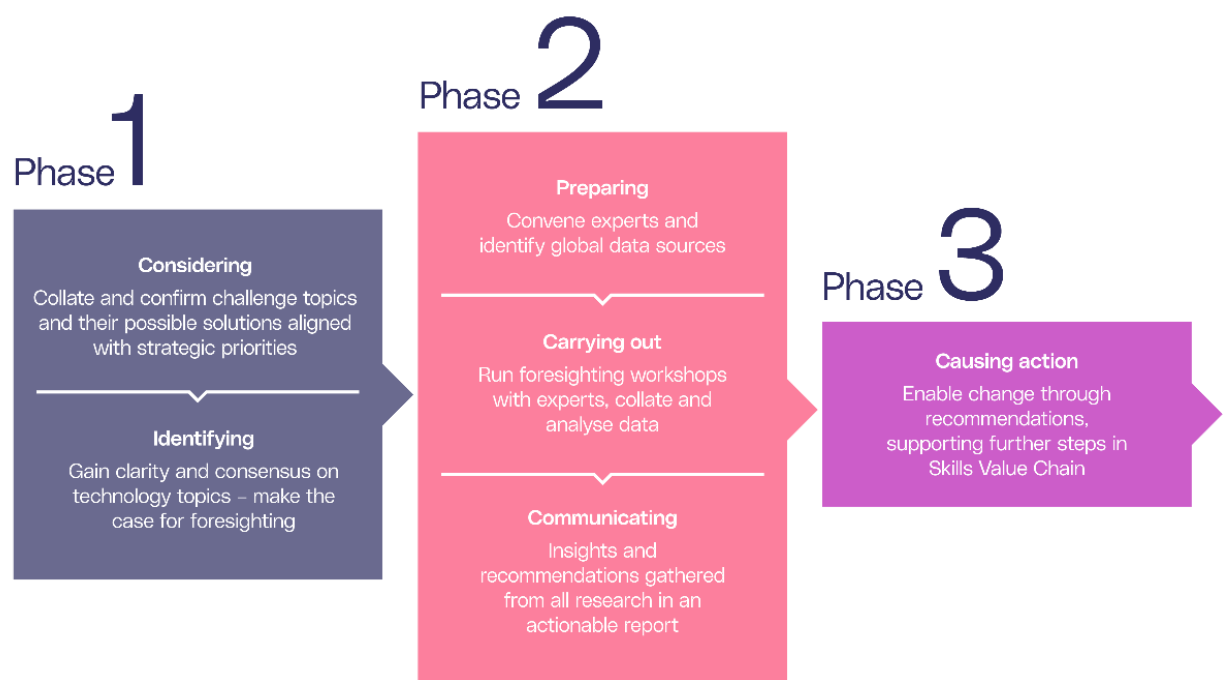


Figure 2 - The workforce foresighting process

1.3 Foresighting vs Forecasting

Although this study is focussed on workforce foresighting in terms of the capabilities, required it is important to keep in mind parallel findings from forecasting in terms of the required capacities and numbers. *Forecasting*, alongside *foresighting*, provides vital input to the sector, feeding into recruitment and development targets for employers, and consideration of economic class sizes and recruitment targets for educators. However, it is beyond the scope of the foresighting study to carry out independent forecasting, and as such readers should refer to referenced studies for detail on forecasting.

1.4 Introducing the Visualisation Tool

The Workforce Foresighting Hub's Visualisation Tool is a powerful, innovative system, which enables the reader to explore and analyse foresighting data to determine the capabilities required for future roles. Links throughout this report make it easy to identify existing standards which meet the needs of these future roles and pinpoint where new standards are necessary to develop a skilled workforce equipped to adopt new technologies.

The data is generated by the foresighting cycles, integrating the expertise of technologists/domain specialists, employers and educators. The data informs the development of future curriculums and course content as determined by the action plan. Using AI tools validated by human oversight, and by linking to external data sources, the tool identifies differences at the level of occupation/role as well as detailed changes required to help update/refresh knowledge, skills and behaviours thus delivering insights for learners, providers, creators and assurers of skills.

Detailed instructions on how to use the [Visualisation Tool](#) and how it was applied to this cycle can be found in the [appendix](#).

2. Aligning the Challenge and Solutions with national priorities

2. Aligning the Challenge and Solutions with National Priorities

2.1 Positioning and context of national challenge

Tackling climate change

The [Climate Change Act \(2008\)](#) is the UK's primary legislation underpinning action on climate change. Originally, it committed the UK to an 80% reduction in greenhouse gas emissions by 2050. However, it has since been revised (2019) to require Net Zero emissions for all greenhouse gas emissions by 2050. To meet this target, the UK Government has set out [carbon budgets](#), in conjunction with the [Climate Change Committee](#), which act as stepping stones towards Net Zero. The UK has already met its first three carbon budgets and is on track to meet the [fourth](#), however it will be increasingly challenging to meet carbon budgets and tackling heat decarbonisation will be increasingly important.

At the most basic level emissions can be broken down into four areas: buildings, transport, industry, and agriculture and land use. Non-domestic buildings account for 27% of the share of all buildings emissions⁴ with the vast majority of the emissions coming from providing heat for space (central) heating and hot water.⁵ It is therefore critical to tackle these buildings in the coming years if we are to meet Net Zero targets. This challenge focuses specifically on the skills and capabilities related to reducing the carbon emissions from buildings.

Non-domestic buildings

Non-domestic buildings like offices, shops, hotels and restaurants as well as public sector buildings like courts, hospitals and prisons, can be large and complex. Many of the buildings already built will still be in operation in 2050, meaning retrofitting these buildings will be a key challenge. Buildings over 1000m² make up only around 7% of the non-domestic stock but [analysis](#) suggests they are responsible for 60% of electricity consumption and 70% of gas consumption. This means tackling these buildings will make a big dent in non-domestic building emissions.

Providing heat to large non-domestic buildings is challenging. The varied nature of the buildings stock in terms of age and use means there is no 'one size fits all' solution. A lot of large buildings will use fossil fuel heating for some or all of their heat, and this will need replacing with low-carbon alternatives, most likely a heat pump. There are different types of heat pumps including air source heat pumps (ASHPs), ground source heat pumps (GSHPs) and less common water source heat pumps (WSHPs). Heat pumps can also operate at different temperatures and be installed in combination with other low carbon technologies such as solar panels or batteries.

These multiple variables mean that designing a system for large non-domestic buildings is challenging, needs appropriate skills and experience and is currently not happening at the scale or pace required to be confident Net Zero targets will be achievable. Without properly detailed and technically robust plans, systems are unlikely to be installed correctly or work effectively and could then fail to deliver suitable internal conditions for occupants (i.e. the building not being warm enough in winter), carbon emissions savings or massively increase running costs. This means that design skills are a critical part of solving the challenge and are

⁴ [Provisional UK greenhouse gas emissions statistics 2024 - GOV.UK](#)

⁵ [Building Energy Efficiency Survey \(BEES\) - GOV.UK](#), Figure 3.13.

required before scaled delivery can commence. CIBSE, the Chartered Institute of Building Services Engineers, recognised this challenge and in 2022 produced [guidance for large heat pump installations in non-domestic buildings](#) in partnership with Government.

Government action

It has been recognised by the Climate Change Committee that not enough progress has been made on the decarbonisation of non-domestic buildings, partly due to the lack of regulatory drivers or other incentives. The government has set out its intention to take action to drive progress across the non-domestic building sector. Strengthened Minimum Energy Efficiency Standards (MEES) as well as the upcoming Warm Homes Plan, the UK Government's initiative for the non-domestic building stock to be warm in winter, cool in summer, and efficient and affordable, will help drive down bills for businesses and organisations, reduce greenhouse gas emissions and improve the country's energy security by reducing reliance on fossil fuels. These and other future clean heat regulations and incentives will drive businesses to tackle the decarbonisation of their estates.

The retrofit sector

Evidence and analysis of the non-domestic retrofit workforce is limited. Existing reports, both published and internal to DESNZ, point to skills gaps across the retrofit journey, from initial design through to installation and post-installation maintenance and operation. A key published report is the [Non-domestic energy efficiency optimisation and retrofit supply chain study](#) (commissioned by the Department for Business, Energy and Industrial Strategy and published by Eunomia in 2021). The results, including from an industry survey, suggested that:

- There were between 36,000 and 87,000 non-domestic retrofit businesses in the UK with a turnover of between £2.4 billion and £5.7 billion in 2019
- The majority (83%) of businesses were involved in new build and retrofit, providing the same energy efficiency services when servicing new-build non-domestic buildings as when retrofitting non-domestic buildings.
- The survey with industry found that two thirds of the supply chain provided retrofit services to offices. Over half of the supply chain offered retrofit services to warehouses, factories, shops, places of education, and hospitality. The survey also showed that very few businesses specialised on one particular building type. These findings were supported by the qualitative research with industry.
- Just over a third (36%) of businesses from the survey with industry offered a deep retrofit service. This rose to just over half (51%) of businesses with >50 employees indicating the capacity of larger businesses to provide a wider variety of retrofit service.
- Most businesses that were interviewed did not rely on international labour as part of their day-to-day operations. For those that did, this was to a small extent.

There was also a percentage breakdown of the types of businesses within the sector:

- 40% of non-domestic retrofit businesses had a primary classification of HVAC manufacturers, suppliers, designers, installers and engineers;
- 30% had a primary classification of lighting consultants, manufacturers, and contractors;
- 12% had a primary classification of classified of doors and windows manufacturers, suppliers, installers and repairers;
- 11% had a primary classification of insulation manufacturers, suppliers and installers;

- 7% had a primary classification of design and management (i.e., architectural services and commercial energy assessors).

The report concluded ‘the formal process of holistic deep retrofit design and management in the non-domestic sector [is] not currently practised at anything close to the rate required to upgrade the UK non-domestic building stock in the next few decades. Retrofit (or rather refit, which is more often used to describe aesthetic upgrades) programmes in non-domestic buildings are typically conducted for aesthetic purposes, at which point work may be carried out to the basic energy efficiency requirements of the time, but whole-building deep retrofit for the purposes of achieving net zero is rare’.

2.2 Workforce Foresighting for chosen prioritised technology solutions

Decarbonising these large complex buildings is technically challenging from the start to finish of the process. For this foresighting cycle we chose to focus on the design of bespoke heat pump solutions for these large non-domestic buildings. It was felt that covering the whole process from design, through installation, commissioning, operation and maintenance would be too broad. There is also evidence of projects failing due to installations being undertaken without suitably detailed designs being drawn up, and problems translating designs into installation and operation.

The focus on heat pump solutions ensures that carbon emissions are tackled, by removing fossil fuel usage (usually gas boilers) and replacing that with electricity usage which is increasingly coming from renewable sources, including on-site generation and renewable energy feeding into the grid.

Additionally, CIBSE have published the [AM17 Heat pump installations for large non-domestic buildings \(2022\)](#) report that provides guidance on the high quality design, installation, commissioning, operation and maintenance of large heat pump systems. This workflow covers all the areas that need considering when designing, the heat pump-based systems in large buildings. This ensures that the cycle is focussing on the best practice solution supported by DESNZ and CIBSE.

The title of this cycle is ‘Decarbonisation of large non-domestic buildings over 1,000m²’

2.3 Current and predicted scale of technology deployment in UK

The majority of non-domestic buildings that will be in operation in 2050 and therefore need to be ‘Net Zero’ are already built. That means the challenge of meeting Net Zero in the non-domestic building sector is predominantly a retrofit challenge, that is removing fossil fuel heating systems and replacing them with low carbon alternatives. There are approximately 2 million non-domestic buildings in the UK⁶, with the majority being commercial buildings, as well as public sector and voluntary and community buildings.⁷ In 2024, these buildings (including the processes from the businesses within them) produced 22 MtCO₂e - accounting for 27% of total UK emissions from the buildings sector.⁸ These buildings will need to be

⁶ 2 million is an estimate based on 1.7 million buildings in England and Wales. [Non-domestic National Energy Efficiency Data Framework \(ND-NEED\), 2025 - GOV.UK](#)

⁷ [Non-domestic National Energy Efficiency Data Framework \(ND-NEED\), 2025 - GOV.UK](#)

⁸ [Provisional UK greenhouse gas emissions statistics 2024 - GOV.UK](#)

decarbonised and heat pumps are likely to be key technology solutions for the majority of buildings.

For the supply chain this is a significant shift, with most installations currently being 'like-for-like' replacements, that is gas boilers being replaced with new gas boilers. The skills required for like-for-like replacements vs retrofit projects where heat pumps (possibly with other technologies such as solar) are installed are significant as they require fundamentally different principles. It requires a shift towards electrical and, to a certain extent refrigerant installations, alongside changes in design such as flow temperatures and overall system sizing.

2.4 Key stakeholders in industry and government

Key stakeholders in industry in government include:

- Relevant Ministers and their officials in DESNZ who have responsibility for meeting overall Net Zero targets and the decarbonisation of the non-domestic building sector.
- Relevant Ministers and their officials in HMT who, through the Comprehensive Spending Review, provide any capital funding for public sector buildings to decarbonise.
- Relevant Ministers and their officials in DfE and Skills England who are responsible for skills across the economy.
- Property portfolio owner and managers. These organisations have responsibility for the large buildings in question, including making investment decisions in relation to these assets.
- Facilities managers either 'in-house' or in companies who operate and maintain these assets and any sustainability managers who may be working to reduce emissions from the assets.
- Numerous professionals and their teams who would be involved with the design of retrofit projects (for heat pumps), ranging from building service, mechanical and electrical engineers, energy managers, surveyors and architects to project managers and cost consultants.
- Trade associations, for example the GSHP Association, Heat Pump Association and Heat Pump Federation.
- Educational establishments who are training the relevant professionals and their teams.

