ENERGY & UTILITY SKILLS

Skills for a greener world

Investigating the skills required for a transition to an advanced zero emission, indigenous diverse energy secure and circular economy in Northern Ireland

Summary report

May 2023

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1 Executive summary

1.1.1 This report has been prepared by Energy & Utility Skills in response to a commission from Northern Ireland's Department for the Economy (DfE).

1.1.2 This research provides the DfE, and its partners, with the intelligence needed to ensure that all organisations involved in the advanced zero emission, indigenous diverse energy secure and circular economy in Northern Ireland to play their part in delivering the required skilled workforce – and in a way that maximises the benefits to all sections of the Northern Ireland population.

1.1.3 The report covers eight relevant industries that are critical to the Northern Irish economy moving forward:

- Large-scale energy production
- Infrastructure
- Domestic low carbon technologies and energy efficiency
- Industrial processes
- Circular economy
- Transport
- Agriculture
- Fisheries

1.1.4 For each of these industries we have sought to answer the following questions:

1. What new skills will be required by new and existing workers to allow for a successful transition?
2. Is existing education, skills and training provision sufficient and relevant to allow for a successful transition for existing and new jobs?
3. What specific skills gaps are expected over the short, medium and longer term?
4. Which industries are likely to offer transferable skills to new growth industries?
5. How can government ensure the transition is a "just transition"?
6. What are other parts of the UK and Ireland doing to prepare their respective education, skills and training provision for a transition to a sustainable energy and circular economy?

   (and whether similar provision is in place in Northern Ireland and, where it is not, whether it would be appropriate)
7. How should the Northern Ireland government prepare in advance of the launch of any new energy schemes in the future to ensure it has the right skills to deliver?

What new skills will be required by new and existing workers to allow for a successful transition and what specific skills gaps are expected over the short, medium and longer term?

1.1.5 Across the green industries and circular economy there are a range of industry-specific and generic skills that are growing in demand and will be crucial to achieving the transition to a net zero economy in Northern Ireland.

1.1.6 Business skills such as project management, business and commercial, customer/stakeholder engagement, risk management and data analysis will not only be essential to the development of these industries, but they will also be demanded by a wider range of job roles than ever before. For example, operatives up to engineers are becoming increasingly customer facing as well as reliant on data to perform job roles that are widening in scope.

1.1.7 Digital skills are increasingly affecting almost every job role, including those in the field workforce. Whether it's new hardware or software, a range of generic/off-the-shelf provision as well as technology-specific courses will be required.

1.1.8 Multi-skilling is also an emerging trend and one that will be necessary to meet the future demands of the green economy. For example, if multiple technologies are being installed in one property (e.g. heat pumps, solar PV/thermal and electric vehicle charging points), it makes sense to multi-skill the installer workforce across the range of technologies (and accreditation systems will need to facilitate this in an efficient manner).

1.1.9 Specific skills have been identified in relation to each industry:

- **Large-scale energy production**: Particularly relating to offshore wind across all its project life cycle; (development of commercial battery storage should be monitored closely)
- **Infrastructure**: Relating to the planning, construction and operation of heat networks; hydrogen blending in the networks; existing skills in greater volume for network expansion and upgrading
- **Domestic low carbon technologies and energy efficiency**: Planning the implementation of various technologies in a "smart home"; installer skills across the full range of technologies; multi-skilling
- **Industrial processes**: Engineering and technician skills relating to the production, storage and transport of hydrogen and biofuels; (development of carbon capture, usage and storage should be monitored closely)

- **Circular economy**: Skills needed to gain value from various waste streams (e.g. biomass, anaerobic digestion, etc.); cross-industry skills/supply chain skills needed to minimise end of life waste through implementation of CE principles
- **Transport**: Repairing and maintaining electric and fuel cell vehicles
- **Agriculture**: Drivers; farm workers; food scientists/technologists; crop and livestock monitoring; Soil and water conservation
- **Fisheries**: Skills associated with the manufacture, servicing, repair and operation of hydrogen-fuelled vessels

1.1.10 Specialist skills that will be needed across many of these industries include those related to geosciences.

1.1.11 Geoscientific skills are essential for the energy transition as it is within geological formations that energy such as geothermal is found, and where the critical minerals essential for the development and construction of green energy technologies are extracted.

1.1.12 Geological formations are also the foundations for wind turbines, both onshore and offshore, and it is within these formations that geological storage can be used, including for gases such as air, carbon dioxide and hydrogen.

1.1.13 Geosciences also have play a central role in the mapping and valuation of our natural resources, including water and in preventing overuse of land and sea areas, all of which are vital for a successful transition.

1.1.14 Chemists, physicists, and product designers are also vital for the energy transition and the manufacturing of advanced technologies. This is necessary for processing critical raw materials, the production of new materials and to ensure longer product and material life cycles.

