green skills 2030

The 1st National Further Education & Training (FET) Strategy for the Green Transition

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SOLAS
learning works

Rialtas na hÉireann
Government of Ireland

Contents

Foreword

SOLAS is delighted to present *Green Skills 2030 – The First National Further Education & Training (FET) Strategy for the Green Transition*. This strategy aims to provide a clear and comprehensive framework to guide collaborative work with key stakeholders, including SOLAS, the 16 Education and Training Boards (ETBs), Higher Education Institutes, and industry partners. This will help to inform future programme development and ensure that we have the necessary national infrastructure in place so we can deliver on our targets.

It is clear that the future of our planet depends on our ability to adapt, innovate and change. The green transition is vital from an environmental perspective, but it also should be recognised as an important social and economic opportunity. Becoming climate neutral by 2050, with a reduction of 51% greenhouses gases by 2030, requires a radical rethink in how we equip learners, and indeed our workforce, to thrive in the face of unprecedented challenges.

SOLAS is committed to ensuring that industries have the right skills supply necessary to thrive in this changing economy and that learners have the chance to develop sustainable, meaningful careers. In collaboration with our delivery partners, we know it is not enough to merely react to the changes that the Green Transition brings; we must anticipate them and prepare the existing and future workforce with the knowledge, skills and competencies required.

Green Skills 2030 is a blueprint for sustainable industry/FET partnership. It is designed to bridge the gap between the skills needs of industries like construction, engineering, and hospitality and the ability of our FET system to deliver on those needs. Through both strategic and sector-specific priorities *Green Skills 2030* can empower individuals by using targeted training programmes, upskilling opportunities, and industry and tertiary partnerships to support and accelerate the Green Transition, providing a pathway for workers and ensuring no one is left behind as industries evolve.

By investing in our FET system, and by investing in our people, we are investing in the planet. *Green Skills 2030* represents our commitment to sustainability, economic resilience, and a future for our learners. In partnership, we can build a workforce prepared for the challenges ahead, capable of leading us to a greener, more sustainable world, with the goal of 51% greenhouse gas reduction by 2030 a more tangible reality.

Andrew Brownlee, CEO, SOLAS

Executive Summary

Green Skills 2030 – The First National Further Education & Training (FET) Strategy for the Green Transition sets out the Irish FET sector's response to emerging green skills needs. As Ireland is committed to reduce its greenhouse gas emissions by 51% by 2030, all economic sectors will need to undergo significant change. The shift to more sustainable ways of living and working brings with it new and changing skills requirements. The green transition will not only create new jobs but will also alter the knowledge and skills needed in existing jobs. This Strategy outlines how FET can support this shift to a greener economy and society.

Green Skills 2030 assesses national and international policies related to the green transition and outlines key areas of green skills demand. In Ireland, green skills are needed in all economic sectors, while transversal skills are vital to allow workers to move from one job to another. By identifying green and transversal skills needed for existing and new occupations in the Irish economy based on stakeholder consultation, the Strategy puts forward recommendations for programme and specialist skills centre development that reflect both policy and industry needs. In addition, the Strategy suggests possible tertiary pathways for learners between FET and higher education and identifies areas for FET and higher education to jointly foster green skills development.

Supporting the green transition is a cross-government endeavour incorporating extensive, multi-layered tasks which effect every economic sector. Through this and other initiatives, the FET sector can and will lead on the development of new courses, the updating of curricula, and the coordination and expansion of clear FET pathways.

Outside of its primary remit, the FET sector will also support other actors in implementing actions to support the green transition. To advance this skills strategy, further collaboration between the FET sector, the HE sector, and industry stakeholders will be crucial to identifying emerging green skills requirements. The delivery of FET programmes will rely on sustained engagement with these stakeholders to identify the green skills requirements for specific sectors and occupations, as has been achieved in this report.

Consultation Findings

Recognising the wide-ranging impacts of the green transition, Green Skills 2030 has been developed through close consultation with key stakeholders. Representatives of various sectors of the Irish economy, government departments, state agencies, Local Authorities, Regional Skills Fora, and Education and Training Boards (ETBs) have informed the Strategy's recommendations.

Consultation with these groups was conducted via surveys and workshops. Four online surveys, that consisted primarily of open-ended questions, targeted professional representative bodies, government bodies, ETBs, Local Authorities, and Regional Skills Fora. Subsequently, seven workshops were organised with representatives of professional bodies, government departments, and ETBs. For ETBs, a dedicated workshop was held to review and respond to the preliminary results of the survey. A summary of discussions was provided to participants at the conclusion of each workshop in order to validate submissions and to enhance key contributions. A list of organisations, agencies and individuals who provided feedback via surveys and workshops can be found in Appendix B.5.

The seven economic sectors considered by Green Skills 2030 are:

1. Construction and Built Environment (including Water and Waste Management)
2. Engineering, Energy, and Manufacturing
3. Transport and Logistics
4. Agriculture, Forestry, and Marine (including Bioeconomy)
5. Biodiversity and Environment
6. Tourism and Hospitality
7. Accounting and Business

Input from all stakeholders has been instrumental in developing specific and relevant recommendations in order to build upon the work already underway by the FET sector to provide green skills training in Ireland. The main consultation findings that have informed the Strategy are summarised in the table below.

Summary of Consultation Findings		
Sector	**Skills Gaps**	**Upskilling Actions**
Construction & Built Environment (including Water and Waste Management)	• Modern methods of construction, building information modelling, nearly zero energy building, retrofitting, and traditional construction • Sustainable design and regulatory and environmental awareness • Supply chain management • Nature-based solutions, biodiversity, and bioeconomy skills	• Develop sustainable construction, design, and management training • Implement short, flexible, and subsidised tailored modules • Promote career and training opportunities in the sector • Work with stakeholders
Engineering, Energy, and Manufacturing	• Electrical and thermal engineering • Data analysis, monitoring expertise, and statistical measurement • Knowledge of new energy systems • Maritime skills for offshore wind • Waste management	• Short, flexible, and tailored training • High degree of engagement • Promotion of existing training • Greater awareness of career opportunities in schools • Centralised information point for FET
Transport & Logistics	• Supply chain management • ECO-driving and digital skills • Offshore wind and electrification of infrastructure • Electric vehicles, batteries, and alternative fuels	• Electric vehicle training to manufacturer standards • Skills to Advance initiatives • Awareness of career opportunities
Agriculture, Forestry, and Marine (including Bioeconomy)	• Sustainable agriculture • Land management, nature restoration, and ecosystem services • Monitoring and implementation • Bioeconomy, forestry, and ecology • Digital and technological skills	• Increase the number of courses • Promote career pathways and benefits at secondary school level • Practical skills in training delivery • Support knowledge sharing • Develop flexible and simple learnings

Summary of Consultation Findings		
Biodiversity & Environment	• Ecology, and environmental science • Traditional craft skills • Practical skills • Knowledge of sustainability	• Raise awareness of career opportunities in secondary schools • Develop programmes on land management, biodiversity, sustainability, and traditional construction
Tourism & Hospitality	• Understanding of green skills, biodiversity, and sustainability • Implementation of sustainability • Traditional craft skills • Knowledge of retrofitting	• Integrate sustainability into programmes • Raise awareness of training offerings • Incorporate sustainable craft skills into mainstream construction trainings
Accounting & Business	• Understanding of sustainability • IT skills • Awareness of legislation, regulation, and climate-related economic issues	• Increase the number of trainings • Awareness raising

The Recommendations in Context

Green Skills 2030 includes two categories of recommendations to foster green skills development in Ireland. The Strategic Recommendations target the development of FET green skills provisions at general and cross-sectoral level, while the Sectoral Recommendations put forward green skills development actions for each of the seven economic sectors covered by the Strategy. Both strategic and sectoral recommendations are based on engagement with stakeholders and analysis of occupational skills needs.

Consultation with industry and government stakeholders

The views expressed by industry representatives, government departments, state agencies, regional bodies, local authorities, and ETBs have fully informed the development of recommendations. The recommendations reflect the stakeholders' own assessment of skills and upskilling needed in their sector, as industry consultees were asked to describe new and emerging skills gaps for specific occupations. The occupation-specific analysis of skills needs and upskilling actions is further supported by stakeholder reflections on the

current and changing context of various occupations. This granular assessment of skills needs should assist those interested in tracking skills needs in the economy and provide a basis for actions around programme design and delivery. Additionally, the strategic and sectoral recommendations point towards other organisations with whom stakeholders can collaborate and coordinate with to design green skills responses in the FET sector.

Consultation with ETBs

Engagement with ETBs authenticated the information provided by industry and government stakeholders by further identifying and clarifying potential FET responses. To inform their inputs on skills needs, ETBs were provided with a summary of the views expressed by stakeholders in each economic sector through both sectoral surveys and workshops. This enabled ETB representatives to prepare responses on how the FET sector could respond to industry skills needs. In conjunction with other stakeholder views, ETBs' perspectives informed the identification of programme development to foster green skills, opportunities for specialist green skills provision, and pathways between FET and HEI.

Policy Alignment

Apart from stakeholder engagement, the recommendations are aligned with existing national and European policy. An assessment of legislation and policy was conducted to provide an understanding of the sources of green skills demand in Ireland. The definitions of green skills and transversal skills align with those used at national and European levels. The list of occupations provided to industry stakeholders to report skills needs was also based on the standard occupational classification used by the CSO. Furthermore, the recommendations align with EU efforts to integrate GreenComp, the European sustainability competence framework, in FET, or VET (Vocational Education and Training as our European counterparts refer to it), programme delivery. From a national perspective, the recommendations have been refined based on input from other government departments outside of Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) given the cross-sectoral and all-encompassing nature of the green transition.

Strategic Recommendations

Green Skills 2030 sets out Strategic Recommendations for an overarching and coordinated FET response to green skills development. This is a set of cross-sectoral actions that originate from stakeholder themes that occurred throughout the consultation process across economic sectors. The Strategic Recommendations are split across five strategic priorities (SP) that outline the overall response of the FET sector to green skills needs as follows:

The strategic priorities constitute cross-sectoral actions to promote and develop green skills.

Strategic Priority 1:

Increasing awareness of FET programmes and green skills provision. Includes actions to create a centralised FET information point, to raise employer knowledge of the green transition, and to work with partners to monitor emerging skills needs.