3. Findings and Results

3. Findings and Results

3.1 Methodology and Findings

Summary information is provided with a narrative based on the underlying data which is also provided using bespoke visualisations to enable greater insight and access to detail. The report is aligned to the needs of those responsible for workforce planning – employers, educators, and skills providers. The methodology is outlined below.

Step One – How will the Supply chain change - Organisational Changes

Exploration of organisational changes provides insights into how organisations will need to adapt their current capabilities to implement the solutions that respond to the challenge addressed by the foresighting project.

Typically, organisational changes will also require the adoption of new capabilities and a change in the distribution of these capabilities across supply chain partners. The change in capabilities within an organisation as well as their supply chain partners will determine the changes knowledge and skill changes required by the role groups within the workforce of each Supply Chain partner.

Step Two – How will the Workforce change - Occupational Changes

A set of 'Future Occupational Profiles' (FOPs) is produced by the foresight process that demonstrates how current occupations may need to change in the future. FOPs are generated using a combination of attributes from the underlying capability classification and from data collected in the workshops. The FOP generation algorithm works to group capabilities into logical sets reflecting role levels, function, proficiency and capability similarity.

As part of the foresight process the generated FOPs are reviewed, revised and distilled by the Employer group. The agreed set of FOPs are then compared with selected current education provision; the default reference is the set of Skills England Occupational Standards; to assess which current training and education provision could be used in the future. Two bespoke metrics - match and surplus - are used to evaluate the alignment of current provision with the set of FOPs proposed. Summaries are presented of the key findings related to each Supply Chain partner.

Findings are aimed at both Employers, and Education and Training Providers, and identify matches and gaps in future training needs compared with current provision to guide further detailed investigation.

Step Three – How the current Education provision meets the future need - Highlighted Changes to Future Provision

The report identifies suggested changes to education and training provision – principally apprenticeship standards that will deliver the knowledge, skills and behaviours required by future occupations. In some cases, this will include the development of short courses and continued professional development (CPD) to upskill the current workforce to meet future needs. Additionally, foresighting outputs can be used to develop programmes, qualifications, and apprenticeship standards for new entrants to the workforce joining via apprenticeship, taught qualification, or other training programme.

The insight and data in this part of the report are primarily aimed at educators training providers, apprenticeship standards bodies and awarding organisations. Combined with insight arising from the Supply Chain capability changes, the provision insight offers an effective way for employers to identify training opportunities that align to their future needs.

3.2 Results and Findings Summary

How will the Supply Chain change - Organisational Changes Insight

Identifying the Future Supply Chain Capabilities

The following charts and graphs summarise the changes in the set of capabilities that will be required by the supply chain (Supply Chain involved in production) in the future. The pie-charts reflect the distribution of capabilities across the five functions of the capability classification. The future state data is captured in three technology focused workshops. The current state data is derived from information collected on apprenticeship standards used across current supply chain partners. sector. This latter information is indicative and used to provide a point of comparison.

These initial pie charts summarise the changes that will be required by the whole supply chain, across the five functions.

- 'Design' exhibits the most substantial relative increase in capability share. 'Implement' shows a modest increase, reflecting a growing need for capabilities related to service delivery and operational execution. This trend indicates that whilst the primary focus has been on design, there is a parallel requirement to prepare for the scaling and deployment of the solutions.
- 'Support' demonstrates a relative decrease in capability share. The decline is likely due to the foresighting cycles orientation towards the early-stage development of design (of heat pump systems), where support functions are not fully engaged.
- 'Enterprise' remains a significant component of the capability distribution, particularly in areas such as data management, regulatory compliance and strategic planning. This reflects the ongoing importance of leadership, governance, and digital infrastructure in enabling innovation and supporting future growth.

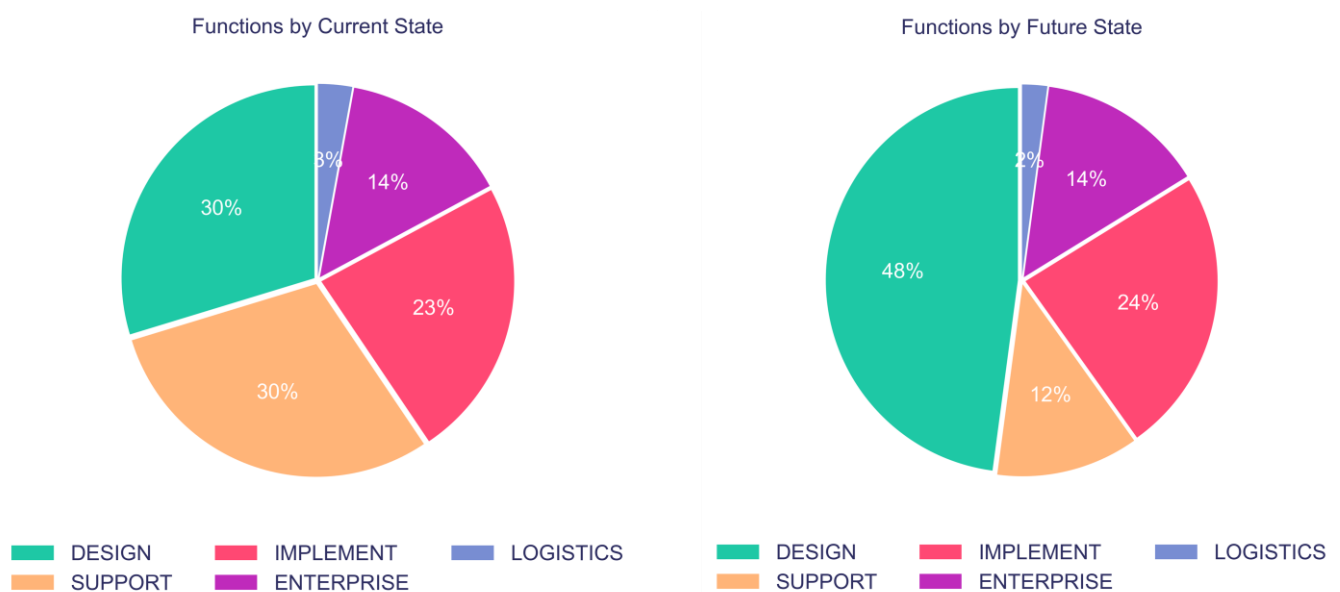


Figure 1: Current and Future – Whole Supply Chain - Capability Function Distribution %

Whilst the information on current and future Supply Chain capabilities is useful to indicate relative changes, factors such as volume of activity will also determine which functions may have greater future significance.

Supply Chain partner organisation types

The workforce foresighting process recognises that different partners in a Supply Chain will require appropriate capabilities, and these are determined and agreed in the initial workshops.

In this cycle, the following Supply Chain partners were identified and then used during participant workshops and data analysis to determine the organisational needs:

1. Consultancies / End-to-End Providers
2. Facility Owner

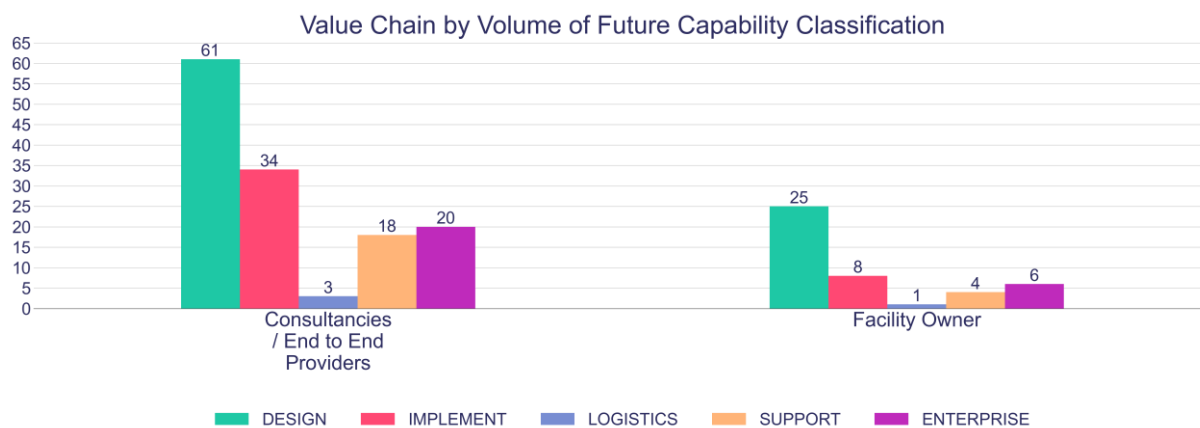


Figure 2: Distribution of Functions across each Supply Chain Partner

The graph illustrates the distribution of capabilities by function across the Supply Chain Partners. These capability sets are used to form the set of Future Occupational Profiles within each role level. The weighting of the functions on the Consultancies / End- to End Providers is a reflection of the design stage of the cycle. While a Facility Owner will need to have some knowledge and involvement, it is expected to be lower at this stage. Consultancies or end-to end providers need the full set of competencies to deliver designs for heat pump systems.

[Further detail can be found in the Appendix.](#)

How will the Workforce change - Occupational Change Insight

From the total of 14 Future Occupational Profiles (FOPs) defined for this cycle, the 6 FOPs outlined below represent the critical roles within the evolving retrofit decarbonisation workforce we have chosen to focus on for further exploration. These FOPs are essential for enabling decarbonisation of large non-domestic buildings over 1,000m².

While there is some alignment with existing education and training programmes, several emerging capabilities are insufficiently addressed. These gaps highlight potential priority areas for innovation and the development of new educational and training solutions. The FOPs defined for this cycle do not capture the full extent of a current or future job role, as the Workforce Foresighting aims to capture the key new capabilities that represent a change in an occupation that will be required in the future to allow technology adoption. A detailed comparison of current apprenticeship provision against the requirements of the identified FOPs is available via the data visualisation tool: [FOP vs Provision](#).

Priority Future Occupational Profiles Priority

FOPs to fully address the needs of the workforce have been identified as including the following roles:

- 1. Buildings and buildings services engineers:** Aligned with supply chain partner - Consultancies / End-to- End Providers. These engineers design, integrate, and optimise heat pump systems and supporting infrastructure to deliver efficient, compliant, and low-carbon design solutions for large non-domestic buildings.
- 2. Building services engineer:** Aligned with supply chain partner - Facility Owner. These engineers commission and optimise heat pump systems, ensuring safe integration, regulatory compliance, and long-term energy efficiency in large non-domestic buildings.

3. **Head of estate:** Aligned with supply chain partner – Facility Owner. These leaders oversee strategic planning, stakeholder coordination, and budget approvals to enable effective, future-proof decarbonisation of large non-domestic buildings.
4. **Heating and ventilating engineers (professional):** Aligned with supply chain partner – Consultancies / End-to-End Providers. These engineers design, analyse, and optimise heat pump systems and hybrid solutions, ensuring efficient, compliant, and tailored installations for large non-domestic buildings.
5. **Mechanical design engineers:** Aligned with supply chain partner – Consultancies / End-to-End Providers. These engineers lead the design and integration of bespoke heat pump systems, ensuring technical precision, regulatory compliance, and energy-efficient solutions for large non-domestic buildings.
6. **Facilities managers:** Aligned with supply chain partner – Facility Owner. These facilities managers run the large buildings on a day-to-day basis, ensuring that the internal environment is fit for purpose for occupants and the building is well maintained. They will have essential knowledge about the building and how it is used and will be responsible for using any newly installed systems.

Preparing the Retrofit Supply Chain Workforce:

Key steps to address capability gaps in priority FOPs:

- Identify shared capability gaps to inform CPD development that supports upskilling across multiple occupations.
- Collaborate with training providers to create short CPD courses tailored to upskill or reskill both current workers and new entrants in this field.
- Assess industry adoption of relevant apprenticeship standards and raise awareness to encourage uptake among existing and future workforce.
- Review higher education (HE) course offerings to identify gaps in each priority FOP and develop targeted modules to address them.
- Contribute to apprenticeship standard updates by recommending modular content that covers identified capability gaps.

[Further detail can be found in the Appendix.](#)

How the current Education provision meets the future need - Highlighted Changes for Future Provision

1. Buildings and building services engineers

Why this FOP is a priority: These engineers require the specialist capabilities needed to design, integrate, and optimise heat pump systems in complex building environments. It prioritises practical knowledge of technologies, regulations, and digital tools to ensure systems

are efficient, maintainable, and tailored to building-specific needs—especially in retrofit scenarios where space, resilience, and legacy systems must be carefully managed.

Key Tasks: Engineers design and specify heat pump systems, electrical infrastructure, and plant layouts; perform energy modelling; and plan for installation, maintenance, and compliance. They perform modelling, use digital tools like IoT sensors and digital twins, collaborate with stakeholders, and integrate systems with existing building services to deliver efficient, resilient, and future-ready solutions.

Aligned to supply chain partner: Consultancies / End-to-End Providers

In FOP vs Provision there was a 63% Fit with the Skills England [Low Carbon Heating Technician](#) apprenticeship.

The apprenticeship standard is a good fit for this FOP covering over 63%. This suggests that only small adjustments might need to be made. Looking at the unmatched FOP capabilities, a few stand out including developing retrofit plans to reduce energy demand and looking at hybrid systems. As the standard covers domestic and new build properties, it may be that the standard needs more focus on the larger buildings and retrofit which tend to be more complex and where there may be more numerous factors to consider in the design, including reducing overall demand and hybrid systems. Other capabilities are also more skewed to larger complex buildings such as giving more thought to maintenance, space requirements and the future use of buildings and sites. There is also a Building Services Engineer apprenticeship standard which would be worth reviewing and looking at the matches within that when considering future requirements.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

2. Building Services Engineers

Why this FOP is a priority: Building Services Engineers are essential to ensuring that heat pump systems and low-carbon technologies are effectively commissioned, integrated, and maintained in large non-domestic buildings. Their role is critical in translating design into operational reality, aligning technical solutions with building energy needs, regulatory compliance, and long-term decarbonisation goals.