1.1.15 Finally, a deeper understanding of the effect that climate change could have on Northern Ireland's green infrastructure and other assets will increasingly be required. This will need to be disseminated to appropriate job roles as the scientific evidence comes through.

Is existing education, skills and training provision sufficient and relevant to allow for a successful transition for existing and new jobs?

1.1.16 Effective pathways to competency are need at all levels of the workforce – from entry level (level 2) through to higher skills levels; while the largest volume of skills demands will be at level 3-4.

1.1.17 Throughout this research, a number of themes have repeatedly been raised in relation to education and skill provision:

- **Entry-level opportunities**: Programmes such as Traineeships and the Skill Up programme offer a wide range entry level routes into selected industries and occupations and are crucial to ensuring that people of all capabilities and circumstances have the opportunity to enter meaningful employment.

  The reach of these programmes needs to be widened through targeted promotion and, potentially, incentives to ensure that the intended market is being reached. Furthermore, funding should be secured to allow these programmes to (i) continue and (ii) expand as required.

- **Apprenticeships**: Apprenticeships are very well regarded by industry. However, Sectoral Partnerships should be tasked with reviewing what is currently available both in terms of range (i.e. the available frameworks) and content (are they future-proof in terms of technology, data and digital advancements?). In relation to the circular economy, all framework content should be reviewed to ensure sustainability and the materials lifecycle is a central theme).

  Furthermore, consideration should be given as to the remit of Sectoral Partnerships in terms of influencing all education and skills provision relating to their industry (e.g. Skill Up, traineeships, further education and higher education).

- **Further education**: The six further education colleges are highly regarded by employers in the green industries, but there is a view that current provision has a bias towards introductory/awareness courses rather than delivering a technically competent workforce.

- **Higher education**: The two main universities in Northern Ireland deliver a range of courses that fit well with the green industries. However, the concern that graduates lack industry experience is often cited and more needs to be done to facilitate this during their studies. Furthermore, few graduates actually enter employment in the green industries – whether this is due to graduates choosing other industries or due to a lack of demand from employers needs further investigation.

1.1.18 There are currently no standalone geoscience degrees available at either undergraduate or postgraduate level in Northern Ireland, while the number of post-primary schools offering either A Level or GCSE courses is limited to one school only. Students that do go on to study geoscience at degree level have to travel outside of Northern Ireland to either GB or Ireland.

1.1.19 The number of graduates entering employment in the green industries and circular economy needs to increase substantially of the nearly 4,000 graduates that entered employment in 2020/21, just 115 did so within the industries covered by this research.

1.1.20 However, it is not clear whether this is due to a lack of supply or a lack of demand from employers. More work may be needed to understand this issue more clearly.

1.1.21 Given that the Northern Ireland Skills Barometer 2021 update reports that almost two-fifths (37%) of new workers in the period to 2030 will require level 6+ qualifications (i.e. undergraduate degree, masters, PhD) and that Northern Ireland will be short of nearly 3,000 level 4+ skilled people per year over the same period (with Engineering and Manufacturing Technologies being particularly in demand), the numbers enrolling on appropriate higher education courses needs to increase substantially.

1.1.22 While many employers, particularly the larger employers, do have good working relationships with education and skills providers, there is always room for more – whether it's through activities such as providing guest lecturers, work experience placements or practice interviews.

1.1.23 Furthermore, this engagement could extend out to organisations that work specifically with disadvantaged communities. Consideration should be given as to how to incentivise/promote the benefits of building "social value" within their communities.

1.1.24 As with tertiary education, course content in compulsory education should be reviewed in the context of the green industries and circular economy to ensure that they actually engender an interest in current and future careers in these industries. As those due to enter the workforce in 2030 are already in Year 6, this work cannot start enough.

1.1.25 Finally, in very few areas of the green economy is a skills revolution expected – it is more a case of evolution. Therefore, while new provision may be needed in some of the learning/training pathways (e.g. in areas associated with geoscience), the upskilling of the current workforce will be a major exercise that will not, generally, require new qualifications.

1.1.26 However, the possibilities for "micro-credentials" and skills passporting that recognise upskilling achievements and facilitate the transfer of these skills around the green (and wider energy) industries should be investigated (in conjunction with these industries across the rest of the UK).

Which industries are likely to offer transferable skills to new growth industries?

1.1.27 The industries which offer the greatest potential for the supply of skills into the green industries are:

- **Oil and gas**: This particularly applies to many aspects of the offshore wind industry and, potentially, tidal power generation

  However, as Northern Ireland does not have a historic legacy of offshore engineering, it is likely that this would require attracting and retaining these skills from other parts of the UK, Ireland and further afield

- **Advanced manufacturing and engineering**: National employment projections suggest that these industries could lose around 14,000 jobs between 2020 and 2035, presenting an opportunity to reskilling those at risk through a range of tailored conversion programmes

- **Fibre/telecoms**: Facilitating the transfer of skills between the utilities and fibre/telecoms could help alleviate skills shortages and reverse the trend of losing skills to that industry

1.1.28 Also, as mentioned previously, facilitating the movement of skills around the green industries should be a priority. For example, multi-skilling the installer workforce across domestic low carbon technologies, including heat pumps, solar PV and EV charging points.