Strategic Priority 2:

Promoting career opportunities arising from the green transition. Focuses on promoting green transition careers opportunities to students across education and fostering green skills for early school leavers.

Strategic Priority 3:

Integrating green skills and transversal competences content into all FET programmes. Actions emphasise integrating the European GreenComp framework into FET, providing continuous professional development for FET instructors / tutors / curricula developers, and incorporating green skills modules across a wide range of disciplines.

Strategic Priority 4:

Developing cross-sectoral green compliance, disclosure, and reporting skills. Actions focus on developing compliance, reporting, analytical skills related to ESG reporting frameworks, carbon accounting, and other relevant practices.

Strategic Priority 5:

Supporting FET green skills programmes design and delivery. Split across three areas which focus on green skills programme design and delivery, collaboration with key stakeholders, and enhanced resources for ETBs and FET Centres.

As Green Skills 2030 sits within a wider ecosystem of strategies and policies that promote green skills development, the Strategic Recommendations support and reiterate the objectives of a wider strategic approach. Further details on how the strategic priorities are aligned with both national policy and the identified green skills needs are provided below.

SP1: Increasing awareness of FET programmes and green skills provision

Actions under Strategic Priority 1 aim to raise awareness of FET programmes and green skills provision amongst employers and are closely aligned to existing policy. The national FET strategy, Future FET: Transforming Learning recognises that 'FET also lacks a good centralised single go to IT portal which can offer more accessible information and advice' and that 'FET must support the development of such a resource' (SOLAS, 2020a, p. 54).

SP2: Promoting career opportunities arising from the green transition

Actions within Strategic Priority 2 relate to promoting career opportunities arising from the green transition in education are also reflected within Future FET: Transforming Learning. The strategy emphasises the need to raise awareness of FET and vocational options from an early stage, as well as equipping school guidance services with the knowledge and tools to promote FET (SOLAS, 2020a). As the strategy states 'it is important that FET is promoted as a valid and smart destination from the earliest stage in schools' (SOLAS, 2020a, p.51). Strategic Priority 2 actions to promote FET options for school students are also echoed in Skills for Zero Carbon 2021, which recommends the promotion of education and training pathways related to the green transition to school students, career guidance professionals, and parents (EGFSN, 2021). Strategic Priority 2 also seeks to promote the

career opportunities of workers in existing sectors of the economy by ensuring they have access to bespoke, lifelong learning programmes to keep pace with the green transition. Defining distinctive tertiary pathways for the green transition is also crucial to ensuring learners have access to multiple routes into green professions which keep pace with industry advancements.

SP3: Integrating of green skills and transversal competences content into all FET programmes

The integration of green skills and transversal competences into all FET programmes is a core goal advanced by Future FET: Transforming Learning. The strategy states that 'curricula across all relevant apprenticeships and other FET programmes should be updated to embed a sustainable development focus' (SOLAS, 2020a, p. 43). Furthermore, the national FET strategy highlights the need to ensure 'that all FET provision is used to develop critical climate change and environmental knowledge' (SOLAS, 2020a, p.43). In addition, ESD to 2030: Second National Strategy on Education for Sustainable Development echoes Strategic Priority 3 actions in continuing to support the development of transversal skills and competences. These actions are also closely aligned with the GreenComp framework, which aims to embed green skills provision in FET programme development.

SP4: Developing cross-sectoral green compliance, disclosure, and reporting skills

Recognised by Strategic Priority 4, the development of compliance, disclosure, and reporting skills is critical for enabling people and organisations to adapt to the green transition. Actions to develop these skills are also recognised as a broader strategic objective in the Climate Action Plan 2024. Specific to the financial sector, the Climate Action Plan recognises that, given an increasing regulatory focus, 'it is crucial to develop the necessary skills and leadership capacity, and to advance environment, social, and governance best practices' (The Climate Action Plan, 2024, p. 150). The need to support companies with reporting requirements under the Corporate Sustainability Reporting Directive is also emphasised.

SP5: Supporting FET green skills programmes design and delivery

Through Strategic Priority 5, the need to ensure sufficient supports for green skill programme design and delivery is also reflected in the overall strategic approach to green skills provision. Future FET: Transforming Learning notes that 'programme development across all green skills areas should be ramped up' (SOLAS, 2020a, p.43). Green Skills 2030 reinforces previous recommendations for the continuous professional development of ETB instructors, trainers, and curricula developers, as suggested in Green Skills for FET 2020-2030 Roadmap and in the FET Professional Learning & Development: Statement of Strategy 2020-2024.

Sector-Specific Recommendations

Green Skills 2030 also includes Sectoral Recommendations for each economic sector considered, which are informed by the feedback provided by sectoral stakeholders. Furthermore, Sectoral Recommendations are in many cases tailored to specific occupational skills needs that have been identified as part of the research.

The recommendations for these sectors include suggestions for FET green skills programme development, such as specific upskilling opportunities and partnerships to meet skills needs. The recommendations also address potential specialist centres for green skills provision in areas such as renewable energy, electric vehicles, and sustainable agriculture. Finally, sector-specific recommendations also include tertiary responses to green skills needs, with suggested pathways and collaboration between FET and Higher Education Institutes (HEIs). These recommendations are grounded in the work already underway by the FET sector and other partners to advance green skills in Ireland through programme development, specialist provision, and tertiary pathways.

In summary, Sectoral Recommendations are split across three themes:

- FET Programmes Development
- Opportunities for Specialist Skills Centres
- Pathways between Further and Higher Education.

Sectoral Recommendations have been summarised in this executive summary to present the key takeaways for each economic sector within each theme. A full list of sectoral recommendations is provided in Chapter 6 of the Strategy.

Summary of 17 Construction & Built Environment Recommendations	
Theme	**Actions**
FET Programmes Development	Continue to support the upskilling of workers across occupations in modern methods of construction as well as traditional building skills. Incorporate sustainability studies and environmental management, as well as content on transversal skills and Education for Sustainable Development competencies, into professional training programmes across construction and built environment areas.
Opportunities for FET Specialist Skills Centres	Continue to promote and expand the Mount Lucas National Construction Campus and the offerings of the six existing Centres of Excellence to ensure futureproof green construction skills, including digital and green technologies.
Pathways between Further and Higher Education	Work with HEIs to review NFQ pathways for craft trades and align more closely pathways from FET to Higher Education programmes in sustainable construction, planning, and environmental management.

Summary of 17 Engineering, Energy, and Manufacturing Recommendations	
Theme	**Actions**
FET Programmes Development	Collaborate with relevant stakeholders to enhance, and develop training in the installation, maintenance, and repair of renewable energy systems.
Opportunities for FET Specialist Skills Centres	Work to maximise geographic advantages which support offshore wind energy with local agencies, HEIs, and other relevant groups to develop a tertiary framework of qualifications in offshore renewable energy (ORE) and establish a specialist FET green skills centre to serve this area.
Pathways between Further and Higher Education	Collaborate with HEIs to develop progression pathways from Level 5 / 6 in renewable energy, green engineering, and sustainable textile manufacturing.

Summary of 10 Transport & Logistics Recommendations	
Theme	**Actions**
FET Programmes Development	Address skills gaps in electric vehicles, supply chain and logistics management, and eco-driving through upskilling opportunities and the expansion and updating of existing training.
Opportunities for FET Specialist Skills Centres	Develop a National eMobility Capability Centre to coordinate training and upskilling courses across multiple areas of the eMobility Sector.
Pathways between Further and Higher Education	Explore progression pathways to the Logistics Associate Apprenticeship, which would provide the required green skills training for the freight, logistics, shipping, and distribution industries.

Summary of 14 Agriculture, Forestry & Marine Recommendations	
Theme	**Actions**
FET Programmes Development	Promote and enhance training and upskilling opportunities in sustainable agriculture, land management, nature-based solutions, circular economy, and the bioeconomy. Expand the delivery of horticulture courses in conjunction with Teagasc.
Opportunities for FET Specialist Skills Centres	Work with Teagasc, Coillte and ETBs to provide spaces for the showcasing of sustainability best practices in the sector (e.g., demonstration farms or demonstration forests). Assess the need and feasibility of a sustainable agriculture specialist skills centre.
Pathways between Further and Higher Education	Work with HEIs to develop stackable micro-credentials for agriculture, forestry, and marine roles to promote multi-disciplinary farming, forestry, fisheries, and aquaculture practitioners. Collaborate with HEIs to develop progression pathways from NFQ Levels 5 / 6 to NFQ Levels 7 / 8, and to review gaps in bioeconomy-related training provision.

Summary of 17 Biodiversity & Environment Recommendations	
Theme	**Actions**
FET Programmes Development	Promote and develop courses, including standalone awards and content to be integrated in other courses, focused on biodiversity, nature, and practical ecology skills.
Opportunities for FET Specialist Skills Centres	Use existing infrastructure to develop a FET learning centre for climate and biodiversity that would provide bespoke programmes in these areas for FET learners across sectors. Co-operation with the All-Island Climate and Biodiversity Research Network and other stakeholders could inform the programme offerings for this centre.
Pathways between Further and Higher Education	Collaborate with HEIs and other relevant stakeholders to support FET programme development on climate, biodiversity, water, and ecology. Work to assess the potential for developing more awards across Levels 4-6 in climate and biodiversity.

Summary of 7 Tourism & Hospitality Recommendations	
Theme	**Actions**
FET Programmes Development	Continue to promote and provide green skills and sustainability training for tourism and hospitality professionals through tailored programme content, the 50 Shades Greener programme, and by working with the ETB Outdoor and Education Training Centres.
Opportunities for FET Specialist Skills Centres	Work with Bord Bia and Skillnet Ireland to assess the feasibility for establishing a specialist centre that would focus on developing sustainability training for culinary and hospitality/restaurant skills.
Pathways between Further and Higher Education	Explore collaborations with HEIs, Fáilte Ireland and flagship tourism and recreation destination providers – such as Coillte – to develop tertiary degrees or micro-credentials in sustainable destination management, outdoor recreation management and commercial management of recreation

Summary of 4 Accounting & Business Recommendations	
Theme	**Actions**
FET Programmes Development	Educate employers about their responsibilities in relation to green reporting skills and promote appropriate training offerings with representative bodies.
Opportunities for FET Specialist Skills Centres	Using existing resources, develop a specialist skills centre with a focus on sustainability, ESG, and Lean Management for businesses and small and medium-sized enterprises (SMEs).