Key Tasks: They manage large-scale heat pump projects, assess building energy and electrical demands, and coordinate with stakeholders including DNOs. They use building information modelling (BIM) and control systems to optimise performance, ensure regulatory compliance, and specify handover tools for maintenance. Their work supports seamless integration of heat pumps and complementary technologies into existing building systems.

Aligned to supply chain partner: Facility Owner

In FOP vs Provision there was a 68% fit with the Skills England [Low Carbon Heating Technician](#) apprenticeship.

Once again, this a good match with over 68% coverage. Some of the unmatched FOPs are ones that are more likely to be required when dealing with large complex buildings and sites, for example coordinating with DNOs about overall electrical capacity for sites and considering electric vehicle charging. More focus on the complex nature of these projects is required (compared with domestic and smaller buildings) with requirements to look at passive measures and cooling as well as FOPs that relate to using data for optimisation and design.

There is also a Building Services Engineer apprenticeship standard which would be worth reviewing and looking at the matches within that when considering future requirements.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

3. Heads of Estate

Why this FOP is a priority: Heads of Estate commission and oversee large buildings with demanding sustainability targets. Their confidence in low-carbon technologies like heat pumps is vital - without it, there is a risk of defaulting to like-for-like replacements that miss decarbonisation goals. This FOP supports estate leaders to make informed, future-proof decisions by aligning energy upgrades with planning, budgets, and wider opportunities such as heat networks.

Key Tasks: They secure project budgets, coordinate with planning authorities, and assess cost-benefits - including strategic and reputational gains. They develop retrofit plans, predict energy performance, and explore modular and digital twin solutions. They also engage external stakeholders to identify opportunities for broader energy system integration.

Aligned to supply chain partner: Facility Owner

In FOP vs Provision there was a 13% Fit with the Skills England [Architect \(integrated degree\)](#).

For Heads of Estate there is a very poor fit with current apprenticeship standards. This is not surprising as looking at large scale decarbonisation and possible heat network connections is not yet common practice and requires a particular set of skills to enable Heads of Estate to effectively engage with the supply chain. While Architect (integrated degree) is the closest match, this is not a suitable standard to be adapted.

For this role, a bespoke training standard could be developed that would be suitable for Heads of Estate, their teams and sustainability professionals who also work on estate decarbonisation. This should cover the technical, financial and stakeholder aspects estates professionals require (in addition to their current capabilities) to effectively drive forward building and site decarbonisation.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

4. Heating and Ventilation Engineers (professional):

Why this FOP is a priority: Heating and Ventilation Engineers are central to designing technically sound, efficient, and compliant heat pump systems for large non-domestic buildings. As trusted advisors to clients, their decisions shape long-term performance, serviceability, and integration with existing infrastructure. This FOP is a priority because it ensures engineers can confidently deliver tailored, low-carbon solutions that meet net zero standards and avoid costly retrofit errors.

Key Tasks: These engineers design and size heat pump systems, optimise plant layouts, and assess ancillary space needs. They perform heat transfer analysis, fluid flow simulations, and load calculations to ensure system efficiency. They collaborate across disciplines, develop schematics, define control strategies, and select hybrid or complementary technologies. Their work includes training plans, regulatory compliance, and performance analysis to support successful installation and operation.

Aligned to supply chain partner: Consultancies / End-to-End Providers

In FOP vs Provision there was a 72% Fit with the Skills England [Plumbing and Domestic Heating Technician apprenticeship](#).

While there is a reasonable fit here with nearly 72%, the standard currently focusses more on domestic buildings (though the apprenticeship is in the process of being revised or adjusted). Again, there is a need to focus more on data, modelling and bespoke solutions due to the complex nature of large buildings and sites and the need to consider cooling, hybrid systems and future training and maintenance. Training and maintenance are areas where there are particular challenges in ensuring that heat pump systems work for buildings and sites and provide the required comfort for occupants whilst being run efficiently to keep costs down.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

5. Mechanical Design Engineers

Why this FOP is a Priority: Mechanical Design Engineers are critical to delivering bespoke, compliant, and high-performing heat pump systems for large non-domestic buildings. Their technical leadership ensures that designs meet decarbonisation targets and Minimum Energy Efficiency Standards, while navigating planning regulations and complex building requirements. Without their expertise, systems risk being under-optimised or misaligned with long-term sustainability goals.

Key Tasks: They lead feasibility studies, manage design projects, and develop integrated mechanical systems using CAD, BIM, and BEMS tools. Their work includes hydraulic and energy distribution design, pipework calculations, and system schematics. They source technical data, assess emerging technologies, and coordinate with specialists to ensure efficient, compliant, and tailored heat pump solutions.

Aligned to supply chain partner: Consultancies / End-to-End Providers

In FOP vs Provision there was a 68% Fit with the Skills England [Building Services Engineer apprenticeship](#).

Here there is a good fit with the Building Services Engineer apprenticeship standard. In this case it seems that minor revisions could be made to again make sure there is enough focus on the requirements for dealing with large buildings and sites. In relation to the Environment Agency and other permitting requirements, these are more likely when looking at large sites and potentially considering options such as ground source heat pumps.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

6. Facilities Managers

Why this FOP is a Priority: Facilities Managers are responsible for the day-to-day operation and long-term performance of large non-domestic buildings. Their involvement is critical to ensuring heat pump systems are practical, maintainable, and aligned with building use and resilience needs. Without their input, designs risk being unserviceable or misaligned with operational realities, undermining decarbonisation efforts.

Key Tasks: They coordinate project delivery, review design specifications, and assess risks, access, and compliance. They plan maintenance schedules, define system outcomes, and ensure staff training. Facilities Managers collaborate with stakeholders, evaluate tenders, and

support integration of heat pumps with existing systems, infrastructure, and future building use.

Aligned to supply chain partner: Facility Owner

In FOP vs Provision there was a 44.0% Fit with the Skills England [Low Carbon Heating Technician apprenticeship](#).

Here there is some match with the Low Carbon Heating Technician apprenticeship which demonstrates the need for Facilities Managers to understand the technologies that might be suitable for decarbonising the buildings they are managing. However, similar to Heads of Estate, Facilities Managers need skills to engage with the supply chain, rather than doing the design themselves. They need to be able to understand what is being suggested and ensure that the proposals will deliver the outcomes they require, not just for reducing carbon emissions but also for occupant comfort. Creating a bespoke standard for those working within the organisations commissioning the decarbonisation could be an option going forward.

Review the [FOP vs Provision](#) data to see full list of matched and unmatched capabilities.

The table below shows all 14 Future Occupational Profiles FOPs listed with lowest to highest matched current apprenticeships. **Priority FOPS are highlighted in bold.**

Role Level	FOP Title	Required for SCP	Max. Fit Factor	Surplus Factor	Best Fit Apprenticeship Standards	Apprenticeship Suitability
Senior Level	Head of Estate	Facility Owner	13%	80%	Architectural assistant (integrated degree)	LOW
Senior Level	Energy Engineer	Consultancies / End to End Providers	21%	70%	Building services engineer	LOW
Senior Level	Energy Managers	Facility Owner	29%	93%	Building services engineer	LOW
Mid-Level	Cost Engineer	Consultancies / End to End Providers	33%	96%	Associate project manager	LOW
Senior Level	Engineering Project Managers and Project Engineers	Consultancies / End to End Providers	38%	44%	Building services engineer	LOW
Mid-Level	Facilities Managers	Facility Owner	44%	20%	Low carbon heating technician	LOW
Mid-Level	Energy Advisers and Assessors	Consultancies / End to End Providers	61%	55%	Energy manager	MEDIUM
Mid-Level	Building and Building Services Engineers	Consultancies / End to End Providers	63%	10%	Low carbon heating technician	MEDIUM
Mid-Level	Electrical Engineer	Consultancies / End to End Providers	67%	20%	Low carbon heating technician	MEDIUM
Mid-Level	Building Services Engineer	Facility Owner	68%	20%	Low carbon heating technician	MEDIUM
Senior Level	Mechanical Design Engineers	Consultancies / End to End Providers	68%	44%	Building services engineer	MEDIUM
Junior Level	BIM and CAD Technicians	Consultancies / End to End Providers	69%	53%	Building services engineering senior technician	MEDIUM

Mid-Level	Heating and Ventilation Engineers (professional)	Consultancies / End to End Providers	72%	15%	Plumbing and domestic heating technician	HIGH
Mid-Level	Compliance and Regulatory Professionals	Consultancies / End to End Providers	100%	30%	Low carbon heating technician	HIGH

Considering all the FOPs and available standards it is worth considering the following:

- Creating a bespoke standard for roles on the commissioning side of these projects, i.e. those working for the organisations who own or operate these large buildings. While these roles will need to understand the design process and be able to evaluate the solutions being offered by the supply chain, they will not need the capability to do the design themselves. For more senior roles such as Heads of Estate, provision should also cover the skills required to make the case for decarbonisation and secure budgets and sign off.
- The Low Carbon Heating Technician and the Building Services Engineer are the closest match in many cases. Looking at the unmatched FOPs suggests that within these standards there isn't enough focus on large, complex buildings and sites where additional elements need consideration, for example cooling, suitability of hybrid solutions and the requirement for more data and modelling capability.
- Looking at Energy Managers, Energy Engineers and Energy Advisors and Assessors, the relevant standards of Energy Manager and Building Services Engineer could again be looked at in the context of large complex non-domestic buildings to ensure the standards are covering this area in enough detail.

[Link to full data set - Visualisation Instructions](#)

Visualisation Data Link	What is it and what can it be used for?
FOP Detail	This page allows you to review a specific Occupational Profile, including the capabilities contained within it and the Knowledge, Skills & Behaviour (KSB) tags associated with the capability. You can select an individual Role Level and linked FOP in the two available dropdowns. The table in the lower section of the page will then be populated with all relevant capabilities. The search control above the table allows you to filter content of any of the columns of data. A key piece of functionality in this table is the presence of the KSB tags associated with the capabilities.
Future KSBs Summary	This page provides a view of the complete set of capabilities within the cycle along with all of the associated KSB tags which are linked to them. It is, essentially, the superset of all details displayed on the FOP detail page. This is used to: • To review the identified Knowledge, Skill and Behaviour tags for a given capability, to support development of future education and learning material. • To review the requirements from a capability level, rather than a role level/occupational profile grouping.
Capabilities Matched to Current Provision	This page allows you to review and compare individual capabilities against 'Duty' statements in an Apprenticeship / Occupational Standard. You can select individual capabilities to review their specific matches. These matches are shown in the bottom panel, including the Standard, the Level and the Duty Statement this is matched to.

	You can filter in several ways to focus your review: • By the Capability Classification Framework (left-hand panel). • By capabilities that are served by the reference mapping framework – the default is Skills England Occupational Standards provision. • By capabilities that are not served by the reference mapping framework, e.g., Skills England Occupational Standards provision – these are capabilities required in the future that may require new/bespoke training and CPD materials to be developed to upskill/re-skill the workforce. This page can be used to identify where existing provision may exist across the broad spectrum of Apprenticeship standards, and not just within a narrow range of sector-specific Standards. The data also allows you to identify where provision may already exist to support specific capabilities.
<u>Fit & Surplus Factors</u>	This page allows you to review the 'Fit' and 'Surplus' of Prototype Future Occupation Profiles (FOP) against existing training provision e.g. Skills England Occupational Standards. It is possible for the 'Fit' and 'Surplus' comparison to total over 100%, as they are two separate calculations based on a two-way comparison.
<u>Fit & Surplus Matrix</u>	This page is a visual representation of the 'Fit and Surplus Factor' insight. You can visually review 'Fit' and 'Surplus' of Prototype Future Occupation Profiles (FOP) against existing training provision e.g. Skills England Occupational Standards. This can help you identify which provision may align strongest, or which may require adaptation, to provide the suitable provision fit for each future role. It will help you focus in on which provision to focus your attention for analysis.
<u>FOP Capability Matches</u>	This page allows you to view the matches between Capabilities and Skills England Occupational Standards Duty Statements. Clicking the arrow next to a number in the 'Matches' column will open a popup with more detail for each Capability. Each capability also includes Knowledge, Skill and Behaviour Tags, to support with scaffolding future education provision. You can review individual Prototype Future Occupational Profiles (FOPs) or review all FOPs under a Role Level, to give a more holistic view of Capabilities and Matches Where a future capability has been matched to existing provision (currently, by default, Skills England Occupational Standards) it is possible to interrogate the data and identify specific statements in standards that align to enable identification of existing training materials and activities that could be used or adapted to meet future requirements. This can be used to review the capability requirements for Role Levels and FOPs, from Job / Occupation level through to Knowledge, Skill and Behaviour level

4. Conclusion and Next Steps

4. Conclusion and Next Steps

4.1 Summary of Key Insights

Decarbonising large non-domestic buildings is challenging, and design of the systems is only one part of the process. This cycle has demonstrated that more needs to be done to ensure there are the right skills and capabilities to deliver the design phase. While there are existing relevant apprenticeship standards, on the whole, these are not a good fit with the required FOPs. Addressing this could help to standardise approaches and drive efficiencies. In particular, when referring to the Building Services and Low Carbon Heating Technician apprenticeships:

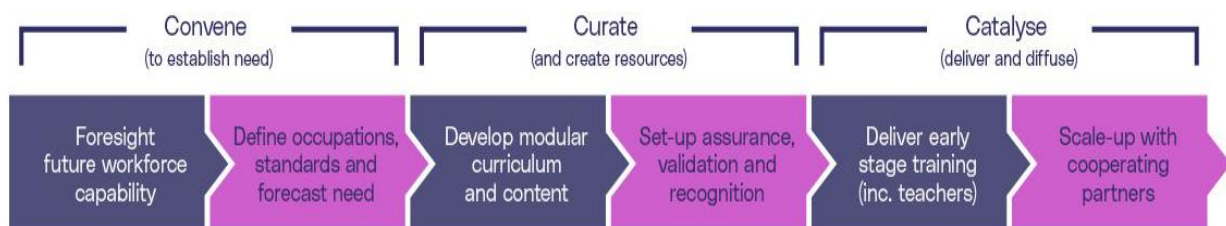
- Developing new/bespoke standards or training for those commissioning the decarbonisation of large non-domestic buildings (Heads of Estate or Facilities Managers) to ensure they can effectively engage with the supply chain to deliver the required outcomes; and
- Ensuring that existing relevant standards (such as the Building Services and Low Carbon Heating Technician apprenticeships) take into account the requirements for dealing with the retrofit of large non-domestic buildings which are often more complex than domestic or new build and therefore require additional considerations.