How can government ensure the transition is a "just transition"?

1.1.29 A common theme during the employer discussions for this research was that the need for people (i.e. volume) was a more pressing concern than how to get the skills – without the people there are no skills!

1.1.30 Therefore, careers education advice, information and guidance (CEAIG) needs to be reviewed in the context of better articulating up-to-date learning and career pathways to those in schools, colleges, universities – and be generally available to all adults. The ultimate aim of this should be to ensure that all sections of the community, no matter what their academic abilities, are aware of and have access to meaningful employment in the green industries.

1.1.31 Therefore, targeted promotion of training and employment opportunities should put in place for:

- Females
- Long-term unemployed
- Those from specific disadvantaged and deprived communities
- Those who are retired
- Those with caring responsibilities
- With physical or learning disabilities
- Youth unemployed

1.1.32 Consideration should be given as to how participation in green training provision can be incentivised – from traineeships and other entry level initiatives, through to apprenticeships, further education and higher education.

1.1.33 Ways of promoting the opportunities available in the Northern Ireland green industries and circular economy to Northern Irish HE students in Ireland and Great Britain should be investigated – with the potential incentivisation to return to apply their newly-acquired skills in their home nation.

1.1.34 Finally, employers and stakeholders should consider how more can be done to create social value as a means of raising awareness of the various green industries and the role that they play in a sustainable, vibrant economy.

What are other parts of the UK and Ireland doing to prepare their respective education, skills and training provision for a transition to a sustainable energy and circular economy?

1.1.35 There are a wide range of activities being carried out across Great Britain that could be transferred over to Northern Ireland.

- Scotland has a strong history of developing offshore skills
- The Humber region is Europe's largest emitter of CO_2 and is working hard to decarbonise its industrial processes, including the production of green hydrogen
- The South West region is working hard to develop its floating offshore wind industry – building links with developers, operators and education and skills providers

1.1.36 On the training and qualification front, there is a more extensive range of apprenticeship frameworks/standards across Great Britain (although it is recognised that a lack of learner numbers in Northern Ireland might deter Awarding Bodies from funding some of the more niche frameworks/standards).

1.1.37 Similar in nature to the Skill Up programme, Skills Bootcamps offer free, flexible courses of up to 16 weeks followed by a job interview with an employer. There are currently nearly 200 different courses on offer, including some that support the green industries.

How should the Northern Ireland government prepare in advance of the launch of any new energy schemes in the future to ensure it has the right skills to deliver?

1.1.38 Starting at the beginning, clear learning and career pathways for critical roles within each of the green industries need to be developed and delivered from Year 6 upwards – through into adulthood.

1.1.39 Specifically, the Careers and Skills Portal for Northern Ireland that is being developed at the moment should have a clear focus on supporting the green industries and circular economy.

1.1.40 One of the major challenges in developing new pathways to competency to deliver new skills (for example, an apprenticeship framework) is that it can take a number of years to (i) develop the qualification and (ii) for learners to become competent through it.

1.1.41 As the pace of technological change in the green industries accelerates, it will be become more important to consider alternative routes to competence other than formal qualification structures. Innovative, more flexible pathways may need to be investigated on an industry-by-industry basis.

1.1.42 In those industries that are clear government priorities, both individuals and employers may need to be incentivised to invest in new skills before the market establishes itself.

1.1.43 Government should consult with industry as to how Apprenticeship Levy flexibilities could be achieved to ensure that employers are able to maximise the impact of the available funds. Part of this discussion could include the expansion of apprenticeships to people of all ages, thereby encouraging their use as a tool to upskill the existing workforce as well as people moving into the new green/ circular economy industries from other industries.

1.1.44 Government stakeholders and industry representative organisations should consider how collaboration with their counterparts in Scotland and Wales might provide economies of scale when seeking to address common issues.

1.1.45 Ensure that all appropriate accreditations/certifications from Great Britain, Europe and globally are built into the Northern Ireland system to ensure ready transfer of skills.

Concluding remarks

1.1.46 Based on the findings of this research, it appears the skills needed for energy transition are, generally, an upgrading/expansion of the skills required now. As new technologies are developed and deployed, the existing workforce will require appropriate upskilling – i.e. the skills of the workforce will evolve.

1.1.47 In responding to these evolving skills requirements, Northern Ireland's education and skills providers at all levels (which are highly regarded by employers) are expected to respond in a timely manner. However, this will require:

i. employer input into curricula development via an appropriate mechanism for identifying when/where new provision is needed or, more likely, existing provision needs to be brought up-to-date

ii. sufficient demand from employers and students to make new/expanded provision economically viable for the providers

1.1.48 Where a revolution is more likely to be required is in terms of:

- attracting the required number of people into the expanding workforce (the majority of which will require level 3-4 qualifications) in the face of strong competition from other sectors and from outside of Northern Ireland
- ensuring appropriate pathways are in place to allow access to these opportunities from all sections of the community and from all abilities – ensuring the transition to a green(er) workforce is just and accessible to all.