1.

Introduction

1. Introduction

Over the last three decades, the deteriorating state of the world's climate has motivated efforts for international climate action. 2015 stands out as a landmark year when two critical global developments occurred in response to the planet's changing climate – the adoption of the 17 UN Sustainable Development Goals, and the Paris Agreement 2015, which saw 196 parties agree to limit temperature increase to 1.5 degrees Celsius above pre-industrial levels. Since 2015, these milestones in international efforts to mitigate climate change have underlain national strategies and policies to make societies and economies less polluting, less reliant on carbon, and, ultimately, greener.

The proliferation of international agreements to take the pressure off the world's climate has encouraged regional and national actors to push forward ambitious environmental policies to reduce emissions and restore nature (Cedefop, 2018). This is exemplified by the European Green Deal 2019, which sets out the vision to make Europe climate-neutral by 2050, and by Ireland's series of Climate Action Plans and is underpinned by the Climate Action and Low Carbon Development Act 2015. In conjunction with the EU Green Industrial Plan 2023, the revised Energy Performance of Buildings Directive 2024, and the EU Bioeconomy Strategy 2018, these policies single out the need to accelerate the reform of economies and societies to be based around greener activities that are sustainable, resource efficient, and less harmful to the environment.

Shifting to greener activities to combat climate change brings about immediate consequences. Under the European Industrial Strategy, the green transition will create one million jobs, but will also require the upskilling and reskilling of 120 million people. To create a greener economy, some jobs will change to be less polluting, while new jobs will emerge that are required for specific activities, enabling an economy which benefits the environment. To create a greener society, individuals will need to develop a deep environmental awareness and an understanding of sustainability.

The requirement to provide workforces with green skills is recognised in Ireland by a wide range of policies and reports. The need for green skills is emphasised in skills reports such as in the National Skills Strategy 2025, Skills for Zero Carbon, Building Future Skills 2020, and Future Jobs Ireland 2019. National policy and strategies recognise and respond to green skills demand, as shown by the Climate Action Plan 2024, the Action Plan for Apprenticeship 2021-2025, and the National Further Education and Training Strategy 2020 – 2024. Green skills have also been considered at a sectoral level in Housing for All 2021, Powering Prosperity: Ireland's Offshore Wind Industrial Strategy 2024, the National Retrofit Plan 2021, and the Report on the Analysis of Skills for Residential Construction and Retrofitting 2023-2030, amongst others.

Through various programmes, trainings, and other development offerings, the Irish FET sector has been working to meet the demands of the green transition through skills development. Given the extent of the demands posed by the transition to the green economy, new skills are required across all sectors of the economy. The need to create a more sustainable economy means that the demand for green skills will continue to grow.

1.1 Strategy Objectives

SOLAS, the Further Education and Training (FET) authority in Ireland, has a clear role in responding to the green skills demand. Given the emphasis in policy on developing the skills of workforces, the FET sector in Ireland has a significant opportunity to address the demands of the green transition through the provision of skills-based education and training. To date, SOLAS has been a leader in anticipating the changes brought by the green transition. This Strategy, and the work to develop it, stand to exemplify SOLAS's continued leadership on climate action, and SOLAS's ongoing commitment to supporting Ireland's climate action objectives.

Indeed, the national strategy for the FET sector, Future FET: Transforming Learning, states that 'climate change and sustainable development must also be a critical focus for FET' and that curricula across all relevant apprenticeships and other FET programmes should be updated to embed a sustainable development focus. 'Perhaps most critically, there should be emphasis on ensuring that all FET provision is used to develop critical climate change and environmental knowledge, and that FET campuses are based on a strong sustainability ethos' (SOLAS, 2020, p.43). The forthcoming FET strategy will strengthen this intent so that climate change and sustainable development is, and will continue to be, a critical focus and fundamental underpinning of FET. In this regard, this Strategy is an indication of the commitment of the FET sector to Ireland's Second National Strategy on Education for Sustainable Development: ESD to 2030.

Furthermore, the FET sector plays a key role in creating a greener society by equipping learners with environmental awareness to drive change (SOLAS, 2020). While the current strategy focuses on green skills delivery at the vocational level, the skills requirements emerging from the green transition extend beyond the FET sector. Given the cross-sectoral and cross-governmental nature of this challenge, the FET sector is willing and preparing to lead through further education provision and learner supports, while also contributing to other areas outside its direct jurisdiction. For example, further education can play a key role in supporting migration policy, which is a key tool in addressing the green skills shortage, by providing broader education and language training supports to non-Irish nationals. Moreover, the FET sector can also play a key role in supporting and engaging with industry partners to monitor emerging skills requirements in the green economy for specific sectors and job roles – as indeed the research underpinning the development of the current strategy has sought to achieve.

FET already plays a pivotal role in ensuring that Ireland has the sufficient skills supply to support the green transition. It is anticipated that this role will increase exponentially as we get closer to the target to reduce greenhouse gas (GHG) emissions by 51% by 2030, and to achieve a 50% improvement in energy efficiency by 2030. From renewable energy and sustainable agriculture to zero-energy construction and eco-tourism, the FET sector is already contributing; however, there is still much to do. For the first time, this Strategy identifies how FET can directly meet the skills needs of emerging green occupations, ensure existing occupations are sustainable and supply the transversal skills learners require to succeed in the green economy.

Building on progress to date, which includes SOLAS's own Green Skills for FET 2021-2030 Roadmap, SOLAS has commissioned KPMG Future Analytics to produce a body of research to aid in the development of Green Skills 2030 – The 1st National Further Education & Training (FET) Strategy for the Green Transition. The aim of the Strategy is to provide a clear, comprehensive, and actionable set of recommendations which highlight the opportunities for FET to make a significant contribution towards meeting Ireland's climate action commitments.

Overall, this study:

- Synthesises existing and upcoming international and national policies in the space of the green economy and transition as well as key research on green skills needs in Ireland.
- Provides information, based on extensive stakeholder expert input, on the green and transversal skills required for existing, new, and emerging occupations across several economic sectors, which were collated through an extensive process of consultation.
- Illustrates possible tertiary pathways between further and higher education, as well as specialist FET skills centres and indicative programmes that could be developed by the FET network to meet the identified green skills needs, on the basis of stakeholder views put forward by representative professional bodies, government departments, Education and Training Boards (ETBs), and other relevant regional and local organisations.
- Puts forward a suite of recommendations that can be drawn upon to ensure that the green skills needed for existing and emerging occupations across key economic sectors in Ireland are addressed by stakeholders through the FET system where applicable.

1.2 Stakeholder Engagement

The development of this Strategy was underpinned by a process of industry and key stakeholder engagement, undertaken between April and June 2024. The consultation process gave stakeholders opportunities to provide expert knowledge on the green and transversal skills required for existing, new, and emerging occupations across various economic sectors. Stakeholders, which included professional representative bodies, government departments, ETBs, and other relevant bodies, were also invited to explore tertiary pathways, indicative programmes, and specialist FET skills centres to meet the identified green skills needs. Submissions were invited via the following channels:

- Four online surveys hosted on the SurveyMonkey platform. The surveys comprised of predominantly open questions and targeted 1) professional representative bodies; 2) government departments; 3) ETBs; 4) Local Authorities and Regional Skills Fora. The lists of questions included in each survey are provided in Appendix B.1-B.4.
- Seven expert workshops were organised with representatives of professional bodies, government departments and ETBs where the preliminary surveys results were presented and discussed by participants. A list of organisations, agencies and individuals who provided feedback via surveys and workshops can be found in Appendix B.5.

An overarching coding framework was developed to analyse survey responses and to provide a structured, thematic analysis of the views expressed via this channel. This material was combined with the feedback expressed through expert workshops. Together this provided a clear picture of the breadth of views expressed by respondents. The consultation process undertaken for the development of the FET Strategy is summarised in Figure 0.1.

1.3 Scope of Evaluation

This report delivers a set of recommendations to anticipate the need for green skills provision across a number of key economic sectors and meta-sectors such as the bioeconomy (namely construction and built environment; engineering, energy and manufacturing; transport and logistics; agriculture, forestry and marine industries; biodiversity and environment; tourism and hospitality and accounting and business) for the period 2024-2030. The recommendations are aimed at the policy remit of further education and training providers and actors including, but not limited to, SOLAS, ETBs, the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS), and other relevant education providers.

1.4 Document Structure

The remainder of this document is structured as follows:

Chapter 2 – Green Skills Development Context explores **international and national green terms understandings and definitions** (Sections 2.1-2.2) and the existing institutional setups for the provision of green skills through FET in Ireland (Section 2.3). Section 2.4 includes an overview of international best practice in addressing demand and supply of green skills. This analysis highlights models for skills provision by focusing on the different levels of involvement of the private sector and higher education in FET. The chapter concludes with an overview of the demand for and supply of green skills provision across the key economic sectors that make up the main focus of this Strategy (Section 2.5).

Chapter 3 – Industry Perspectives on Green Skills Needs provides a summary of the context and changing nature of occupations across economic sectors, as well as the skills gaps singled out by stakeholders and the upskilling actions and new occupations that respondents put forward as ways of meeting the green skills gaps identified. This chapter also outlines the transversal skills that were considered relevant in the context of the green transition and presents their ranking by stakeholder groups as well as the additional transversal skills that stakeholders added to the initial list.

Chapter 4 – ETBs Perspectives on Green Skills Training Development summarises the views expressed by ETB representatives on emerging green skills shortages as well as their reflections on the extent to which new FET programmes, specialist skills centres, and collaboration between further and higher education could help meet these gaps.