Addressing these priorities would mean those who wish to upskill in this area would have a clear pathway to doing so.

4.2 What this means for Industry and the Workforce

Collective Action

Foresighting has been developed to provide insight and the detailed information required to enable action by relevant stakeholders but is the first step of the Skills Value Chain. Collective action will be required by all stakeholders to ensure that the changes identified by foresighting – to the supply chain, the workforce and education provision are implemented.



This section summarises the actions required as a result of this foresighting cycle.

Employers

Employers in the retrofit sector must take proactive steps, both individually and collectively, to ensure that the development of skilled professionals meets industry needs. It is essential for employers to embrace upskilling and reskilling initiatives across the sector particularly as the evidence suggests there is lots of overlap between the domestic and non-domestic supply chain. There should be active fostering a pipeline of future talent from schools, colleges, and universities and those already working in the domestic and non-domestic retrofit sector.

There is potentially a skills gap with employers on the commissioning side, that is organisations that are employing Heads of Estate and Facilities Managers. This should be investigated further; however, Energy Systems Catapult's extensive work with the public sector does concur with this finding that there is a skills and capability gap on the

commissioning side in some organisations. As this type of retrofit is not yet happening at scale, employers might not realise that these are skills their employees should have, so are unlikely to be seeking training for these employers.

4.3 What this means for Education

The findings from the foresighting study indicate that future needs for many of the FOPs could be addressed through modifications to existing degrees and the two relevant apprenticeship standards (Building Service Engineer and Low Carbon Heating Technician). The exception is on the commissioning side (Heads of Estates, Facilities Managers) where creating a bespoke standard could be beneficial. **A modular approach** for both of these is more likely to be achievable, compared to wholesale course design.

The prominence of the Building Service Engineer and Low Carbon Heating Technician standards and the unmatched FOPs suggest that revisiting these standards and making additions/changes to ensure that the more complex nature of decarbonising large non-domestic buildings is covered in enough detail would go a considerable way to addressing the identified gaps.

4.4 Recommended Next Steps

This foresighting study is a helpful step in supporting the at-scale adoption of heat pumps for large non-domestic buildings. Our recommended next steps are as follows.

Undertake further engagement with the sector to understand the challenges and requirements in more depth, including testing and validating our findings that those in the sector would value more focus on large non-domestic buildings within the low carbon heating and building services standards.

Additionally, explore the value of bespoke provision for those commissioning and overseeing these types of works and what that training provision should look like and cover.

If further engagement validates these findings, the next steps may include:

- Adapting or creating additional modules for the Low Carbon Heating Technician and Buildings Services standards.
- Creating the bespoke provision for those commissioning and overseeing these types of works across the whole non-domestic sector.
- Exploring the role of creating Continuing Professional Development courses either instead of, or in addition to additional modules or full standards.

Continued engagement with key industry bodies is recommended, such as CIBSE, who continue to develop best practice in this area to make sure that any activity is informed by leading technical experts.

Further work investigating degree level provision could be considered and how that addresses the particular challenges of large complex non-domestic buildings.

Other cycles looking at different parts of the process of retrofitting large non-domestic buildings with heat pumps could also be beneficial, for example when designs are passed to contractors for installation, the installation phase itself, commissioning and handover stages and on to operation and maintenance.

Inaction in this area means a risk that the supply chain will not have the right skills and capabilities to deliver value for money, high quality installations in the current market. Any

government action to drive adoption at scale would also be put at risk for the following reasons:

- The design process would be more expensive as it would rely on more senior colleagues who have built up experience and expertise over time, rather than being a mainstream activity with a well-structured skill mix.
- Poor quality designs, leading to poor quality installations that don't deliver the required outcomes risk damaging the reputation of the sector and technologies that are critical for the transition to Net Zero.

In summary, with the continued focus on decarbonisation of the built environment it is essential that steps are taken to upskill the existing retrofit workforce and train new entrants to ensure that there is enough provision of the rights skills to enable the cost effective and high-quality decarbonisation of large non-domestic buildings.

5. Appendix

5. Appendices

Section	Title
5.1	<u>List of participants</u>
5.2	<u>Cycle timeline</u>
5.3	<u>Access to output data - link and authorisation</u>
5.4	<u>How will the Supply Chain change - Organisational Changes Insight</u>
5.5	<u>How will the Workforce change - Occupational Change Insight</u>
5.6	<u>Unmatched FOP capabilities</u>
5.7	<u>Glossary - common language</u>
5.8	<u>Visualisation links and illustrations</u>

5.1 List of Participants

Industry Participants	Skills Participants	Technology Participants
21 Engineering Ltd	Cardiff University	Heat Pump Federation
Independent Energy & Building Consultants	Building Engineering Services Association (BESA)	Oakes Energy
D2i Management Ltd	Liverpool John Moores University	Building Engineering Services Association (BESA)
Deloitte		Independent Energy & Building Consultants
Derwent London		Mitsubishi Electric
		HI Group

5.2 Cycle timeline

Workforce Foresighting cycle started the Carry Out phase in March 2025. The Carry Out phase concluded in July 2025. The Findings report was prepared following the data validation period and published in November.

5.3 Access to output data - link and authorisation

[Data Capture Overview](#)

5.4 Step One – How will the Supply Chain change - Organisational Changes Insight

Organisation functions

The Workforce Foresighting process uses an information architecture built on five functional areas which are common to most business:

Design	The function of an organisation that focuses on activities relating to product, service or solution design.
Implement	The function of an organisation that focuses on activities relating to producing / making / providing its products or services.
Logistics	The function of an organisation that focuses on activities relating to procurement, delivery, materials, or services necessary for operations – service / manufacturing, etc.
Support	The function of an organisation that focuses on activities relating to users, in-service support, repair / maintenance, recycling, end of life disposal.
Enterprise	Core functions of an organisation - e.g., strategic planning, leadership and management, human resources, digital backbone and data systems, integration of relevant statutory / regulatory requirements and compliance.

The functional structure is developed to levels of detail that enable the foresight process to reference external data sets including ONET (US) Occupational Information Network [⁹], ESCO – European Skills, Competences, Qualifications and Occupations [¹⁰], Skills England formerly IfATE (UK) Institute for Apprenticeships and Technical Education [¹¹].

The five root functions comprise around 40 domains which are broken down to around 140 functional areas. The architecture is used to position ~ 25,000 capability statements which are the building blocks used in the workforce foresight process. Each capability statement has several attributes - some are static and reflect the position of the capability statement in the architecture, whilst others are dynamic and are assigned values through a cycle and set of workshops.

The data architecture is implemented in a bespoke 'data-cube' which underpins the foresight process, workshops, and enables extensive use of LLM and AI tools. Additionally, a key feature of the data-cube is that the data from each foresight topic cycle is added into the data set and can then be used, where relevant, in future cycles. This ensures that the capabilities of the system are dynamic and up to date.

⁹ ONET - Occupational Information Network - <https://www.onetcenter.org/>

¹⁰ ESCO - European Skills, Competences, Qualifications and Occupations - <https://esco.ec.europa.eu/en>

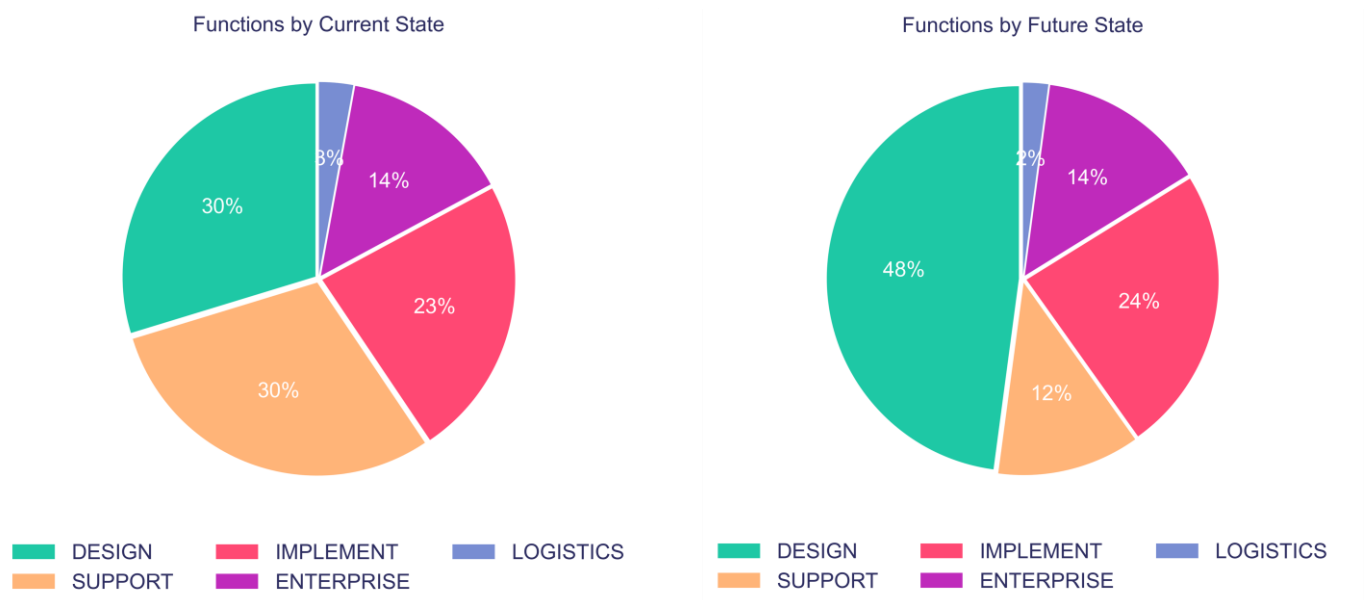
¹¹ IfATE – Institute for Apprenticeships and Technical Education - <https://www.instituteforapprenticeships.org/>

Identifying the Future Supply Chain Capabilities

The following charts and graphs summarise the changes in the set of capabilities that will be required by the supply chain (Supply Chain involved in production) in the future. The pie-charts reflect the distribution of capabilities across the five functions of the capability classification. The future state data is captured in three technology focused workshops. The current state data is derived from information collected on apprenticeship standards used across current supply chain partners. sector. This latter information is not as detailed as that produced by the workshops but is indicative and used to provide a point of comparison.

These initial pie charts summarise the changes that will be required by the whole supply chain, across the five functions.

- 'Design' exhibits the most substantial relative increase in capability share. 'Implement' shows a modest increase, reflecting a growing need for capabilities related to service delivery and operational execution. This trend indicates that whilst the primary focus has been on design, there is a parallel requirement to prepare for the scaling and deployment of the solutions.
- 'Support' demonstrates a relative decrease in capability share. The decline is likely due to the foresighting cycles orientation towards the early-stage development of design (of heat pump systems), where support functions are not fully engaged.
- 'Enterprise' remains a significant component of the capability distribution, particularly in areas such as data management, regulatory compliance and strategic planning. This reflects the ongoing importance of leadership, governance, and digital infrastructure in enabling innovation and supporting future growth.