2 Recommendations

Based on the findings of this research, the following recommendations are made:

2.1 Engage with young people to make them aware of the available learning and career pathways

Short-term (i.e. during 2023)

2.1.1 It is worth noting that the labour market entrants of 2030 will be starting in Year 8 in September 2023.

Figure 1: Age of current school students and their likely entry into the labour market

School Year	Age in 2023/24 academic year	Year entering the workforce
Year 14	17-18	2024
Year 13	16-17	2025
Year 12	15-16	2026
Year 11	14-15	2027
Year 10	13-14	2028
Year 9	12-13	2029
Year 8	11-12	2030

2.1.2 Clear learning and career pathways for critical roles within each of the green industries should be developed that articulate the learning, qualification and experience requirements from entry level through to level 8.

2.1.3 Working with the Careers Occupational Information Unit, there is an urgent need to produce careers education advice, information and guidance (CEAIG) materials that highlight the career opportunities available in each of the eight industries included in this report.

2.1.4 Similarly, a review of materials supplied to and used by the Careers Services should also be undertaken. A crucial element of this work will be to revamp the employee value proposition with a focus on the values and ambitions of the industries.

2.1.5 Consider how best to develop and deliver short learning/ information events for careers teachers/professionals.

2.1.6 It is understood that a Careers and Skills Portal for Northern Ireland is currently being planned, so consideration should be given to how it can best support the green industries and circular economy. There are similar websites in Scotland (completed) and Wales (still under development, although intelligence relating to the energy industry is already present):

- Future Jobs Wales (for more information, see the Future Jobs Wales website (external link opens in a new window)
- My World of Work (for more information, see the My World of Work website (external link opens in a new window)

2.1.7 Ways of creating closer industry and school links should be investigated, promoted and actively supported, such as:

- Enterprise Adviser Network (information about becoming an Enterprise Advisor is available on The Careers & Enterprise Company's website (external link opens in a new window)
- Founders4Schools (for more information, see the Founders4Schools website (external link opens in a new window)
- STEM Ambassadors (information about becoming a STEM Ambassador is available on the STEM Learning website (external link opens a new window)
- Work experience placements pupils
- Engage and support the Pupil Support Services
- Providing practice interviews for students

Medium-term (during 2024 & 2025)

2.1.8 Course content at Key Stage 3 should be reviewed in the context of the green industries and circular economy to ensure that they engender interest in the current and future careers.

Long-term (out to 2030)

2.1.9 DfE and other stakeholders should consider how to maintain, update and publish the latest developments in skills and workforce requirements of the green industries and circular economy. For example, this may include a refresh of this research (circa every two years), or one or more annually produced reports based on third party data.

Feedback from stakeholder event

2.1.10 On 28th April 2023, more than 90 industry stakeholders and employers met in-person and online in Belfast for the Launch of Green Energy Skills Research and Workshop. The main discussion points coming out of that event were:

- The need to articulate opportunities, via a multi-facetted (i.e. not just schools), regional approach, from primary to 18 – and it needs to be inspirational!
- Articulate potential career/learning/earning journeys
- Need to reaching out/engage young people outside of the school/education system
- More work experience, project-based activities and "sector weeks" (along the lines of Apprenticeship week)

2.1.11 In order to assess whether progress is being made in combatting the challenges highlighted in this research, a number of measures are proposed:

- Number of students engaged/funded/sponsored
- Number (and diversity) of students progressing onto green further and higher education provision
- Number of website visits and enquiries to the Careers and Skills Portal for Northern Ireland

2.1.12 These may require new measurement systems and cross-organisation data collection/shared to be introduced.

2.2 Ensure opportunities for all by widening access to learning and careers opportunities

2.2.1 A common theme throughout this research has been the need for additional people to enter the green workforce over the coming years – untapping the latent skills in the population and ensuring a just transition for all.

2.2.2 It was widely commented upon throughout the interviews for this research that the development of solutions needs to be industry-led, rather than being constrained within current policy and funding boundaries.

Short-term (i.e. during 2023)

2.2.3 Over the course of 2023, work should commence on identifying innovative and practical ways of improving the supply of people into the green industries for the following:

- Disadvantaged and deprived communities – Consider what additional support may be required in order to open up opportunities for those in deprived areas and/or with low educational attainment (for example, pre-employment or pre-apprenticeship support programmes)

- Economically inactive – Reducing the barriers for economically inactive people to enter/re-enter the labour market, particularly those:
  - With physical or learning disabilities
  - With caring responsibilities
  - Who are retired
- Females – (particularly in technical, engineering and managerial roles)[1]
- Long-term unemployed
- Refugees – Consider ways of reaching out and engaging with the refugee population to identify and utilise their skills
- Youth unemployed

2.2.4 Options should be investigated as to how to incentivise/promote participation from these groups on provision at all levels – from Skill Up programmes and traineeships, through to apprenticeships, further education and higher education.