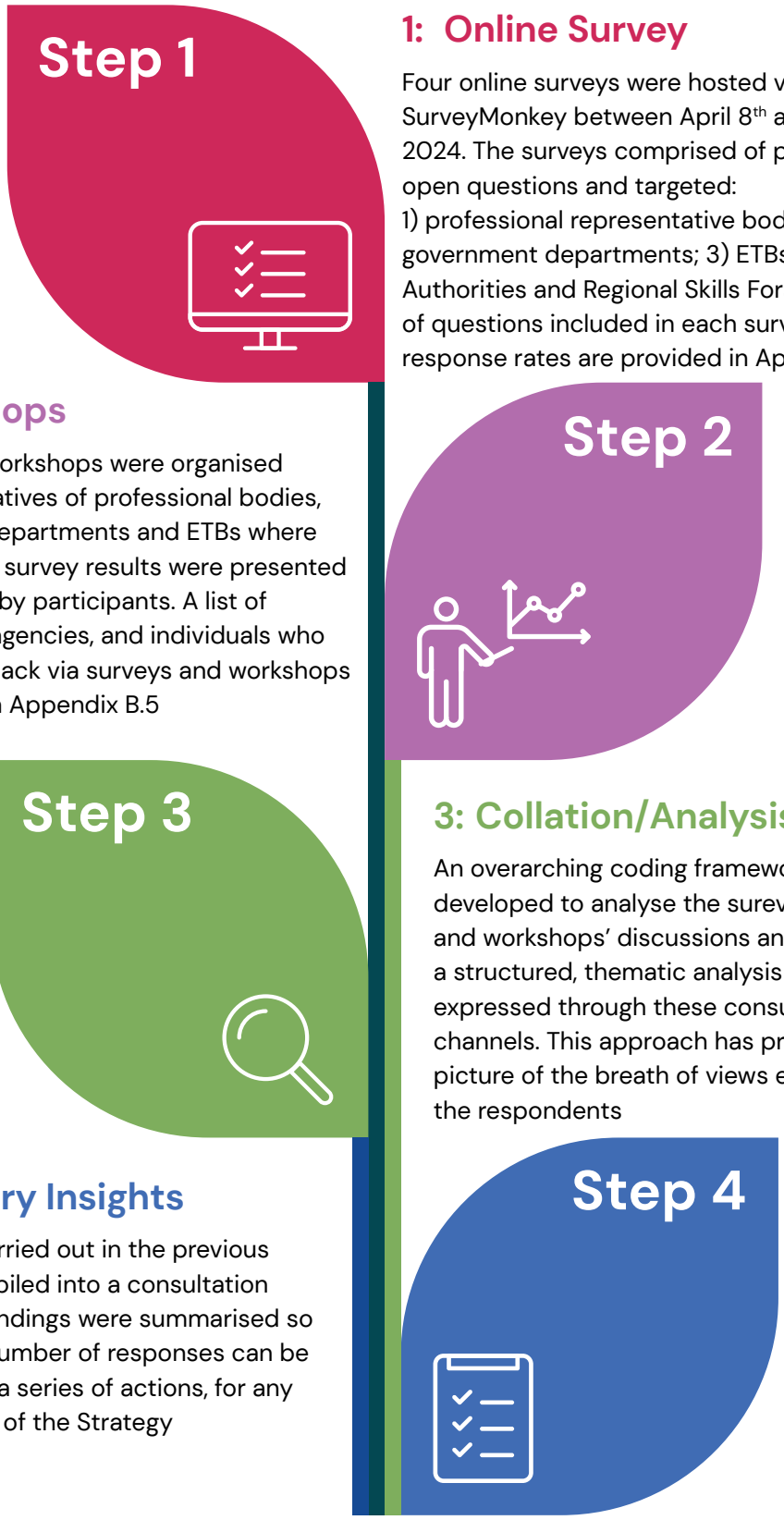
Chapter 5 – Strategic Recommendations sets out general and cross-sectoral recommendations for an overarching FET response to green skills development. The Strategic Recommendations are split across five strategic priorities which outline the overall response of the FET sector to green skills needs. These Strategic Recommendations are based on commonly occurring suggestions raised by stakeholders during the consultation. They are also aligned with national and European responses to green skills needs, sitting within a wider strategic approach to green skills development.

Chapter 6 – Sectoral Recommendations identifies opportunities to enhance the provision of green skills programmes for all FET learners as well as within the seven economic sectors on which the Strategy focuses. In developing the recommendations and associated actions, the findings of the literature review and policy analysis of national and international skills strategies have been carefully considered. This review includes documents such as the Climate Action Plan 2024, the Green Skills for FET 2021-2030 Roadmap (SOLAS, 2022), and the GreenComp European Sustainability Competence Framework (European Commission, 2022) – as well as national and international good practice in skills development.

Chapter 7 – Implementing Green Skills 2030 outlines the next steps for the implementation of the Strategy.

The Appendices provide additional details in support of each chapter of the Strategy. Appendix A contains further information on the context for green skills development, including definitions of green terms, national and international approaches to green skills, and the overarching policy context. Appendix B details the consultation process which has informed this Strategy, giving an overview of stakeholder engagement. Stakeholder perspectives on the context, changing nature of industry sectors, and new emerging occupations for each sector are included in Appendix C. An overview of stakeholder rankings of transversal skills for each sector considered is provided in Appendix D, while feedback on regional skills needs given by ETBs and the Regional Skills Fora is included in Appendix E.

Figure 0.1: Consultation Process



2.

Green Skills Development Context

2. Green Skills Development Context

To perform greener activities, people will have to learn new ways of working and living. Workforces will need to be equipped with appropriate knowledge and skills to carry out the new and changing jobs of greener economies. Therefore, skills provision is of vital importance to successfully achieving internationally agreed objectives to reduce the pace of climate change and is explicitly set out within the European Green Deal 2019.

Despite the rising prominence of skills to support greener economies and the abundance of national environmental policies, skills development is not usually addressed in a systematic way. Only 40% of countries contributing to the Paris Agreement have plans for skills training that would support the implementation of their low carbon ambitions (Cedefop 2018). Often, environmental strategies to achieve the green transition are not linked to skills strategies to meet the needs of those economies. At an EU level, it is recognised that Member States rarely have an explicit focus on green skills. References to green skills are frequently made in national strategies, while the actual skills plans are left for development on an ad-hoc basis by organisations in affected sectors (International Labour Organization, 2019).

An additional challenge is brought by the clear gender imbalance of existing green jobs. Across OECD regions some 72% of green jobs are currently held by men, with the imbalance accentuated in some sectors (OECD, 2023). Training and education programmes will need to find ways to increase the number of women entering these occupations, particularly in STEM subjects (European Commission, 2023). The green transition needs to be fair and inclusive by ensuring that people with disabilities, the elderly, young people, and other underrepresented groups can participate in high quality and lifelong education and training opportunities (European Commission, 2023).

The relatively weak connection between organisations in environmental policymaking and organisations involved in skills development has led to European Commission calls for a robust vocational or further education and training framework at national and bloc levels (European Commission, 2023). Such a framework is needed to address the immediate skills needs demanded by responses to climate change. Furthermore, the emphasis for skills development is largely placed on training and education outside of, and in addition to, formal qualifications (European Council, 2023).

For an in depth understanding of the green skills development context, Appendix A.3 provides an overview of national and European policies that encourage skills development as part of the green transition.

2.1 Green Terms and Definitions

There are several key terms used throughout this report to describe the type of society envisaged by international and national strategic policies to reduce the impacts of climate change.

Green transition: The European Training Foundation defines the green transition as 'a process towards a new development model that ensures environmentally sustainable and fairer societies' (European Training Foundation, 2023, p.2).

Green economy: The United Nations Environment Programme defines the green economy as 'one that results in improved well-being and social equity, while significantly reducing environmental risks and ecological scarcities' (United Nations Environment Programme).

Green jobs: The International Labour Organization (ILO) regards green jobs as 'decent jobs that contribute to, preserve, or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging sectors such as renewable energy and energy efficiency' (ILO, 2016, p.19).

Green skills: SOLAS uses the definition of green skills put forward by CEDEFOP as 'the abilities, needed to live in, develop and support a society which aims to reduce the impact of human activity on the environment' (Cedefop, 2014 in SOLAS, 2022, p.4).

Transversal skills: Cedefop defines transversal skills as 'learned and proven abilities that are commonly seen as necessary or valuable for effective action in virtually any kind of work, learning or life activity and are not exclusively related to any particular context (job, occupation, or academic discipline)' (European Commission & Cedefop, 2021, p.4).

Education for Sustainable Development: UNESCO defines education for development (ESD) as giving learners of all ages the knowledge, skills, values, and agency to address interconnected global challenges including climate change, loss of biodiversity, unsustainable use of resources, and inequality (UNESCO, 2024).

Further background information on these terms can be found in Appendix A.1.

2.2 Green Terms and Definitions Used in Ireland

In Ireland, the importance of the green transition is highlighted across several government strategies. However, there is no consistent definition of the green economy, green jobs, or green skills. The Expert Group on Future Skills Needs (EGFSN) offers three definitions of the type of economy resulting from attempts to achieve climate targets. The first definition offered is the zero carbon economy which is described as 'a loose collection of economic activities that are aimed at protecting and alleviating negative pressures on the environment' (EGFSN, 2021).

The second definition of a low carbon, low fossil fuel, or decarbonised economy originates with the EPA, and refers to 'an economy based on low carbon power sources that therefore has a minimal output of greenhouse gas emissions into the atmosphere, specifically carbon dioxide' (EGFSN, 2021).

Thirdly, EGFSN put forward Eurostat's definition of environmental goods and services as being the statistical basis for green skills analysis. This definition includes any activities to measure, prevent, limit, minimise or correct environmental damage to water, air, soil, as well as problems related to waste, noise, and eco-system (Eurostat, 2020).

The National Skills Council oversees and approves the reporting of EGFSN. In Building Future Skills 2020, the National Skills Council does not call out green skills specifically, but points to several areas within the built environment sector where upskilling and retraining would be required. These new and emerging occupations include nearly zero energy building (NZEB) skills and were clearly related to the requirements of Irish environmental polices (National Skills Council and EGFSN, 2020). The National Skills Council also notes that there are emerging skills within construction occupations, particularly amongst craft trades, as the sector moves away from traditional construction techniques.