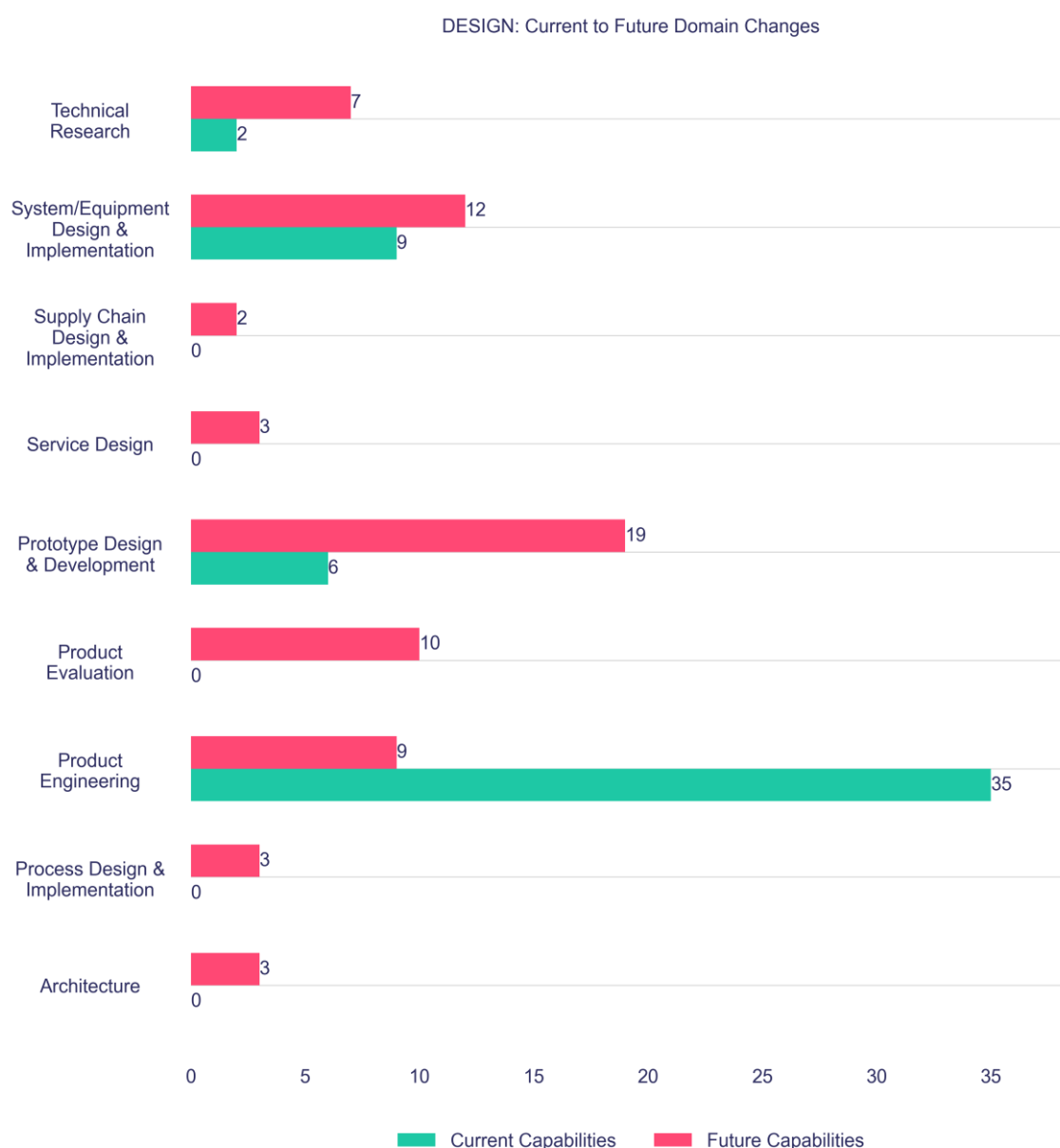


3Current and Future – Whole Supply Chain - Capability Function Distribution %

Whilst the information on current and future Supply Chain capabilities is useful to indicate relative changes, factors such as volume of activity will also determine which functions may have greater future significance.

The graphs below show the distribution of capabilities assigned at domain level within the five main functions for this cycle. These graphs provide insight into the relative importance of each domain for the large-scale heat pump sector in the future.

Design Domains

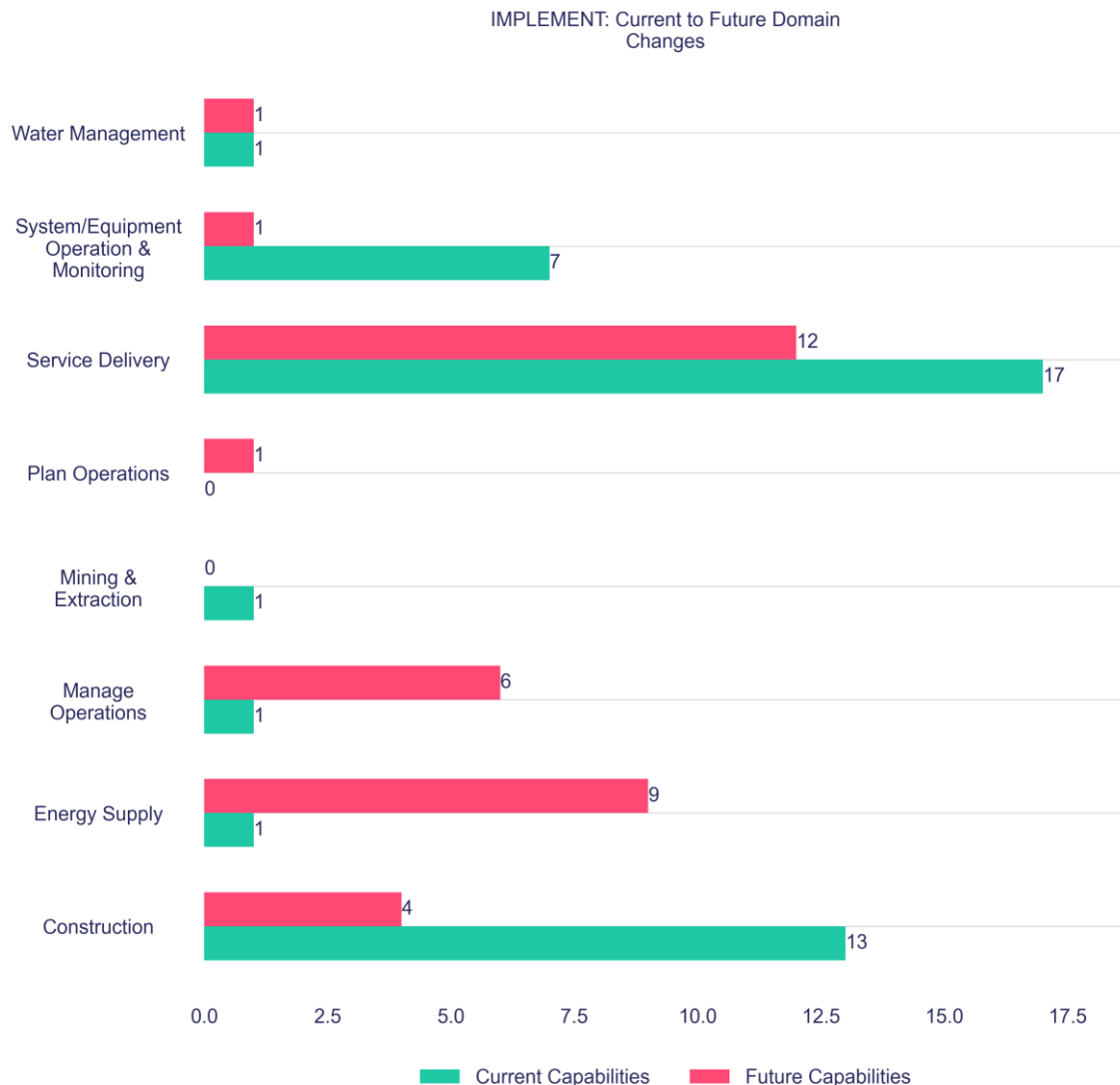


Design Future Domain Spread of Capabilities

The design function has the **highest number organisational capabilities with 93 out of a total of 142 capabilities for this cycle**. The highest score is in prototype design and development, reflecting the change to new technologies and improving efficiency/costs. The largest change from current to future occurs in product engineering, which highlights the change from initial product manufacture to full system install.

The current and future comparison for design reflects the foresighted transition to an increase in improved products, engineering, and evaluation moving on from the existing development and implementation phase.

Implementation Domains

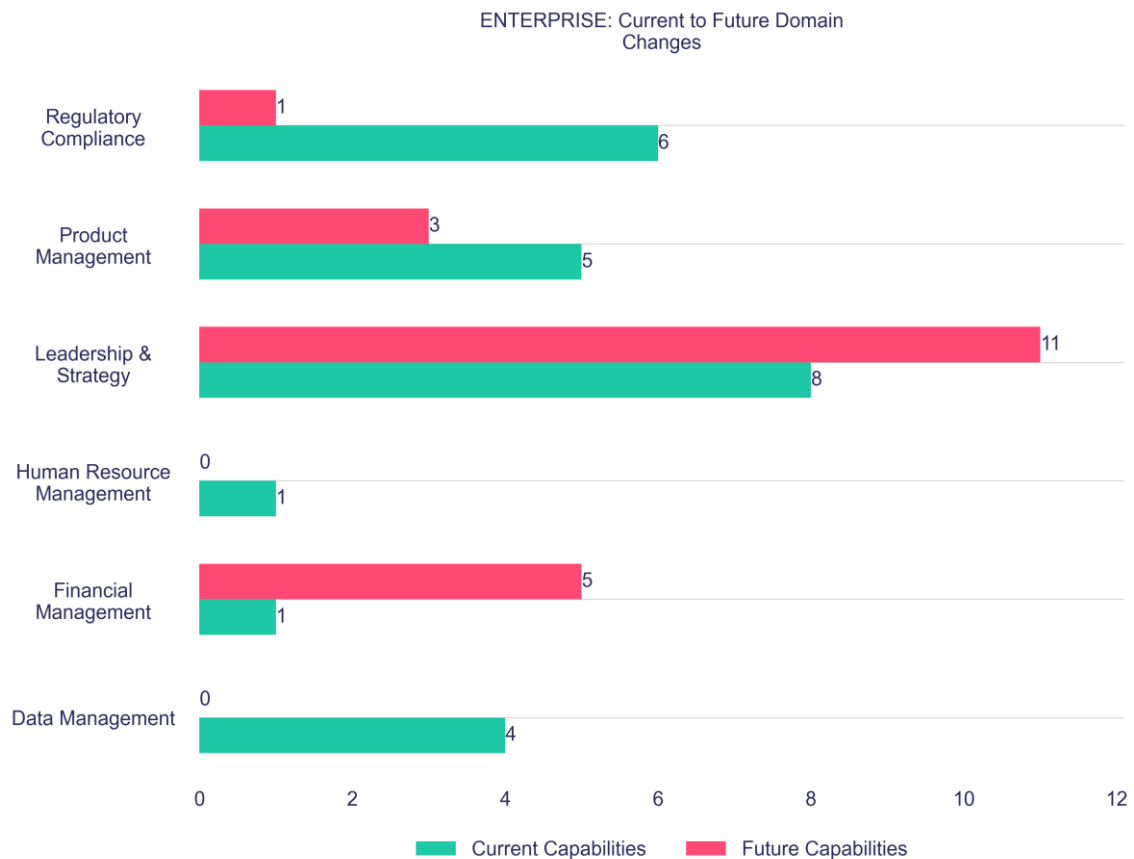


Implementation Future Domains Spread of Capabilities

The second highest function is 'implement' with 34 of the 142 capabilities for this cycle., The majority sit in service delivery and energy supply, closely followed by management of operations and construction.

The current and future comparison of implementation functions reflects the changes associated with greater adoption and installation of systems.

Enterprise Domains:



Enterprise Future Domain Spread of Capabilities

Of the 142 cycle capabilities for the cycle, **20 sit in the 'enterprise' function**. The capabilities are spread across the domains with the highest being in Leadership and Strategy and Financial Management. This reflects the importance of costs and proper planning and strategy to implementing a successful heat pump project.

The current and future comparisons in the enterprise area show the increased need associated with running a successful project versus a focus on regulatory and data management which are better understood at this stage.

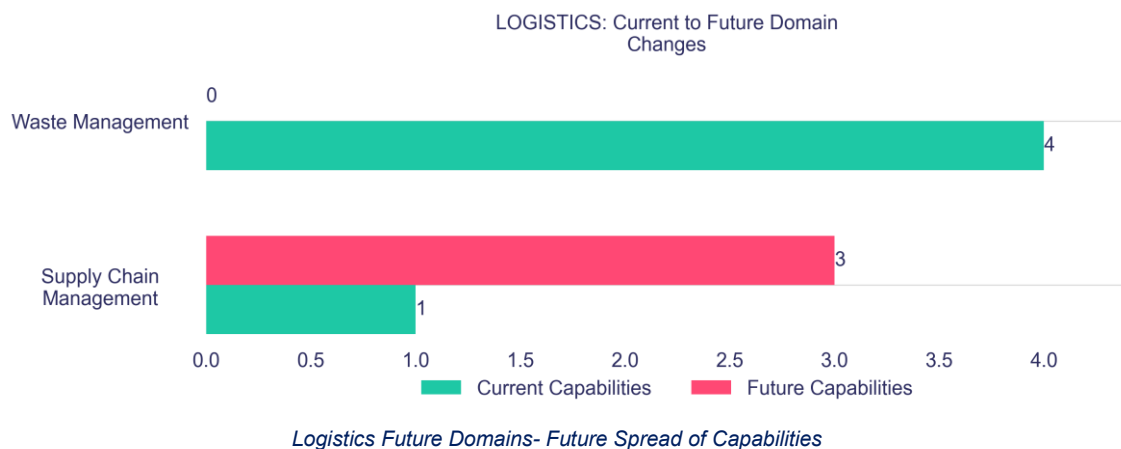
Support Domains



The 'support' function has **17 capabilities of the 142 for the cycle**, with the Operator Support domain being the highest. This includes capabilities in areas such as designing and configuring support systems and operating support systems

The current and future support comparison reflects the current prominent levels of Health and Safety and System/Equipment Maintenance – the reduction in proportions may be due to omissions during the data gathering and analysis.

Logistics Domains



Only 3 capabilities out of 142 sit in the logistics function, reflecting the cycle focus on design of systems. Of those 3 capabilities, they operate in the functional areas of identifying and working with suppliers; monitoring inventories; and coordinating logistics.

The current and future comparison for logistics is as expected for organisations gearing up to work at a higher scale of production.