2.2.5 This incentivisation/promote should focus on the green industries/circular economy as included in this report.

- An example of this might include the sponsoring under-graduates on relevant STEM/IT/data courses, augmented with work and summer placements

2.2.6 Such incentives/sponsorship may be linked to agreeing to work in Northern Ireland for a certain number of years (e.g. five) following graduation.

2.2.7 Ways of promoting the opportunities available in the Northern Ireland green industries and circular economy to Northern Irish HE students in Ireland and Great Britain should be investigated – with the potential incentivisation to return to apply their newly-acquired skills in their home nation.

[1] For example: Building on/supporting the work of Women in STEM Northern Ireland. More information about The Trades Fit Expo: Young Women in Trades and Tech can be found on the Victoria Government's website (external link opens a new window).

2.2.8 In conjunction with industry employers, education and skills providers and other relevant agencies, a review should be undertaken to identify "quick wins" in terms of conversion training from other industries into specific areas in the green industries and circular economy. This should include a review of the available provision on the Skill Up and Assured Skills programmes to ensure they offer relevant provision/opportunities for the green industries and circular economy.

- There are approximately 45,000 people working in occupations in other industries of the economy that could, potentially, transfer their skills into the green industries

2.2.9 Consideration should be given to how a more proactive approach could be taken to support the upskilling/reskilling of people who are at risk of losing their current job or any employed in declining industries/occupations.

2.2.10 DfE and other stakeholders should review the mechanisms by which they communicate the support available to businesses and individuals to ensure the right information is imparted to the right audience in the most appropriate manner.

Medium-term (during 2024 & 2025)

2.2.11 More work needs to be done to understand and address why so few STEM graduates enter employment in the green industries. In 2020/21, of the 5,100 graduates with a pass from a First Degree course from an HE institution in Northern Ireland, 3,800 entered employment or self-employment – but just 115 of these did so in the green industries covered by this research.

Figure 2: Number of graduates entering employment in the green industries

Industry	Standard Industry Classification	Graduates in employment
Large-scale energy production	35.11 Production of electricity	10
Infrastructure	35.12 Transmission of electricity 35.13 Distribution of electricity 35.14 Trade of electricity 35.22 Distribution of gaseous fuels through mains 35.23 Trade of gas through mains 36.00 Water collection, treatment and supply 37.00 Sewerage 42.2 Construction of utility projects 42.9 Construction of other civil engineering projects	40
Domestic low carbon technologies and energy efficiency	43.2 Electrical, plumbing and other construction installation activities 43.3 Building completion and finishing 43.9 Other specialised construction activities	15
Industrial processes	20.1 Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms 20.2 Manufacture of pesticides and other agrochemical products 35.21 Manufacture of gas	<5
Circular economy	38 Waste collection, treatment and disposal activities; materials recovery 39 Remediation activities and other waste management services	10

Industry	Standard Industry Classification	Graduates in employment
Transport	29.1 Manufacture of motor vehicles 49 Land transport and transport via pipelines 52 Warehousing and support activities for transportation	25
Agriculture	01 Crop and animal production, hunting and related service activities 02 Forestry and logging 81.3 Landscape service activities	10
Fisheries and marine environment	03 Fishing and aquaculture	0
Total number of graduates entering employment in the green industries		**115**

Source: Northern Ireland Business Register and Employment Survey, 2021 and Agricultural Workforce in the United Kingdom at 1 June.

Long-term (out to 2030)

2.2.12 Employers and stakeholders should consider how more can be done to create social value as a means of raising awareness of the various green industries and the role that they play in a sustainable, vibrant economy.

Feedback from stakeholder event

2.2.13 On 28th April 2023, more than 90 industry stakeholders and employers met in-person and online in Belfast for the Launch of Green Energy Skills Research and Workshop. The main discussion points coming out of that event were:

- Keep the focus on equality, diversity and inclusivity (including neurodiversity)
- Promote more flexibility in working practices
- Promote the opportunities to Northern Irish people (including students) in Ireland and GB

2.2.14 In order to assess whether progress is being made in combatting the challenges highlighted in this research, a number of measures are proposed:

- Total headcount and levels of diversity in the workforce
- Number of students engaged/funded/sponsored

2.3 Ensuring effective pathways to competency

2.3.1 One of the major challenges in developing new pathways to competency (for example, apprenticeships) is that it can take a number of years to (i) develop the qualification and (ii) for learners to become competent through it.

2.3.2 As the pace of technological change in the industry accelerates, it will be important to consider alternative routes to competence other than formal qualification structures, such as an Apprenticeship programme, in terms of meeting specific skills needs in the near-term. Therefore, innovative, more flexible pathways may need to be investigated.