As previously mentioned, SOLAS have adopted Cedefop's definition of green skills as 'abilities needed to live in, develop, and support a society which aims to reduce the negative impact of human activity on the environment' (Cedefop, 2014, in SOLAS, 2022, p.4). Further distinctions are made between different types of green skills, which can be generic (those that help develop awareness raising or implementation of resource-efficient activities, eco-citizenship, etc.), specific (those that are required to implement standards and processes to protect ecosystems and biodiversity, and to reduce energy, materials, and water consumption), or highly specialised (those that are required to develop and implement green technologies such as renewable energies, sewage treatment, or recycling) (SOLAS, 2022, p.4). SOLAS's decision to use the Cedefop definition was carefully considered after exploring multiple options.

2.3 Green Skills Demand in Ireland

Given the extensive targets identified by European and national policies, a robust FET sector must be equipped to deliver the supply of skills in the future (in addition to industry and HE). In Ireland, there are several economic sectors where demand for green skills is readily identifiable based on national policy, which include construction and the built environment, engineering, renewable energy, manufacturing, transport and logistics, agriculture and bioeconomy, biodiversity, tourism and hospitality, as well as accounting and business. In addition, there is growing demand for a selection of core green skills, which employees can retain as they move between jobs. These transferrable skills are essential to instil wider behaviours and practices that support sustainability and environmentally friendly practices. The current FET provision across these areas is outlined in Appendix A.4.

Construction and the Built Environment

The construction and the built environment sector is immediately impacted by the transition to a greener economy. There are two elements to this impact – construction of new and the retrofitting of existing residential and non-residential buildings. The sector is being impacted by a critical need for new housing and rising environmental performance standards through Nearly-Zero Energy Buildings, Zero Emissions Buildings, and the EU Energy Performance of Buildings Directive (MosArt, 2023). To meet Ireland's housebuilding targets, an additional 24,185 skilled workers are required to deliver an annual average of 33,000 residential units per year (DFHERIS, 2022). In addition, non-residential buildings account for a significant portion of emission reduction targets set out under the Sectoral Emissions Ceilings (Department of the Taoiseach, 2022).

Given the Government's aim of retrofitting 500,000 homes to BER B2 or cost-optimal equivalent standard by 2030, SOLAS has conducted extensive research on the green skills demand for construction and retrofitting (DFHERIS, 2022; MosArt, 2023). Specific skills where shortages need to be addressed include BER assessors, ventilation engineers, and heat pump installers, particularly when considering the conservation and restoration of traditional buildings (DHLGH, 2023; EGFSN, 2021). Technological skills are increasingly needed in construction as the sector is digitalised through modern methods of construction techniques and building information modelling (MosArt, 2023). Laois and Offaly ETB's Digital Construction Pathway is an example of an education and training structure which provides a comprehensive pathway, covering Modern Methods of Construction (MMC), sustainable building, retrofitting, and the use of Building Information Modelling (BIM) and various construction design software packages.

Renewable Energy Production

As well as construction, Ireland's climate policies have significant consequences for energy production. The development of renewable energy production is a critical piece in decarbonising Ireland's energy production infrastructure (Climate Action Plan, 2024). Green Tech Skillnet's analysis of the skills requirements for offshore renewable energy (ORE) points to a lack of direct experience for the industry in Ireland (Wind Energy Ireland, 2024). However, the analysis also finds that there are existing skills within the economy that could be adapted to suit the offshore wind industry.

Overall, the scale of offshore wind development implies the emergence of new skills needs demands, with annual job demand of an estimated 5,000 full-time equivalent (FTE) jobs in an average year required to 2040 (Wind Energy Ireland, 2024). For renewable energy in general, there are potential shortages for technicians, both wind and solar (EGFSN, 2021). Entry routes to these roles have been largely unstructured, though an apprenticeship has been developed for wind turbine maintenance technicians by Kerry ETB (EGFSN, 2021; Kerry ETB, 2023).

The availability of suitably qualified and trained staff to work on and deliver major electricity grid infrastructure projects (on land and in the marine environment) will be critical; for the roll-out of the energy infrastructure. This will include electricity generation, storage and transmission and distribution systems. Expertise in ecology, biodiversity and planning will be required to undertake baseline and ongoing ecological, biodiversity and environmental assessments. These will be critically important for the delivery of major infrastructural projects.

In addition to ORE, the Irish government has clearly outlined the role of biomethane as a renewable energy source in decarbonising the economy (DAFM & DECC, 2024). The National Biomethane Strategy outlines an objective to produce 5.7 Terawatt hours (TWh) of indigenous biomethane by 2030 through the sustainable development of Ireland's anaerobic digestion and biomethane industry (DAFM & DECC, 2024). The construction and operation of the biomethane is estimated to be capable of creating 1,800 direct jobs and 4,400 indirect jobs in rural Ireland (DAFM & DECC, 2024). These jobs will need to be supported by skills and training programmes for construction workers, plant operators, and skilled management teams involved in biomethane facility construction and operation. Training will also be needed to support farmers to develop farm-level skills to support the development of biomethane in Ireland (DAFM & DECC, 2024).

Transport

Another area in which significant targets and subsequent public investment has been outlined is electric vehicles (EVs) (EGFSN, 2021). An ambition exists for having 845,000 private and 95,000 commercial EVs on Irish roads by 2030 (Climate Action Plan, 2024). The Zero Emission Vehicles Ireland (ZEVI) implementation plan sets out the State's approach to developing electric vehicle infrastructure, with EGFSN (2021) providing the analysis of skills related to EVs. The main jobs related to EVs are vehicle technicians, mechanics, and electricians, who generally complete a Level 6 Craft Apprenticeship in Motor Mechanics (EGFSN, 2021). The EGFSN note that the current levels of training for EV technicians is sufficient in the short term, and that the addition of electric vehicle training to current Motor Mechanic apprenticeships would likely address the supply of skilled EV workers required to 2030 (EGFSN, 2021). In the short to medium term, a national eMobility Capability Centre will provide for the ongoing upskilling and reskilling needs arising from the shift to electric vehicles.

Agriculture

The national strategy for FET – Future FET: Transforming Learning – describes agriculture as one of the sectors served by FET which has a pivotal role to play in achieving climate change targets (SOLAS, 2020). Given the yearly Climate Action Plans commitment to reducing Ireland's greenhouse gas emissions and the predominance of agriculture as being a source for Irish emissions, there exists a significant pressure for the sector to become more sustainable. As key suppliers of training for agri-food workers, FET providers (including Teagasc) will have to create and adapt offerings of green skills for the agricultural sector (SOLAS, 2020). For example, the Laois and Offaly ETB and Teagasc have partnered to enhance agricultural training programmes to meet the evolving needs of the agricultural sector. This is particularly important as the agri-food sector views the availability of skilled workers as a critical risk to businesses (DAFM, 2021).

Potential skills shortages in the sector cut across occupation types, and include professional, technical, scientific, and operative skills (DAFM, 2021). Critically, there is recognition that education and training in environmental sustainability and diversification will need to be addressed, potentially through work-based learning, covering topics such as sustainable biomass production, social sustainability, nature and bio-based solutions, new technologies, forestry, and carbon farming and organic farming (DAFM, 2021).

Biodiversity

Similarly, national policy has placed a significant emphasis on the protection and restoration of biodiversity, which has clear implications for the development of green skills. Most notably, the EU Nature Restoration Law, which contains the EU Biodiversity Strategy, sets binding targets to restore degraded ecosystems. These measures are intended to address 20% of the EU's land and sea areas by 2030, and all ecosystems in need of

restoration by 2050. This scale of restoration is to be achieved through the National Restoration Plan showing how Member States aim to deliver on their targets. Meeting these targets requires a significant need for biodiversity and environmental skills related to nature restoration and protection.

At a national level the legislative obligation on public sector bodies to pay due regard to the objectives and actions of the 4th National Biodiversity Action Plan (NBAP) creates an immediate demand for public sector staff and their contractors to have a degree of environmental training (Irish Statute Book, 2023). Equally important, the development of the National Biodiversity Officer Programme will mean that each local authority will have a dedicated member of staff for biodiversity (NBAP, 2024). These staff members will need appropriate training in environmental and biodiversity issues. More widely, NBAP points to the increase in biodiversity-specific skills needs, such as ecology and taxonomy skills (NBAP, 2024).

Tourism & Hospitality

Another broader sector in which the climate targets impact occupations is tourism and hospitality. The sector is already experiencing an acute shortage of labour. In 2022, 30% of businesses surveyed by Fáilte Ireland reported that they were at risk of closure if their recruitment challenges went unresolved, while there was an estimated total of 22,000 vacancies in tourism and hospitality jobs (Fáilte Ireland, 2022). Compounding this degree of workforce demand, the tourism industry in Ireland is making a concerted effort to become sustainable and environmentally friendly (Fáilte Ireland, 2024). The ultimate policy aim is to create a sustainable tourism sector, given that the natural landscape and built heritage of Ireland are critical tourism assets (DTCAGSM, 2021). The decarbonisation of the sector requires financial and business support, as well as the provision of dedicated climate action advisors to support businesses on becoming more sustainable and environmentally friendly.

Accounting and Business

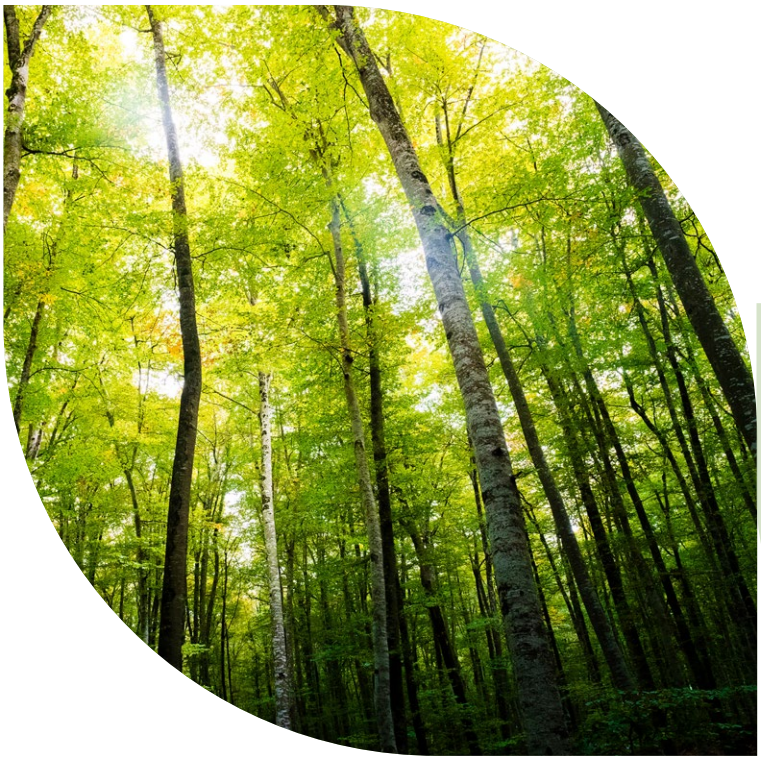
The green transition implies two important consequences for finance – the need to direct public and private investment to environmentally beneficial / friendly projects, and the need to account for green practices and sustainability within businesses. The Climate Action Plan states the importance of these two aspects in enabling the delivery of emissions-reducing actions across sectors, in mobilising decarbonisation efforts, and in ensuring a just transition to a greener economy (Climate Action Plan, 2024).