Visualisation Instructions

Visualisation Data Link	What is it and what can it be used for?
Organisational Capabilities	The page provides details of the capabilities required by each supply chain partner and the supply chain as whole. The information is presented using the Capability Classification Framework, Design / Implement / Logistics / Support / Enterprise and can be interrogated and then exported to suit specific user requirements and interest. The information provided also identifies capabilities supported by existing provision, and also where there may be gaps that require new development to support to equip the future workforce.

5.5 Step Two – How will the Workforce change - Occupational Change Insight

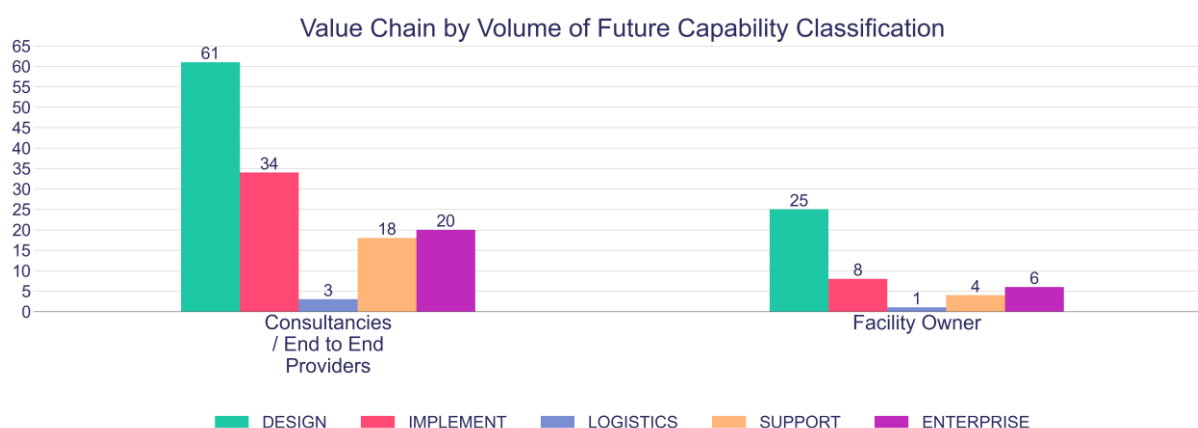
Insight into occupational change uses the understanding of how capabilities will change across business functions (section 3.2) to inform proposals for how occupations and their associated skills sets for each supply chain partner may need be revised to reflect change for each role level within that partner.

Supply Chain partner organisation types

The workforce foresighting process recognises that different partners in a Supply Chain will require appropriate capabilities, and these are determined and agreed in the initial workshops.

In this cycle, the following Supply Chain partners were identified and then used during participant workshops and data analysis to determine the organisational needs:

1. Consultancies / End-to-End Providers
2. Facility Owner



4Distribution of Functions across each Supply Chain Partner

The graph illustrates the distribution of capabilities by function across the Supply Chain Partners. These capability sets are used to form the set of Future Occupational Profiles within each role level. The weighting of the functions on the Consultancies / End to End Providers is a reflection of the design stage of the cycle. While Facility Owner will need to have some knowledge and involvement, it is expected to be lower at this stage. Consultancies or end-to-end providers need the full set of competencies to deliver designs for heat pump systems.

Visualisation Instructions

Detailed instructions can be found in the [appendix](#).

Visualisation Data Link	What is it and what can it be used for?
Supply Chain Capabilities	This page provides an overview of the identified capabilities at a Supply Chain Partner level. By selecting/deselecting each Supply Chain Partner you can review the capabilities identified as required in that area of the Supply Chain. This can be used to generate organisational capability profiles for each area of the Supply Chain to help prioritise and focus the acquisition of new capabilities that will be required in the future. It can also be used to generate combined organisational profiles, where an organisation may be involved in more than one area of the Supply Chain.

Role Levels

The foresighting process uses the concept of Role Levels to represent future occupations. Utilising this approach acknowledges that the workforce is not homogeneous, there will be varying levels of proficiency required across a workforce and qualifications and training may be aligned/require different types of vocational or academic qualifications. Additionally, the role level approach seeks to avoid presuming that the future workforce will be operating at a different level to the current state.

Role Levels determined through workshops:

1. Senior Level
2. Mid-Level
3. Junior Level

Proficiencies

Each of these role levels will require proficiency that reflects their role and the needs of each Supply Chain Partner. The foresight process uses a three-point scale to capture and differentiate the proficiencies required. This information is used both in the generation of the Future Occupational Profiles, and to assist the definition of training needs identified. Within the workforce foresight process proficiency is defined as:

Awareness (A) - Has a foundational knowledge of tools, technology, techniques relevant to sector, industry, or organisation. Sufficient comprehension to know where to seek further information/details as necessary for a particular issue.

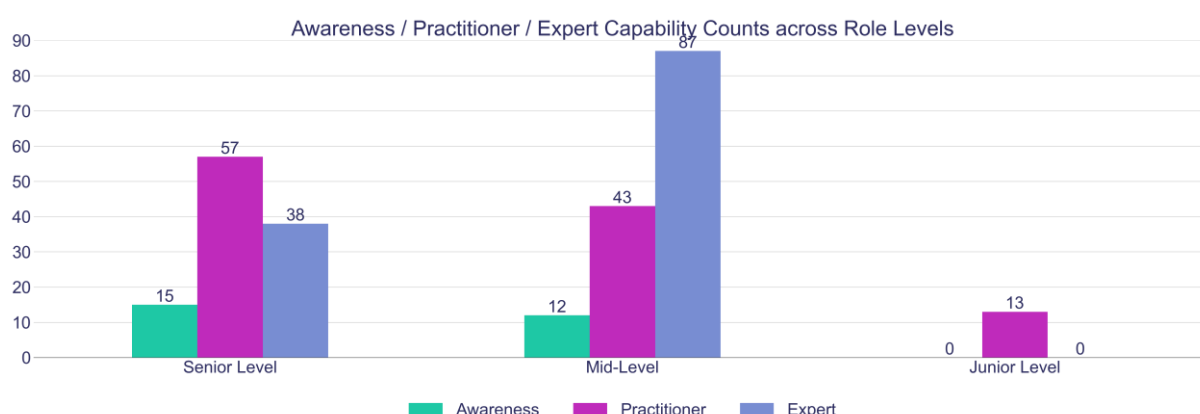
Practitioner (P) - Has the ability to apply and use independently a tool, system, or process. Understands the implications, consequences, and impact for their role/function. A Practitioner knows what key actions are required and in what context.

Expert (E) - Has detailed knowledge of process, system, tool, or technology. Can support others and identify improvements required for a process, system, or tool. An Expert can implement improvements personally or direct and guide others.

During the workshops participants applied their insight to assign proficiency for each role group to each capability. Individual responses were aggregated by the system to arrive at a consensus.

A summary of the distribution of required proficiency for the role levels in this cycle are:

	Senior Level	Mid-Level	Junior Level
Awareness	15	12	0
Practitioner	57	43	13
Expert	38	87	0



Proficiency details by Role Level

The spread of capability counts across the role levels demonstrates the complex nature of designing these systems and potentially the fact that this is not yet being delivered at scale. For the design process it is likely that the mid-level roles are doing the majority of the work, visiting the sites, undertaking surveys, performing the necessary calculations and putting together the designs so it is correct that we see the highest level of expertise in these mid-level roles. Those in the more senior roles will be involved in the quality assurance process and the commercial arrangements with the clients. For the quality assurance it is particularly important that there is the correct level of expertise.

Over time it would be worth exploring if more of the work could be done at the junior level as this becomes more routine, familiar and project volumes increase. This would drive down costs for the sector and enable a clearer pathway for progression.

Future Occupational Profiles

FOPs are used to describe and suggest occupations, or roles, that may be required in the future and provide a framework to indicate capabilities and related duties. They can be used to review the impact on current roles and the adaptation that may be required in the future.

Educators can review current apprenticeship standards against the requirements of the FOPs and interpret which need to be changed to fill the gaps between the current and future state.

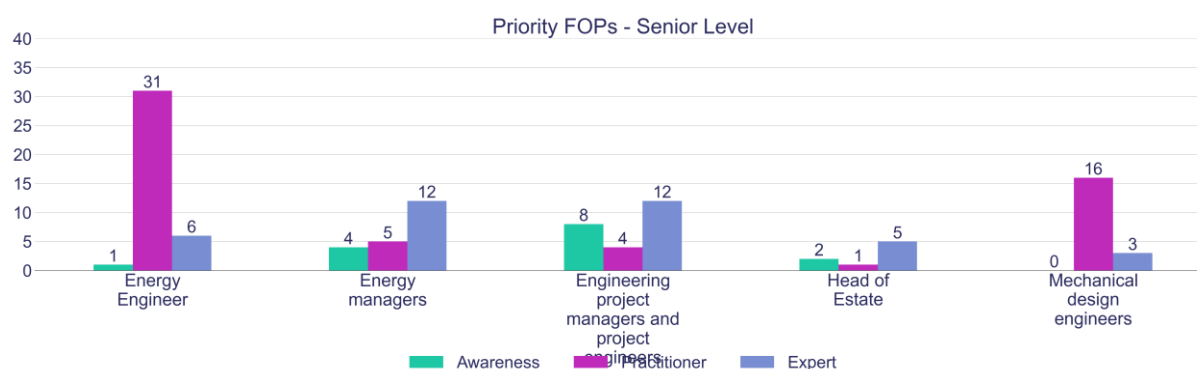
Employers can consider existing apprenticeship standards and make a judgement on adapting an existing apprenticeship standard to upskill their workforce to meet the requirements of a particular FOP.

FOPs and indicative skills need

Combining proficiency with the identified FOPs, the following graphs indicate the priority needs across the supply chain for each Role Group to deliver future capabilities.

Senior Level Role Level FOPs:

In this cycle the Senior Level role level was defined as occupations and roles requiring a minimum Level 5 qualification or apprenticeship, which are broadly equivalent to the second year of a bachelor's degree, foundation degree, NHD or DipHEs.



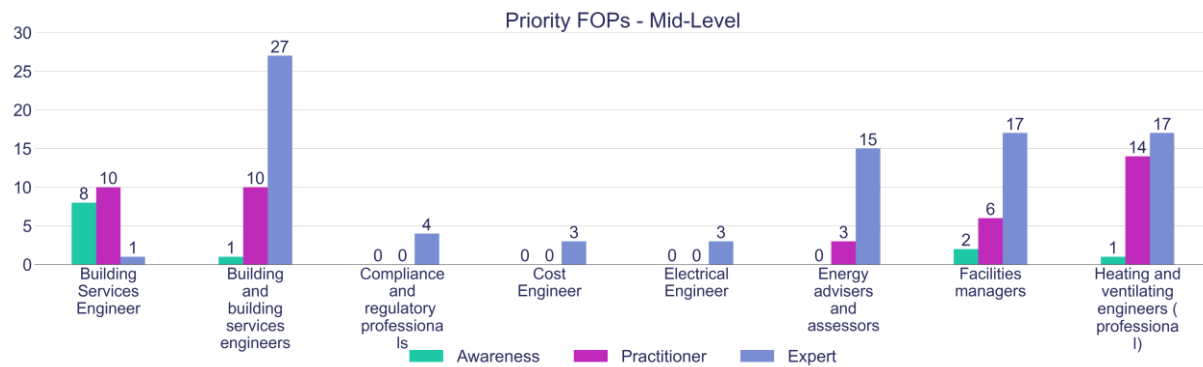
Priority FOPs - Senior Level Role Level

For the Senior level priority FOPs, the practitioner level proficiencies are high in the Energy Engineer role, reflecting the operational nature of that occupation. Practitioner proficiency is also high in the Mechanical design engineer role. The distribution for energy managers with more proficiencies at expert level demonstrates that being part of these types of projects require advance energy management skills.

Mid-Level Role Level FOPs:

In this cycle the Mid-Level role level was defined as occupations and roles requiring a minimum Level 3 qualification or apprenticeships, which are broadly equivalent to A Levels,

Advanced Apprenticeships and Access to Higher Education Diplomas.



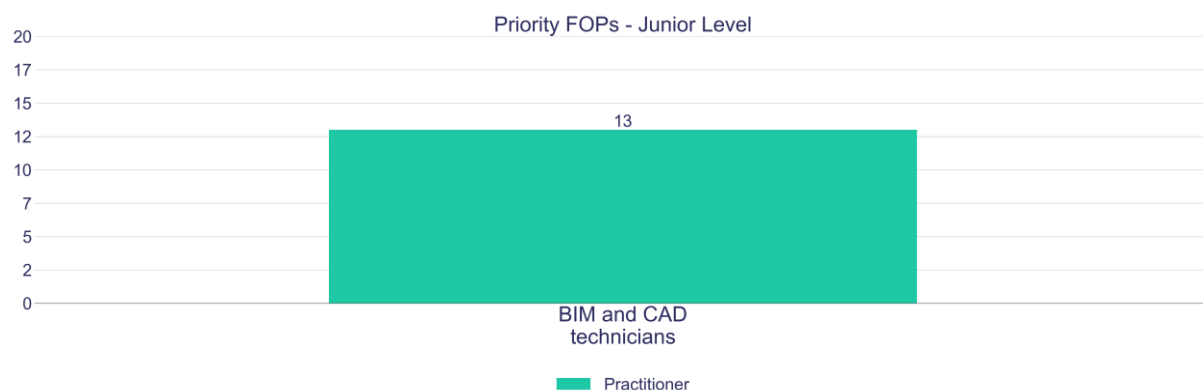
Priority FOPs - Mid-Level Role Level

For the mid-level role FOPs, the expert level proficiencies are high for building services engineers, energy advisers and assessors, facilities managers and HVAC engineers. This recognises the critical expertise across these professions required for designing the heat pump systems. Over time as retrofitting large non-domestic buildings becomes more routine you might expect for the energy advisers, facilities managers and heating and ventilation engineers a move towards more proficiencies being at practitioner level.