2.3.3 It was widely commented upon throughout the interviews for this research that the development of solutions needs to be industry-led, rather than being constrained within current policy and funding boundaries.

2.3.4 Effective pathways to competency are need at all levels of the workforce – from entry level (level 2) through to higher skills levels; while the largest volume of skills demands will be at level 3-4.

2.3.5 Apprentices in the electrotechnical industry are seen as vital for its future, with employers seeing them as a way to overcome the ageing workforce and to create succession plans where needed[2].

2.3.6 However, there are challenges to be over-come in this area if demand from employers is to increase. For example, retaining apprentices once they complete their learning programme can be a major issue for smaller companies and those lower down the supply chain. The risk of having their newly-completed apprentices "poached" by other organisations who are willing to pay a higher salary (but not invest in the actual training programme) means that, for many, it is a risk not worth taking.

2.3.7 Also, the transactional nature of contractor supply chain means that visibility of future work is low; this results in a lack of investment in long-term training programmes such as Apprenticeships.

Short-term (i.e. during 2023)

2.3.8 In conjunction with the Sectoral Partnerships, review both the range and content of relevant apprenticeship frameworks to ensure that they meet the current and future requirements of the green industries and circular economy.

- This point also applies to further and higher education provision

[2] Labour Market Intelligence Research, NET/ECA/The Electrotechnical JIB/TESP/Select/Unite, March 2019.

2.3.9 The content of relevant existing apprenticeship frameworks that are used by employers in the green industries and circular economy should be reviewed to ensure that their data, digital and IT requirements are fully recognised.

- This point also applies to further and higher education provision

Medium-term (during 2024 & 2025)

2.3.10 Information provided from the six further education colleges lists more than 80 courses associated with the green industries. However, the majority of these appear to be awareness/introductory courses, rather than skills-based courses that aim to produce technically competent people in that subject area.

2.3.11 Therefore, colleges should review the extent to which their provision is able to extend into the delivery of technical skills leading to technically competent people.

2.3.12 This might be achieved through the establishment of a green industry/circular economy further education hub amongst the further education colleges.

2.3.13 There are currently no standalone geoscience degrees available at either undergraduate or postgraduate level in Northern Ireland, while the number of post-primary schools offering either A Level or GCSE courses is limited to one school only. Students that do go on to study geoscience at degree level have to travel outside of Northern Ireland to either GB or Ireland.

2.3.14 The development of an applied environmental geoscience undergraduate degree would be essential to address the identified skills gap in this area.

2.3.15 DfE should seriously consider what arrangements are put in place once funding for the current Skill Up programme ends in March 2024. It is likely that such initiatives will be crucial to the reskill and upskilling of workers looking to enter the green industries and circular economy over the coming years.

2.3.16 Sectoral Partnerships should consider implementing a scheme for apprentice "sharing" within and across related industries (see Thames Water's shared apprenticeship as an example[3]). This would allow apprentices to gain an understanding of the whole value chain they're working in and how their decisions and actions have a wider impact on the value chain.

[3] [3] More information about Thames Water's shared apprenticeship programme can be found on the Thames Water website (new link opens an external window).

2.3.17 Consider whether it might be appropriate to widen the remit of Sectoral Partnerships to encompass a "watching brief" over all provision related to their industry, including entry level (e.g. Skill Up, Assured Skills Academies), further education and higher education.

2.3.18 Consider introducing cohorts of apprenticeships for specific cohorts of under-represented groups (e.g. females on technical frameworks)

2.3.19 Government should consult with industry as to how Apprenticeship Levy flexibilities could be achieved to ensure that employers are able to maximise the impact of the available funds.

2.3.20 Part of this discussion could include the expansion of apprenticeships to people of all ages, thereby encouraging their use a tool to upskill the existing workforce as well as people moving into the new green/ circular economy industries from other industries.

2.3.21 In order to improve the capacity and capabilities of the trainer/lecturer workforce, consider how closer engagement between employers and education and skills providers can be encouraged and supported (e.g. facilitate "guest lecturers" from industry).

2.3.22 Working with relevant industry stakeholders across the different green industries, consider how their regulatory/compliance skills and knowledge requirements can be best supporting and kept up-to-date.

Long-term (out to 2030)

2.3.23 Employers are calling for greater flexibility in skills systems, so that training can be more modular, with shorter programmes enabling upskilling and reskilling, and that duplication of training in common role elements is avoided.

2.3.24 A Technical Skills Visa or Passporting system, aligned with current competency registration schemes, could support this. This is important because if the recruitment of young people into green job roles is a material challenge, then schemes which support older people to extend or transfer roles become more valuable.