Skills needs in finance are becoming more immediate compared to other sectors with the introduction of the EU Corporate Sustainability Reporting Directive, EU Taxonomy, and Sustainable Finance Disclosure Regulation (SOLAS 2023; International Sustainable Finance Centre of Excellent, 2023). The Corporate Sustainability Reporting Directive requires major reporting requirements for all organisations, particularly given that it requires businesses

to report on sustainability upstream and downstream of their supply chains. A recent study commissioned by the International Sustainable Finance Centre of Excellence (ISFCOE) found that over half of respondents identified biodiversity as a skills gap in the sector, while 44% of finance professionals felt themselves to be 'beginners' in sustainable finance (ISFCOE, 2023). Therefore, professionals across economic sectors need upskilling related to regulatory awareness and compliance, reporting and disclosures, green procurement, and leadership (Climate Action Plan, 2024; SOLAS, 2023).

Transversal Green Skills

Finally, a broader need for green skills is required across occupations and job types to foster and sustain a green transition. SOLAS recognises the importance of green skills for life, namely those skills that constitute a general recognition of climate change and environmental issues, and which embed green behaviours (SOLAS, 2022). These types of more general green skills encourage the efficient use of resources across occupations and point to the importance of promoting sustainability in all sectors of the economy (SOLAS, 2022). Beyond these skills however, there is a recognised role for FET to facilitate 'personal development, vibrant and integrated communities, and a commitment to social justice' (SOLAS, 2020). In this sense, there is a wider need to foster climate awareness and climate literacy for a greater understanding of the environment so that people across communities in Ireland can advocate and adopt change.



2.4 International Responses to Address Green Skills Needs

A strong FET sector is a critical component to effectively meet green skills needs. When assessed across states (see Appendix A.3 for a review of EU and Irish government policies that both emphasise the green transition and promote more robust further education and training systems to support that shift), all FET systems tend to involve a high degree of consultation between government, industry, and education providers.

Although there is no one, dominant institutional set-up for the provision of green skills via FET from an international perspective (ILO, 2019; Cedefop 2018), some key elements stand out across countries, including varying classifications of green economy, green jobs, green skills; the development of a formal skills strategy; the level of involvement of businesses or other social partners; the institution of a national skills body; the institution of specific sectoral skills-focused bodies; and the proliferation of more regional or local skills initiatives.

The exact make-up of these elements varies widely. One distinguishing institutional feature is whether a national or sector specific skills council is in place, though this belies a greater complexity between countries (Siedschalg et al, 2022). A common element to all types of skills provision systems is a high level of stakeholder engagement with business and industry to determine the exact skill need (Siedschalg et al, 2022). Usually, these systems have some degree of responsibility for formulating and implementing strategy, monitoring, and anticipating skills needs, developing programmes and funding training (Siedschalg et al, 2022).

Ireland's own FET system has a diverse set of organisations working in different capacities. SOLAS, ETBs, Skillnet, and the Regional Skills Fora, amongst others, work to ensure that the FET system responds appropriately to identified skills needs across the country. Further information about international approaches to green skills identification and development at FET level, including the collaboration and involvement of private sector organisations and higher education institutions is provided in Appendix A.2.

Across Denmark, Germany, Spain, France, Estonia, and England, some form of consultative body exists for dialogue between education providers, social partners, or business (Cedefop, 2018). The types of bodies can differ widely. In Denmark, 50 separate Trade Committees focus on skills needs and set standards, while in Spain a group of industry representatives provides key advice to government on emerging skills needs (Siedschalg et al, 2022; Cedefop, 2018). To add to the complexity, however, some of these bodies deal with a wider range of issues than just green skills. In Germany for instance, a national platform consisting of stakeholders from politics, business, and civil society also considers education on sustainable development under the UNESCO World Action programme 'Education for sustainable development' (Cedefop, 2018).

The key challenge in identifying similarities lies in the fact that the narrative level of focus for green terms varies widely. In Denmark, the focus is on the green economy and green forms of employment (Cedefop, 2018). Germany also considers jobs that it defines as being environmental occupations. Similarly, France identifies economic activities related to green jobs (Cedefop, 2018). However, Spain takes a different approach of identifying aspects of occupations across the economy that could be taken as relevant to green terms. England provides a four-way classification of green skills, while Estonia offers no classification of green skills and no typology for their identification (Siedschalg et al, 2022; Cedefop, 2018).

As well as national level systems for the provision of green skills training, it is worth noting that there are prominent examples at local and regional levels of green skills provision. The most often cited example is that of Samsø island in Denmark, which specialises in sustainability courses. Samsø has been identified as a hub for people within Europe to upskill and reskill as part of the transition to greener economies (Cedefop, 2018). As well as Samsø, the Danish Local Education Training Centre Syd provides 75 different programmes for different types of green skills training. This is in addition to specialist classes which are tailored towards construction workers. A slightly different example is that in the UK, where the Liverpool City Region Local Enterprise Partnership created training programmes to upskill electricity and electrical workers to work for energy companies such as Scottish Power (Siedschalg et al, 2022). The partnership has also developed training programmes with universities to give people skills for the local manufacturing and offshore wind industries (Siedschalg et al, 2022).

The overall picture of green skills development is fragmented with very few national green skills strategies published across Europe. There is no consistent institutional set-up across states. It is also important to consider how at a national level, responsibility for green skills development tends to be spread across multiple government departments and within several units, which can make it even more difficult to identify how skills development is coordinated and identified (ILO, 2019). Moreover, this decentralisation of skills development seems to weaken the links between environmental policies to achieve lower emissions and strategies to develop green skills (ILO, 2919). Countries with more formalised mechanisms for inter-ministerial coordination – such as Korea, Germany, France, Denmark, the Philippines, and India – were found to have higher coherence between their environmental policies and skills policies (ILO, 2019). Therefore, it appears that well developed inter-ministerial platforms have engendered better aligned environmental and skills development policies.

In an effort to bridge knowledge gaps, the European Commission coordinated a study entitled A compendium of inspiring practices: Vocational education and training and the green transition (2023), showcasing green skills from 20 countries across Europe. Focusing on skills for the green transition, the creation of greener VET programmes, the adoption of new ways of teaching and learning; the study also highlighted the need for developing the skills of teaching and training staff.

This includes practical ways to 'green VET', such as integrating sustainability in curricula, staff training, and collaboration through networks and platforms. The study highlights that VET teaching and training staff need professional development opportunities to acquire core green skills through initial training; short, continuing professional development (CPD) courses; and national measures to support VET schools.

2.5 Existing FET Responses to the Green Transition in Ireland

The FET system in Ireland is well placed to respond to the demand for green skills and labour market changes. A wide range of actors operate in the vocational education and training space in Ireland, including the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS), SOLAS, ETBs, Regional Skills Fora, Skillnet business networks, as well as Higher Education Institutions (HEIs) and private businesses. There are strong relationships between these different actors, which perform varying functions from policy setting and strategic planning, to the provision of education and training and the funding and monitoring of FET programmes in Ireland.

Similar to other EU and OECD states, a National Skills Council (NSC) was established in 2017 as a provider of expert and independent strategic advice and recommendations to Government on priorities for the future direction and implementation of national skills policy. A reconstitution of the NSC was announced in 2024 in response to the OECD's 2023 Review of Ireland's Skills Strategy. The current Chair of the NSC is also the Chair of SOLAS's Strategic Planning Committee. In line with the OECD's recommendations, the Council has been repositioned as a platform for strategic engagement with industry, social partners, the community and voluntary pillar, and other non-governmental stakeholders, with a strong interest in skills and workforce development policy, facilitating a high-level and broad perspective on skills challenges, policies, and priorities.

Both the Expert Group on Future Skills Needs (EGFSN) in the Department of Enterprise, Trade and Employment and the Skills and Labour Market Research Unit (SLMRU) within SOLAS also play a critical role in researching and reporting on skills demand in Ireland's labour market, including the demand for green and transversal skills. The EGFSN advises the Irish government on future skills requirements, particularly at sectoral level, and on labour market developments that may impact the growth of enterprises and employment. The SLMRU monitors the supply and demand for skills at occupational level, including the identification of areas of skills and labour shortages. As in other international contexts, the demand for green and transversal skills is informed by this process of monitoring of skills needs.

The National Skills Council will engage with, and be informed by, the research and reporting conducted by the EGFSN and the SLMRU in their assessment of the critical strategic risks and opportunities in the areas of skills and talent, particularly with regard to the green skills agenda.

In addition, Skillnet Ireland functions as a focus point for business to identify and respond to emerging skills needs through trainings created or funded by Skillnet Ireland. For example, the Green Tech Skillnet is an industry-led network that facilitates the workforce and development needs of the renewable energy industry in Ireland. Green Tech Skillnet is also part of the wider Climate Ready Cluster, which is a group of Skillnet business networks including Sustainable Finance Skillnet and Lean & Green Skillnet.

SOLAS mirrors other international skills institutions in formally developing the national strategy for FET in Ireland in collaboration with delivery partners, the 16 regional Education and Training Boards. Represented by Education and Training Boards Ireland (ETBI), ETBs directly provide training through upskilling and reskilling opportunities, apprenticeships, as well as adult and community education amongst other forms of provision.