For the mid-level roles, there is a high level of expertise required across the Future Occupational Profiles potentially recognising the challenge and relative unfamiliarity of the design of these systems at present.

Junior Level Role Level FOPs:

In this cycle the Junior Level role level was defined as occupations and roles requiring Level 2 qualifications or apprenticeships.



Priority FOPs - Junior Level Role Level

Only one FOP is at the junior level. This is not surprising at present as design of these systems is complex and requires specialist knowledge. However, over time we would hope to see more FOPs at the junior level as the supply chain becomes more efficient at delivering these designs. This should also bring down costs for building owners.

There is only

Visualisation Instructions

Detailed instructions can be found in the [appendix](#).

Visualisation Data Link	What is it and what can it be used for?
FOP Matrix	This page provides a detailed breakdown of future occupational profiles that could be required in the future workforce. These were generated using a combination of attributes collected through the workshops and an algorithm. These suggested profiles were then reviewed and ratified by small groups of employers who were able to add/remove capabilities and uprate/downrate proficiency levels required. You can view all the FOPs in a role level by selecting one (or more) of these from the drop down. This will then allow you to select the FOPs aligned to that role level. The populated table allows you to review and compare different FOPs within or across role levels. You can view the capabilities in each FOP and the assigned proficiency levels.

5.6 Unmatched FOP capabilities

1. Buildings and building services engineers

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Consider digital twin software approaches.
Design	Collaborate with internal stakeholders to provide relevant information to suppliers
Design	Understand the current and future use of the buildings and sites to inform design process
Design	Review and refine system design: storage tank package including instrumentation, control, pipework, electrical & mechanical.
Design	Plan serviceability features and maintenance schedules to ensure safe access to all installations and timely hardware replacement in the event of failure.
Design	Develop retrofit plans to reduce building energy demand.
Design	Source materials and technical information to develop specific building services engineering solutions by reviewing, interpreting data, carrying out calculations, and analysing outputs.
Design	Explore remote access opportunities to system controls for specialist intervention in system failures.
Design	Investigate the role for, and design for, hybrid systems.
Implement	Integrate heat pump technology with existing building systems to improve overall energy efficiency
Implement	Assess the impact of design choices on future maintenance and accessibility to ensure optimal operational functionality.
Implement	Consider IoT sensors to enable real-time monitoring and control of heat pump systems.
Implement	Assess the additional space requirements for ancillary plant required alongside heat pumps, particularly in a retrofit environment.
Implement	Use specific workshop tools and technologies to plan and execute building services projects, ensuring appropriate technology selection and process application

2. Building Services Engineers

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Assess requirements for other electrical demands, such as enhanced employee electric vehicle charging.
Design	Source materials and technical information to develop specific building services engineering solutions by reviewing, interpreting data, carrying out calculations, and analysing outputs.
Design	Use Building Information Modelling (BIM) software to design and optimise large non-domestic buildings
Implement	Coordinate with Distribution Network Operators (DNO) to understand any constraints on the network

Implement	Use specific workshop tools and technologies to plan and execute building services projects, ensuring appropriate technology selection and process application
Enterprise	Identify specific opportunities in building systems to implement energy efficient technologies and passive measures that reduce energy consumption and heating and cooling demands.

3. Heads of Estate

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Ensure that any visible future site development is considered to inform potential modular solutions that are extendable
Design	Predict energy performance and optimise energy efficiency of bespoke heat pump systems
Design	Consider digital twin software approaches.
Design	Develop retrofit plans to reduce building energy demand.
Enterprise	Collaborate with external stakeholders (local authorities, etc.) to consider whether the target building could become the focus of a wider heat network opportunity.
Enterprise	Conduct cost-benefit assessments to understand the benefits of decarbonisation.
Enterprise	Secure sign-off and budgets for projects to design heat pump systems for large non-domestic buildings

4. Heating and Ventilating Engineers (professional):

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Consider digital twin software approaches.
Design	Collaborate with internal stakeholders to provide relevant information to suppliers
Design	Perform fluid flow simulations and conduct heat transfer analysis using CFD software
Design	Develop, assess, and quantify alternative solutions to address unique challenges in bespoke built environments where standard solutions are inadequate
Implement	Assess the impact of design choices on future maintenance and accessibility to ensure optimal operational functionality.

Implement	Investigate the role for, and design for, hybrid systems.
Implement	Understand the impact of design temperatures and temperature differentials on new and retrofit systems to enhance system performance.
Implement	Consider opportunities for simultaneous heating and cooling for optimal system efficiency.
Support	Specify and detail the on-site system training requirements to ensure that in-house facilities maintenance teams are equipped to manage the new systems.

5. Mechanical design engineers

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Ensure the heat pump is designed with the appropriate building planning and building control regulations in mind.
Design	Review and refine system design: storage tank package including instrumentation, control, pipework, electrical & mechanical.
Design	Design hydraulic systems required for a heat pump installation considering the technology, building and site characteristics, heating and cooling loads.
Implement	Calculate the appropriate dimensions for pipework to optimise fluid dynamics based on mathematical principles.
Support	Design and integrate bespoke heat pump systems for large non-domestic buildings over 1,000m ² to achieve decarbonisation and meet Minimum Energy Efficiency Standards.
Logistics	Engage specialist thermogeological and hydrogeological expertise to enhance design quality and secure necessary Environment Agency licences.

6. Facilities managers

The unmatched FOP capabilities are shown in the table below:

Function Area	Capability Statement
Design	Collaborate with internal stakeholders to provide relevant information to suppliers
Design	Plan serviceability features and maintenance schedules to ensure safe access to all installations and timely hardware replacement in the event of failure.
Design	Understand the current and future use of the buildings and sites to inform design process
Design	Understand the different on-site renewable generation technologies
Design	Ensure that plant rooms are actually designed, specified and constructed as plant room with all appropriate acoustic attenuations and vibration isolation, etc.
Logistics	Assess tender documentation from potential suppliers

Support	Specify and detail the on-site system training requirements to ensure that in-house facilities maintenance teams are equipped to manage the new systems.
Implement	Assess the impact of design choices on future maintenance and accessibility to ensure optimal operational functionality.
Implement	Assess the additional space requirements for ancillary plant required alongside heat pumps, particularly in a retrofit environment.
Implement	Coordinate with Planning Authorities to understand planning implications of proposed design
Enterprise	Lead project teams and coordinate operational tasks from inception to completion to ensure timely and successful project delivery.
Enterprise	Identify specific risks associated with the project and implement appropriate mitigation strategies.
Enterprise	Collaborate with external stakeholders (local authorities, etc.) to consider whether the target building could become the focus of a wider heat network opportunity.
Enterprise	Liaise with energy assessors to obtain EPCs/DECs/ESOS audits for large non-domestic buildings over 1,000m ² .

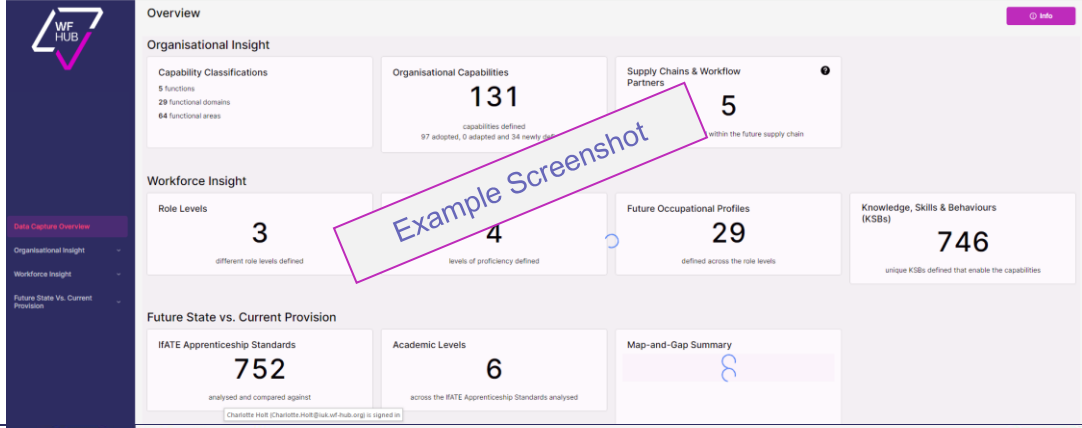
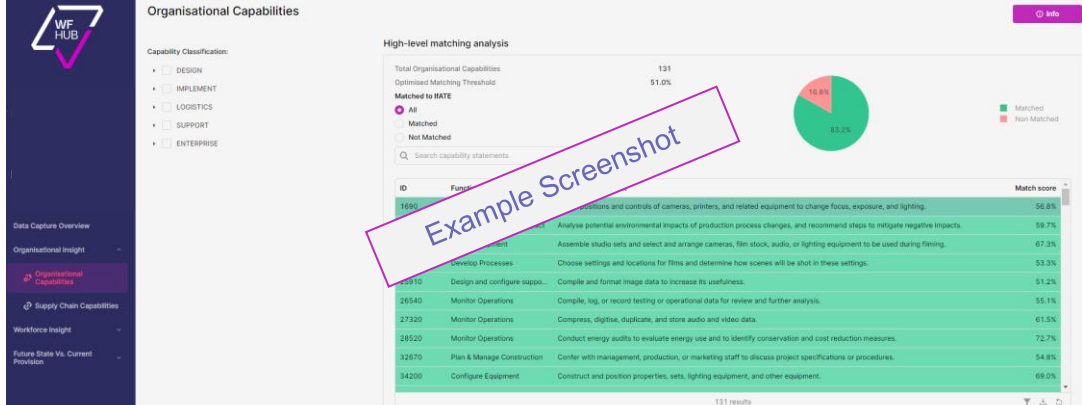
5.7 Glossary - common language

Term	Definition
Impact Domains	Innovate UK domains used as Strategic Categories to assist setting and monitoring priorities
National Challenge (Industry / Sector / Region)	A recognised technological or socio-political threat or opportunity for which there is consensus that workforce action is necessary
Challenge Response	Specific intervention aimed at the challenge
Capability (Organisation)	The collective abilities, and expertise of an organisation to carry out a function, because provision and preparation have been made by the organisation
Capability Classification	Classification provides a common, structured vocabulary to define capability
Capability Statements	Description of the depth and nature of each capability within an organisation
Capability Syntax	Common language to describe each capability application within organisation type
Competencies (Workforce / Individual)	'Proficiency, aptitude, capacity, skill, technique, experience, expertise, facility, fitness related to capability
Competency definition 'KSBs' (Knowledge, Skills and Behaviours)	Knowledge, Skills, and Behaviours are the elements used to express the required competencies for each Role Group
Competency Domain	Used during foresighting analysis to provide focus on existing and emerging competency needs
Delphi Process	Foresighting takes a Delphi approach which has come to represent consulting expert opinion. (Harking back to the Delphic Oracle of ancient Greece)
Foresight Cycle	Set of workshops, analysis and reporting that implements the Foresight Process for each subject
Foresight Process	A series of activities which are convened to understand future competence needs, the opportunities available and actions required to deliver the right skills at the right time and place
Foresighting Champion	An individual nominated within a new user organisation of foresighting to facilitate and lead the use of foresighting processes and tools with the support of the Project Team
Foresighting Subject	The application of specific technologies in the context of a given challenge and which are candidates for foresighting
Future Competency Set	The KBS output from the Educator workshop for each Role Group
Map and Gap Analysis	A combined expert and automated process that maps the Future Competency Set against a selected reference framework
Organisation Type	Simple description of nature of organisation for which capability is required
Proficiencies	Proficiencies differentiate the degree of competencies required from differing Role Groups to support capabilities
Project Sponsor	Typically, a stakeholder in the challenge being successfully met who requires information to under-write plans to act
Role Group	Role groups are a collective of roles that exist in a typical manufacturing business / industrial sector
Syntax	The way in which a statement is phrased to ensure reliable, repeatable and meaningful interpretation

Technologies	The technology that could be used to address the challenge
Working Scenario	To provide further context in relation to the subjects and used to position participants thinking during the detailed identification of future capabilities
Workshops	Online sessions used to undertake each step in the foresight process
Roadmaps	Sector, Industry, Regional view of emerging opportunities and their market entry
Participants	Technologists, Educators, Employers

5.8 – Visualisation links and Illustrations

Images are not cycle specific and just for guidance purposes

Link to Visualisation	View of data
Data Capture Overview	
Organisational Capabilities	

Supply Chain Capabilities



Data Capture Overview
Organisational Insight
Organisational Capabilities
Supply Chain Capabilities
Workforce Insight
Future State Vs. Current Provision

Supply Chain Capabilities

Supply Chain / Workflow Partners

- ☒ All
- ☐ 1. Media Companies (Client)
- ☐ 2. Production Companies
- ☐ 3. Technology Suppliers (Hardware and Software)
- ☐ 4. Research and Technology Organisations (RTOs) and Higher Education Institutions (HEI)
- ☐ 5. Niche small to medium enterprises (SME) and Freelancers Specialists



Example Screenshot

High-level matching analysis

Total Organisational Capabilities

Optimised Matching Threshold

Capability served by BATE

☒ Select all

☐ Yes

☐ No

Search capabilities

Download CSV

Capability statement

Contribute to the development and ethical and legal conduct of AI systems and processes, in line with organisational and regulatory requirements.

Data Analysis

Interpret and apply audience analytics to inform content development to meet brand strategies and objectives.

Create Art & Entertainment

Use AI tools to interrogate resources from different cultures or languages to improve content diversity.