2.3.25 Possibilities for "micro-credentials" need to be explored further. Micro-credentials are short, credit-bearing courses that support higher education. Micro-credentials would not normally constitute an award in their own right, but they have standalone value and could also contribute to a recognised qualification. They potentially widen access to learners who might not have considered a more academic route to achieving a qualification.

2.3.26 Regularly review the range and content of apprenticeship, further and higher education provision to ensure they continue to meet industry requirements.

2.3.27 Education and skills providers should be encouraged to review their current provision, and provide future provision, in ways that acknowledge and support different learning styles and methods, including innovations such as micro-learning, mobile learning, immersive technologies (e.g. virtual and augmented reality), and gamification.

2.3.28 Monitor the development of new technologies and how they are being deployed and impacting upon the green workforce – and seek to develop new or updated provision as appropriate in a timely manner.

Feedback from stakeholder event

2.3.29 On 28th April 2023, more than 90 industry stakeholders and employers met in-person and online in Belfast for the Launch of Green Energy Skills Research and Workshop. The main discussion points coming out of that event were:

- Need a strategic plan that covers secondary schools through to higher education
- Increase number and scope of apprenticeships
- Implement a cyclical review of all pathways, both individually and as an holistic all industry/all age approach – who owns this?

2.3.30 In order to assess whether progress is being made in combatting the challenges highlighted in this research, a number of measures are proposed:

- Qualification/course take-up and success rates
- Progression of course leavers/qualifiers - % employed in green industries/circular economy
- Satisfaction levels of students
- Proportion of businesses in the green industries and circular economy that report skills shortages and skills gaps
- Gross Value Added by the industries
- % of Apprenticeship Levy that is unspent

2.4 Ensuring Northern Ireland plays its role the development of UK solutions

2.4.1 Government stakeholders and industry representative organisations should consider how collaboration with their counterparts in Scotland and Wales might provide economies of scale when seeking to address common issues, and how this collaboration might be enacted.

2.4.2 Relevant employers and stakeholders should ensure that the Green Jobs Delivery Group is made aware of new skills needs relating to the transition to a zero-carbon, resource efficient economy, and that its work recognises the differences in Northern Ireland's skills system, particularly as it relates to available funding, are identified and minimised and delivers a localised focus on skills investment.

2.4.3 The Green Jobs Delivery Group is cognisant of the more flexible approach to skills provision developed through programmes such as Skill Up, Assured Skills and Skills Focus. Continued close employer involvement will be the key to developing this type of provision to meet emerging employer skills needs in a timely, effective and efficient manner.

2.4.4 Ensure that all appropriate accreditations/certifications from Great Britain, Europe and globally are built into the Northern Ireland system to ensure ready transfer of skills.

2.5 Industry-specific recommendations

In addition to the overall recommendations listed above, there are a number of industry-specific actions that government, stakeholders and employers should consider implementing:

Large-scale energy production

Short-term (i.e. during 2023)

2.5.1 In the GB offshore wind industry at present, much of the equipment manufacturing takes places overseas. In order to capitalise on the potential employment opportunities throughout the value chain, Northern Ireland stakeholders should review how best to support and incentivise the offshore wind industry to maximise local content in the manufacturing and installation of offshore assets.

2.5.2 In order to combat the general lack of awareness about the opportunity that offshore wind presents for stable and well-paid careers, awareness campaigns should be considered in order to attract new skilled workers and influence the thoughts of those still in school – particularly in the coastal communities local to projects and ports, including those smaller ones that will host storage facilities.

Medium-term (during 2024 & 2025)

2.5.3 Government should develop a longer-term pipeline of projects (beyond the current 2030 ambition) which can instil confidence in the market and provide certainty in terms of investment in learning and training, and career decisions.

Long-term (out to 2030)

2.5.4 In future iterations of this research, the workforce and skills requirements of commercial-scale battery storage technologies should also be included. This technology will become increasingly important to the energy system as a means of ironing out the peaks and troughs of intermittent renewable energy technologies.

Infrastructure

Short-term (i.e. during 2023)

2.5.5 Consideration should be given to whether specific provision should be developed specifically to cater for the skills needed to design, build, operate and maintain heat networks. This applies to colleges and universities in Northern Ireland.

2.5.6 Colleges to review content of their provision to make sure it covers awareness and understanding of heat networks.

Medium-term (during 2024 & 2025)

2.5.7 Building on the Combined Utilities Programme Pilot, businesses in the electricity, gas, water and heat network industries should seek out further opportunities to collaborate more closely on identifying and addressing their common skills issues across network infrastructure.

2.5.8 Consider the value of a specific conversion programme to bring craft trades from the fibre/telecoms workforce into/back into the power workforce.

2.5.9 Engage with all parties in the heat networks industry to establish the requirement for nationally accredited training standards – in conjunction with partners in Great Britain.

Domestic low carbon technologies and energy efficiency

Short-term (i.e. during 2023)

2.5.10 Sectoral Partnerships should investigate whether a similar framework to the Low Carbon Heating Technician standard[4] in England might be appropriate.