From a green transition perspective, SOLAS's Green Skills for FET 2021-2030 Roadmap recognised the importance of supporting Just Transition projects as well as the employers and employees who may be vulnerable as part of the green transition (SOLAS, 2020b). In an Irish context, a just transition 'seeks to ensure transition is fair, equitable, and inclusive in terms of processes and outcomes' (SOLAS, 2020b, p.10). The Climate Action Plan further specifies that 'the term is used specifically in relation to the transition to a climate resilient, biodiversity rich, environmentally sustainable, and climate neutral economy' (SOLAS, 2020b, p.10).

The Climate Action Plan 2024 notes the role of FET in equipping people with the right skills to participate in, and benefit from, the green transition and highlights the central role of SOLAS in green skills development. Short and tailored upskilling programmes allow FET bodies to be flexible and adaptable to changing skills needs. Furthermore, economic sectors that are most impacted by the transition to a greener economy, such as construction and agriculture, already have links with FET programmes that have been made available to their workforces (SOLAS, 2020b). Through apprenticeships, transferrable skills development, and lifelong learning, the Irish FET sector is part of a wider policy effort to protect the most vulnerable and empower individuals and communities (Climate Action Plan, 2024).

The FET sector is also committed to ensuring that education provision is tailored to the needs of learners through a universal design for learning (UDL) approach. UDL refers to a framework with a set of principles for learning and teaching, based on scientific insights into how humans learn. In the FET sector it is recognised as reducing barriers 'for all learners, including those with disabilities, with literacy or numeracy difficulties, and with limited English proficiency' (SOLAS, 2020c, p.3).

2.6 Summary

The green transition implies a major shift in the skills required across sectors of the economy, which the Irish FET sector is well placed to respond to. While terms like the green transition, green economy, green jobs, and green skills might be difficult to define, European and national policy readily make significant commitments to overhauling economic activities to create them. The proliferation of international and national commitments to mitigate against climate change alongside Ireland's commitment to education for sustainable development have created a coherent set of aims associated with the green transition. To achieve this vision, however, the workforce must be prepared and enabled to adapt, while labour market entrants need to be equipped with new knowledge, skills, and attitudes. The need for an education and training strategy that meets this need is therefore clear, particularly given the emphasis on changing skills needs for already existing occupations. Ultimately, the FET sector has a vital role to play in being an essential supplier of green skills in Ireland.

3.

Industry Perspective on Green Skills Needs

3. Industry Perspectives on Green Skills Needs

This chapter presents a summary of stakeholder perspectives on emerging green skills gaps and ways to meet the identified skills needs. Consultation of stakeholder groups – which included representatives of professional bodies, government departments, industry, state agencies, and higher education institutions – was carried out via two targeted surveys and six sectoral workshops.

Industry Survey

The industry survey was primarily targeted at representative bodies or associations for core occupations in each of the economic sectors considered. In addition to identifying their primary economic sector, industry stakeholders were also asked to select an occupation that their organisation or association represented or that aligned most closely with their own occupation. The remaining survey questions elicited reflections about how the selected occupation is evolving in response to the broader legislative and policy landscape related to climate change in Ireland, as well as the skills that are or have become more critical in the context of the green transition and upskilling actions that the further education sector could introduce to meet the identified skills need (see Appendix B.1 for the full list of questions included in the Industry Survey).

Government Departments Survey

Government departments were also asked to feed into this research via a separate survey, which asked respondents to reflect on how sectors under the aegis of their department are evolving in response to the legislative and policy landscape and the skills gaps that have emerged due to policy and legislative developments related to climate change (see Appendix B.2 for the full list of questions included in the Government Departments Survey).

Sectoral Workshops

The initial stakeholder input on green skills needs for existing and emerging occupations gathered through surveys was further validated and enhanced through six virtual workshops. The workshops were attended by representatives of industry and professional bodies, as well as government departments and higher education institutes. Preliminary survey results were presented to stakeholders at each sectoral workshop, followed by open discussions that validated and enhanced the initial material.

Local and Regional Bodies Survey

In addition to engagement with industry stakeholders, a survey focused on regional skills needs was issued to ETBs, Local Authorities, and Regional Skills Fora (see Appendix B.3 for the full list of questions included in the Local and Regional Bodies Survey). The information provided by regional stakeholders is summarised in Appendix E.

Engagement Summary

Appendix B.5 provides a summary of the engagements conducted, which includes the surveys response rate, workshops attendance, as well as lists of sectoral stakeholders and stakeholder groups consulted (i.e., government departments, ETBs, Local Authorities, Regional Skills Fora).

The remainder of this chapter summarises stakeholder perspectives on emerging green skills gaps and ways to meet the identified skills need in each of the sectors considered by the current Strategy. Additional reflections on the context, changing nature of the sectors, and new emerging occupations are included in Appendix C.

3.1 Construction & Built Environment (including Water and Waste Management)

Stakeholders in the construction and built environment sector reflected on changing construction methods and approaches to reducing the environmental impact of the sector. This includes modern methods of construction (MMC), building information modelling (BIM), as well as traditional construction techniques. In addition, embedding circularity and the circular economy in construction was recognised as a growing area to reduce the sector's environmental footprint. There is a key need for skills to meet Ireland's retrofitting targets, including plumbers, heating engineers, electricians, carpenters, plasterers, roofers, glaziers, insulation operatives, and airtightness operatives.

Stakeholders reported specific skills gaps in construction methods, with a particular emphasis on retrofitting skills, traditional building, and conservation skills, as well as environmentally focused skills such as carbon accounting, nature-based solutions, and biodiversity. For traditionally constructed buildings, there is a critical need for skills to allow for the reuse and adaptation of the existing building stock.

To meet construction and built environment skills needs, stakeholders suggested the following upskilling actions:

- Prioritise short, flexible, and subsidised modules for SMEs.
- Raise employer awareness of existing training opportunities.
- Promote career opportunities in the sector.

- Review traineeships and craft apprenticeship NFQ pathways.
- Support businesses to release staff for training.
- Develop further courses on rigging, MMC, and working with timber.
- Upskilling training on nature-based solutions, biodiversity, and bioeconomy skills (e.g., the use of bio-based materials and supply chain management).
- Address skills gaps through training on the circular economy, supply chain management, and reuse of materials.
- Collaboration between education and training providers and industry.
- Develop train-the-trainer skills.

Table 0.1 includes the skills and upskilling actions for individual occupations across the construction and built environment sector that were identified through stakeholder consultations.

Table 0.1: Construction and built environment occupation-specific skills gaps and upskilling actions.

Construction & Built Environment Occupations	Skills Gaps	Upskilling Actions
Architects and town planners	• Sustainable design (e.g., nature-based, bio-based, and circular solutions), applied in botany, ecology, soil science • Heat pump and external insulation installation • Construction techniques (e.g., embodied carbon measurement, thermal and hydrothermal modelling, and building performance management) • Environmental awareness (e.g., climate mitigation and adaptation, compliance with SDG and EU frameworks)	• Integrate sustainability and carbon management into CPD • Provide a single information point for all programme offerings • Establish a register for green skills trained professionals • Expand Nearly Zero Energy Building (NZEB) fundamentals and offer one day NZEB training • Map skills needs
Bricklayers and masons	• Air tightness, insulation, stove installation, and dry stone wall techniques such as corbelling	• Training in water and waste management • Restoration training focused on lime plastering, brick repointing, and salvaging • Training on insulation, use of compressed earth blocks, and dry stone walling
Carpenters and joiners	• External insulation	• Raise awareness of green skills needs for businesses • Provide incentives for businesses to upskill workers • Provide upskilling in flat roofing, standing seam cladding, and external insulation

Construction & Built Environment Occupations	Skills Gaps	Upskilling Actions
Chartered Architectural Technologists	• Carbon accounting, sustainable design, and awareness of building regulation updates • Modelling, specification of materials, monitoring, and quality assurance • Thermal bridging, external wall insulation, and use of compressed earth blocks • Windows installation, airtightness, and ventilation	• Working with professional body groups to create CPD webinars • Develop certificate level part-time learnings which are practical for new products and courses • Create new degree level courses • Upskill in passive design, use of bio-based materials including timber, Leadership in Energy and Environmental Design (LEED), Building Research Establishment Environmental Assessment Method (BREAAM), HVAC, smart building systems, circularity, and BIM • Apprenticeships in airtightness, ventilation, external wall insulation, and window installation
Construction and building trade supervisors	• Health and safety • Climate awareness	• Increased availability of courses • Targeted promotion of training to construction workers • Instructors with practical experience • Health and safety

Construction & Built Environment Occupations	Skills Gaps	Upskilling Actions
Plasterers	• Retrofit insulation skills • Buy-in to meet quality standards	• Review training for plasterers to update modules of the plastering apprenticeship • Upskilling courses for external wall insulation • Workshops on retrofitting skills • Standalone training for workers other than plasterers in external finishing
Plumbers, heating, and ventilation engineers	• Quality assurance • Awareness of climate issues	• Ongoing CPD • Quality assurance • Incentives for plumbing apprenticeship participation • Add a Level 6 course on heat pumps to the plumbing apprenticeship • Update the plumbing apprenticeship programme book
Production managers, directors, and professionals in construction / built environment	• Retrofit business management, awareness of regulations and guidelines, site coordination, and renovation experts for historic buildings • External wall insulation, passive ventilation, rigging, and slinging • Heat pump installation, retrofit design, digital construction, MMC, and green roofing	• Upskilling in project management, risk assessment, and green procurement • Build knowledge on building regulations, building control, and building survey • Mandatory CPD • Short stackable modules which are tailored towards micro-businesses, sole traders, and contractors • Promotion of skills and career opportunities in schools
Road construction operatives	• Reuse of materials • Circular economy	• Upskilling in the reuse of waste materials

Construction & Built Environment Occupations	Skills Gaps	Upskilling Actions
Scaffolders	• Lack of resources for scaffolders • Acute need for scaffolders	• Create alternative training avenues for scaffolding
Other occupations	• Energy efficiency, renewables, embodied carbon, digitalisation, carbon literacy, working with timber, ventilation, Lean management, Takt implementation, passive design, and BER assessment • Circular economy and circularity • Ecologists, building surveyors, and a lack of certification for the use of bio-based materials • Steeple jacks, riggers, drone operators, welders, and metal workers	• Industry collaboration on skills needs. • Training on carbon literacy, embodied carbon, and circularity • Hybrid training, free training, or short sustainability courses

3.2 Engineering, Energy & Manufacturing

According to stakeholders, the most major impact for the engineering, energy, and manufacturing sector stems from the shift to renewable energy. Changing energy systems brings with it new skills in terms of engineering, maintenance, operation, and knowledge of how the energy system fits together. The sector will be implementing new standards and procedures resulting from the Energy Efficiency Directive and Corporate Sustainability Reporting Directive (CSRD), contributing to a need for greater regulatory expertise. Digital technology is also expected to play a bigger role in the sector with changes to the energy system, the need for remote monitoring, and the greater use of data in monitoring.