Identify New Business Partnerships

Assess partnerships between technology providers and industry organisations to build project consortia.

Advise Others On Operations

Create contextual feedback loops for production schedules to learn from asset and crew tracking.

Monitor Operations

Compress, digitise, duplicate, and store audio and video data.

Test Equipment & Systems

Test Artificial Intelligence (AI) tools for future production capabilities to ensure readiness.

Model Processes

Optimise process development using Modelling And Simulation (M&S) and Digital Twin Technologies.

Identify Suppliers

Identify potential suppliers with relevant expertise.

Monitor Operations

Complete equipment usage behaviour data to promote safer practices in the future.

FOP Matrix



Data Capture Overview
Organisational Insight
Workforce Insight
FOP Matrix
FOP Detail
Future KSBs Summary
FOP Distribution
Future State Vs. Current Provision

Future Occupational Profile (FOP) Matrix

Select Role Levels

1. Production Assistants

2. Archivists

3. Photographers

4. Business systems analysts

5. Business development managers

6. Researchers in media and entertainment

7. User Reviewed FOPs

8. Hide empty capabilities

9. Hide domain and area columns

Search capability statements

Download CSV

Function

Domain

Area

Function

10113

Example Screenshot

Future Occupational Profile Detail

Select Role Level

1. Production Assistants

2. Archivists

3. Photographers

4. Business systems analysts

5. Business development managers

6. Researchers in media and entertainment

7. User Reviewed FOPs

8. Hide empty capabilities

9. Hide domain and area columns

Search capability statements

Download CSV

ID

Capability Statement

Function

Functional Domain

Functional Area

Proficiency

Knowledge tags

Skill tags

27320

Compress, digitise, duplicate, and store audio and video data.

183803

Collate, process and evaluate data and information for

200940

Utilize artificial intelligence and machine learning algorithms

201879

Manage metadata and keywording to ensure proper identification

209817

Utilize machine learning algorithms to monitor and optimize

213030

Develop automated routines to correct image-distorting artifacts

213043

Collate and create visual assets using augmented reality technology

213082

Utilize AI to identify and manage copyright infringements

Example Screenshot

Future KSBs Summary



Data Capture Overview
Organisational Insight
Workforce Insight
FOP Matrix
FOP Detail
Future KSBs Summary
FOP Distribution
Future State Vs. Current Provision

Future KSBs Summary

ID

Capability Statement

Function

Functional Domain

Functional Area

Knowledge Tags

1690

Adjust positions and controls of cameras, printers, and related equipment to change focus, exposure, ...

6120

Analyse potential environmental impacts of production process changes, and recommend steps to mit...

10880

Assemble studio sets and select and arrange cameras, film stock, audio, or lighting equipment to be u...

18980

Choose settings and locations for films and determine how scenes will be shot in these settings.

25910

Compile and format image data to increase its usefulness.

26540

Compile, log, or record testing or operational data for review and further analysis.

27320

Compress, digitise, duplicate, and store audio and video data.

28520

Conduct energy audits to evaluate energy use and to identify conservation and cost-saving op...

32670

Confer with management, production, or marketing staff to discuss production

34200

Construct and position properties, sets, lighting equipment, and

34970

Consult with lighting director or production staff to determine lo

36360

Control workflow scheduling or job tracking, using computer data.

37520

Coordinate recycling collection schedules to optimise service and efficiency.

37630

Coordinate the activities of writers, directors, managers, and other personnel throughout the produc...

39230

Create and manage documentation, production schedules, prototyping goals, and communication pla...

45710

Determine efficient and cost-effective methods of moving goods from one location to another.

46260

Determine production schedules and staff requirements necessary to ensure timely delivery of servic...

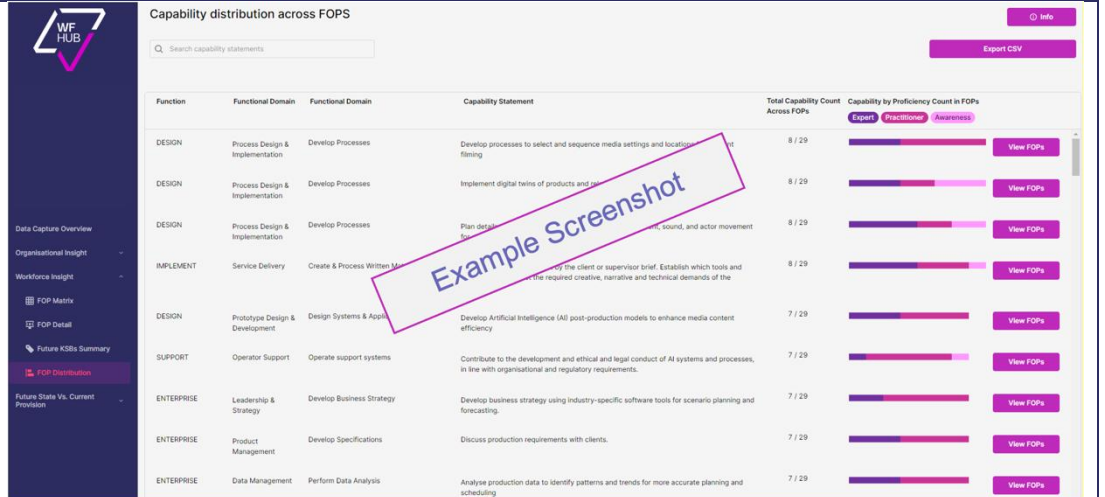
46270

Determine project goals, locations, and equipment needs by studying assignments and consulting wit...

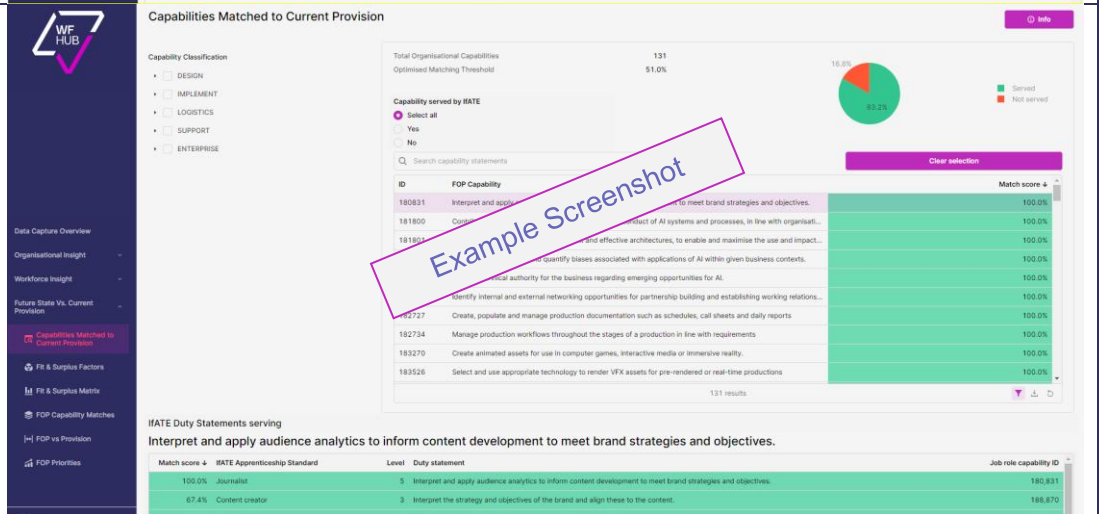
Example Screenshot



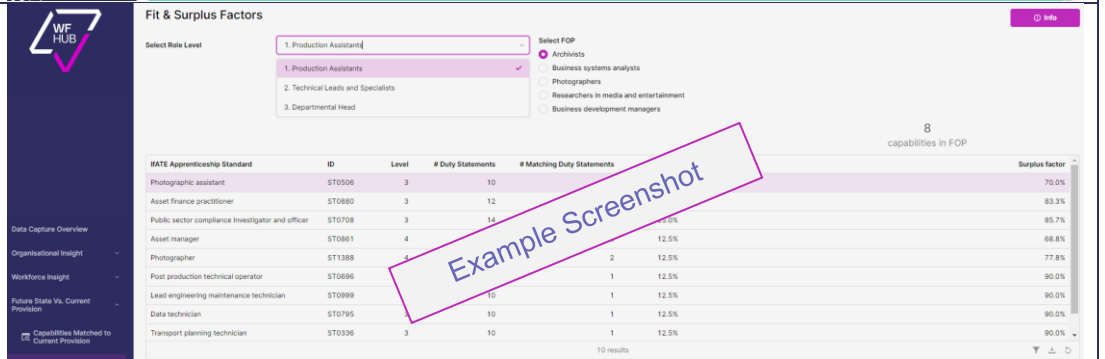
FOP Distribution



Capabilities Matched to Current Provision



Fit & Surplus Factors



Fit & Surplus Matrix



FOP Priorities

- Data Capture Overview
- Organisational Insight
- Workforce Insight
- Future State Vs. Current Provision
- Capabilities Matched to Current Provision
- Fit & Surplus Factors
- Fit & Surplus Matrix
- FOP Capability Matches
- FOP vs Provision
- FOP Priorities

P-PDF Capability Matches

Select Role Levels
 1. Production Assistants x 2. Technical Leads and Specialists x
 3. Departmental Head x

Select FOP
 Archivists x Business systems analysts x Photographers x

Capability Classification

- ☐ DESIGN
- ☒ IMPLEMENT
- ☐ SUPPORT
- ☐ ENTERPRISE

Matched to
 All
 Matched
 Not Matched

30 Total Capabilities

Search capability statements

Type	Capability Statement	Matches
Use	Compress, digitise, duplicate, and store audio and video data.	3
Maintain	"Manage metadata and keywording to ensure proper identification and retrieval of stored images."	5
Maintain	"Collate, process and evaluate data and information for assets and asset systems."	15
Use	"Utilize artificial intelligence and machine learning algorithms to monitor and optimize operations."	3
Use	"Utilize artificial intelligence and machine learning algorithms to automate compliance monitoring and identify potential non-compliance issues."	3
Create	Develop automated routines to correct image-distorting artefacts, maintaining image quality."	1
Maintain	"Collate, process and evaluate data and information for assets and asset systems."	15

30 results

Inferred via AI

Download capabilities with K&Bs

- Data Capture Overview
- Organisational Insight
- Workforce Insight
- Future State Vs. Current Provision
- Capabilities Matched to Current Provision
- Fit & Surplus Factors
- Fit & Surplus Matrix
- FOP Capability Matches
- FOP vs Provision
- FOP Priorities

FOP vs Provision

Select Role Level
 1. Production Assistants
 Archivists

Select FOP
☐ Show only matched
☒ Show only not matched

Info Select a served Duty Statement to see what FOP capabilities matched to it:

Capability ID Capability Statement

27320	Compress, digitise, duplicate, and store audio and video data.
201578	"Manage metadata and keywording to ensure proper identification and retrieval of stored images."
193803	"Collate, process and evaluate data and information for assets and asset systems."
213082	"Utilize AI to identify and manage copyright infringements"
206817	"Utilize machine learning algorithms to monitor and optimize operations"
200940	"Utilize artificial intelligence and machine learning algorithms to automate compliance monitoring and identify potential non-compliance issues"
213043	"Collate and curate visual assets using augmented reality"
213030	Develop automated routines to correct image-distorting artefacts, maintaining image quality."

8 results

Select RATE Apprenticeship Standard

Photographic assistant | Fit 37.5% | Surplus 70.0%

Photographic assistant Fit 37.5% Surplus 70.0%	✓
Asset finance practitioner Fit 25.0% Surplus 83.3%	
Public sector maintenance technician Fit 25.0% Surplus 85.7%	
Public sector maintenance technician Fit 12.5% Surplus 90.0%	
Public sector maintenance technician Fit 12.5% Surplus 90.0%	
Data technician Fit 12.5% Surplus 90.0%	
Post production technical operator Fit 12.5% Surplus 90.0%	
Lead engineering maintenance technician Fit 12.5% Surplus 90.0%	
Publishing assistant Fit 12.5% Surplus 90.0%	

7 results

- Data Capture Overview
- Organisational Insight
- Workforce Insight
- Future State Vs. Current Provision
- Capabilities Matched to Current Provision
- Fit & Surplus Factors
- Fit & Surplus Matrix
- FOP Capability Matches
- FOP vs Provision
- FOP Priorities

FOP Priorities

Role Level	FOP Title	FOP Code	Primary Supply Chain	Max. Fit Fac. ↑	Associated Surplus Factor
2. Technical Leads and Specialists	UI and UX designers and researchers	10156	5. Niche small to medium enterprises (SME) and Freelancers Specialists	12.5%	94.1%
1. Production Assistants	Business development managers	10117	4. Research and Technology Organisations (RTOs) and Higher Education Institutions (HEI)	20.0%	70.0%
3. Departmental Head	Studio and Stage Manager	10130	2. Production Companies	25.0%	88.2%
3. Departmental Head	Film and television production manager	10129	1. Media Companies	26.9%	52.9%
3. Departmental Head	Creative Director	10191		28.6%	70.0%
2. Technical Leads and Specialists	Planning, process and production technicians			30.4%	10.0%
2. Technical Leads and Specialists	Software developers		Technology Suppliers (Hardware and Software)	33.3%	20.0%
1. Production Assistants	Business system	10114	2. Production Companies	33.3%	90.9%
2. Technical Leads and Specialists	Set designers	10146	2. Production Companies	36.4%	70.6%
1. Production Assistants	Archivists	10113	1. Media Companies (Client)	37.5%	70.0%
3. Departmental Head	Broadcasting and Entertainment Director	10133	2. Production Companies	37.5%	70.6%

29 results