2.5.11 Consider what approaches could be taken to incentivise accreditation to Trustmark and MCS standards.

Medium-term (during 2024 & 2025)

2.5.12 Consider the development of an A Level qualification to support entry into construction professions.

Long-term (out to 2030)

2.5.13 In future iterations of this research, the workforce and skills requirements of domestic battery storage technologies should also be included. This technology will increasingly be coupled with a range of domestic low carbon technologies as part of a whole-system approach to decarbonising home heating.

Industrial processes

Short-term (i.e. during 2023)

2.5.14 Although the majority of skills development will be centred around upgrading of existing skills, it is expected that specific upskilling will be required for the installation, commissioning, servicing and operation of electrolysers.

2.5.15 Consider how government policies can support the concept of industrial clustering around industrial processes. This could help support the development of attractive career pathways, including offering a more comprehensive early learning pathway (e.g. shared apprenticeships) as well as clearer career progression across the value chain.

Medium-term (during 2024 & 2025)

2.5.16 Review, with industry, the extent to which conversion courses are needed to support the decarbonisation of industrial processes.

2.5.17 Monitor developments in the carbon capture, usage and storage industry to ensure that evolving skills demands are fully understood and that provision is fit for purpose.

[4] Further information is available on the Institute for Apprenticeships & Technical Education's website (external link opens in a new window).

Long-term (out to 2030)

2.5.18 The already acute shortage of technical skills to meet current demand in other industries will be exacerbated as industrial decarbonisation programmes accelerate. This is likely to require a significant increase in the number of FE students in Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment.

Circular economy

Short-term (i.e. during 2023)

2.5.19 The circular economy is more than end of life waste management and recycling, it requires whole lifecycle and systems thinking across the value chain. Therefore, consideration needs to be given as to how this can be incorporated into school and tertiary curricula, so the circular economy becomes synonymous with the Northern Irish economy.

Medium-term (during 2024 & 2025)

2.5.20 Establish clear learning and career pathways that can be used to promote the industry.

Long-term (out to 2030)

2.5.21 Monitor the scale of developments in the various aspects of the circular economy to ensure that evolving skills demands are fully understood and that provision is fit for purpose.

Transport

Short-term (i.e. during 2023)

2.5.22 Review the content of the level 2 and 3 Vehicle maintenance and repair apprenticeship frameworks to ensure it contains sufficient content relating to electric and hydrogen fuel cell vehicles.

Medium-term (during 2024 & 2025)

2.5.23 Monitor the scale of developments in the fuel cell vehicle market to ensure that evolving skills demands are fully understood and that provision is fit for purpose.

Agriculture

Short-term (i.e. during 2023)

2.5.24 Consult with industry and schools regarding what activities could be put in place/expanded upon to engender a positive lived experience and connection with the agriculture and land-based industries for young people in school (e.g. through work experience, visits, etc.).

Medium-term (during 2024 & 2025)

2.5.25 Implement the findings of the industry/schools review of potential activities.

2.5.26 Review all core agricultural learning provision to ensure that it is "future-proof" in terms of incorporating new skills/understanding such as utilising new technologies, analysing and using data, environmental science, environmental protection, etc.

Long-term (out to 2030)

2.5.27 Monitor the scale of developments in the agri-tech market to ensure that evolving skills demands are fully understood and that provision is fit for purpose.

Fisheries and marine environment

Short-term (i.e. during 2023)

2.5.28 There is little relevant provision currently on offer outside of that offered by specialist organisations such as NIFPRO Training Company and the Sea Fish Industry Training Association.

2.5.29 There are currently no traineeships, higher level apprenticeships, or further education college provision – and only one relevant apprenticeship framework (in Environmental conservation).

2.5.30 Sectoral Partnerships, industry stakeholders and employers need to consider whether additional provision/entry routes may be needed to attract and train the workforce needed across all aspects of the fisheries and marine environment industries.

Medium-term (during 2024 & 2025)

2.5.31 Monitor the development of technologies aimed at decarbonising the fishing fleet – particularly in terms of running and repairing alternative fuel engines – and seek to develop new upskilling/conversion provision in a timely manner.

Data, digital and specialist IT skills

Short-term (i.e. during 2023)

2.5.32 Consider what can be done to promote the green industries and circular economy as attractive career options for those currently studying data, digital and IT skills at all levels of education.

Medium-term (during 2024 & 2025)

2.5.33 Increasing/incentivising participation in IT/software/computing-related provision, at all levels, should be a priority due to their increasing demand across all industries.

2.5.34 Investigate the potential demand for modular upskilling courses relating to:

- Industry context for data, digital and IT specialists
- Data, digital and IT upskilling for the existing workforce

2.6 The Green Energy Skills Industry Reference Group (GESIRG)

2.6.1 The GESIRG should now take the findings of this research and its recommendations and use them to develop an achievable and measurable action plan, with clear ownership and responsibility for delivery.