Skills gaps for the sector were identified by respondents in monitoring expertise, and in more applied skills across occupations. Monitoring skills included knowledge of CSRD, non-financial reporting, measurement of key statistics, and analysis of data. More applied skills suggested by respondents were waste management, adaptation to energy transition, and maritime skills for offshore wind maintenance.

With the boundaries of renewable energy integration being pushed and demand becoming more unpredictable there is a need for greater modelling, digitalisation, data analytics and the application of Artificial Intelligence in the development of new innovative approaches, to increase the number of experts who can assist in addressing these challenges.

In addition, there is an expansion in the range of technologies utilised on the electricity system and the emergence of new technologies to provide a range of services to use as system operator which can reduce reliance on conventional fossil fuel-based generation systems. These systems are critical to maximising the yield from renewable energy production.

As largescale renewable energy becomes available, there will be opportunities for significant new industrial opportunities from the Power-to-X technologies. 'Power-to-X' is a broader term that refers to the conversion technologies that turn surplus electricity into higher value products (X), such as carbon-neutral fuels for transport (land, maritime and air), biogas, chemicals or foods. The skills required to build and operate these industrial processes (which will be part of the broader biocircular economy of the future) will be critical for enabling Ireland to achieve and maintain sustainable competitive advantage.

Stakeholders recommended the following upskilling actions to meet skills needs in the engineering, energy, and manufacturing sector:

- Design short courses with an emphasis on transferable skills.
- Provide subsidised training for priority occupation needs.
- Create joint projects between FET and HEIs' students to increase cross-disciplinary skills.
- Promote existing education and training opportunities.
- Raise awareness of career opportunities for secondary school students.
- Establish a centralised information point for all existing education and training opportunities.
- Upskill tutors and trainers.
- Gather better data on future demand for occupations.
- Develop the skills for a whole of energy system approach and the dynamics of a very different energy system.

These upskilling actions apply for occupations across the sector, while occupation-specific skills gaps and upskilling actions are presented in Table 0.2

Table 0.2: Engineering, energy and manufacturing occupation-specific skills gaps and upskilling actions

Engineering, Energy & Manufacturing Occupations	Skills Gaps	Upskilling Actions
Electricians and electrical fitter	• Working with alternative fuels • Electrification of ports • Awareness of how greener approach can be implemented	• Updated apprenticeships with high degree of industry engagement to align with sector needs
Energy managers and professionals	• Sustainability, knowledge of the impact of green energy, and the understanding of the effects of digitalisation on products • Carbon literacy, quality installation standards, and understanding green products (e.g., smart metres) • Understanding of new energy systems	• Training on carbon literacy, energy systems, and ESG • Training for plumbers on heat pump installation • Training for electricians on solar PV array installation
Engineers	• Electrical and thermal engineering • Battery technology, hydrogen conversion, thermodynamic expertise • Wind and solar expertise • Offshore and onshore processing • Ecology skills • Maritime skills for offshore wind turbine maintenance • Innovation and digital literacy skills • Communication, problem solving, and creative thinking • Power to X skills	• Supports to enable engineers to shift towards the renewable energy sector • Incentives for individuals to pursue education, or for business to invest in low energy capital and innovate • Establish an offshore centre of excellence. • Maximise the use of existing infrastructure for training

Engineering, Energy & Manufacturing Occupations	Skills Gaps	Upskilling Actions
Manufacturing occupations	• Fashion and textile manufacturing skills, such as, pattern drafting, tailoring, garment construction, sewing, knitting, crochet, loom, and machinery operation	• Develop opportunities for textile manufacturing skills • Explore certification (Level 5 / 6) of skills
Production and process engineers	• Use of data • Risk literacy • Transferrable skills (e.g., procedure writing, goal setting, risk-based decisions) • Plant operators and skilled management teams will be required to operate anaerobic digestion and other integrated facilities.	• Team-based workshops, self-directed learning, and cross-disciplinary seminars • Skills and training programmes as required for jobs directly involved in the anaerobic digestion-biomethane sector and the wider bioeconomy
Other occupations	• Project management, resource efficiency, and circular economy • Commercial awareness, product design, marketing and branding, customer service • Heat pump maintenance and domestic retrofit • Measurement, carbon accounting, and performance management • Welding for offshore wind, remote operating skills • Leadership, Lean management, strategy, systems thinking • Legal, green financial, and environmental expertise • Insurance in energy infrastructure • Major infrastructure project accounting	• Short, targeted, and tailored trainings (e.g., micro-qualifications, work-based learnings, academic-industry partnerships, and lifelong learning) • Incentives to attract experts and workers from abroad based on analysis of international job markets • Governmental action to develop a roadmap for skills needs

3.3 Transport & Logistics

The transport and logistics sector has experienced significant change with the move from internal combustion engines to electric vehicles. Electrification of infrastructure has also seen the growing importance of maritime skills, as well as supply chain management. Stakeholders emphasised skills gaps in driving techniques, maritime skills, electric vehicles, and knowledge of energy systems. Specific gaps were identified in qualified professionals to support electrification of transport and logistics infrastructure, as well as in the implementation of alternative fuels such as hydrogen.

Stakeholders suggested several upskilling actions to meet skills needs in the sector:

- Adopting a regional approach to address local skills needs.
- Designing flexible and tailored courses.
- Developing hybrid / cross-disciplinary skills through partnership programmes with business and education and training providers.
- Offering training to clusters of SMEs to incentivise businesses to release staff to attend training.
- Raising awareness of career opportunities arising from the green transition.

Table 0.3 summarises skills gaps and upskilling actions for specific occupations in the transport and logistics sector.

Table 0.3: Transport and logistics occupation-specific skills gaps and upskilling actions

Transport & Logistics Occupations	Skills Gaps	Upskilling Actions
Bus and coach drivers	• Eco-driving	• Eco-driving courses • Environmental awareness courses
Large goods vehicle drivers	• Eco-driving and energy efficiency • Sustainable supply chain, waste, and carbon management • Compliance and Innovation • Technology, digitalisation, and automation (e.g., route planning optimisation) • Sustainability strategy	• Skills to Advance initiatives in eco-driving, SMART driving, and new technologies • Training in stress management and mental wellbeing • Introduce a sustainability strategy award for energy efficiency, resource management, compliance, technology, waste management, or carbon management.
Maritime professionals	• Digital skills including remote monitoring, ICT skills • Maintenance, remote monitoring, and health and safety in working with offshore wind	• Gather data on jobs needed over time
Transport and distribution managers / professionals	• Energy knowledge • Eco-driving not recognised in RSA CPC	• Emphasise opportunities of green transition to business • Fund eco-driving and energy efficiency training programmes
Vehicle technicians, mechanics, and electricians	• Repairing electric vehicles	• Upskill technicians and mechanics to standards set by manufacturers • Training on working with alternative fuels • Greater emphasis on EVs in motor trade apprenticeships • Set EV training against a licensing structure, similar to electrical or gas installation.

Transport & Logistics Occupations	Skills Gaps	Upskilling Actions
Other occupations	• Working with hybrid vehicles • Carbon management • As a service model • Electrification of transport and logistics infrastructure	• Training in working with hi-voltage technology • Focus on product lifecycle management, as a service model, product repair, and sustainable design.

3.4 Agriculture, Forestry, & Marine (including Bioeconomy)

For agriculture, forestry, and marine occupations, stakeholders described a shift in emphasis of their work because of policy and legislative developments. Stakeholders reported that skills gaps in the agriculture, forestry, and marine sector are largely concentrated in existing occupations as opposed to emerging occupations. However, there are gaps in specialist skills for each as well as in more support-type skills such as administration, public engagement, or the use of technology.

Stakeholders identified a range of upskilling actors for the sector, such as:

- Coordinated messaging with other stakeholders around career promotion and career pathways to occupations (e.g., to machine operators).
- Include guest speakers in education and training delivery to speak to evolving market demands and policy requirements.
- Develop flexible and simple learnings.
- Incentivise employers / employees to participate in programmes.
- Account for the existing knowledge and life experience of workers in certification of skills.

Table 0.4 presents occupations specific skills gaps and upskilling actions for the agriculture, forestry, and marine sector.

Table 0.4: Agriculture, forestry and marine occupation-specific skills gaps and upskilling actions

Agriculture, Forestry, and Marine Occupations (including Bioeconomy)	Skills Gaps	Upskilling Actions
Agriculture and horticulture managers / proprietors / professionals	• Land use management, nature restoration, water quality, organic agriculture, and the delivery of eco-system services including carbon farming • Data analysis • Regenerative agriculture • Marketing skills • Biodiversity, water quality, and reducing the use of pesticides • Expand and verify the skills of people working on nature restoration projects and climate neutral farming in their local community	• Offer information-sharing opportunities on land management, eco-system services (including carbon farming, agri-biomethane and green biorefining), and biodiversity (e.g., webinars on the Citizens' Assembly on Biodiversity, assistance with biodiversity plans, and town halls in rural areas) • Land management and biodiversity for landowners / farmers • Integrate practical skills in training delivery through showcasing of best practice methods (e.g., demonstration farms and demonstration forests) • Provide opportunities for peer-to-peer learning and knowledge sharing • Map existing skills and skills gaps across eco-system services

Agriculture, Forestry, and Marine Occupations (including Bioeconomy)	Skills Gaps	Upskilling Actions
Bioeconomy professionals	• Bioeconomy skills (e.g., agroecology, precision farming, vertical farming, and the use of bio-based inputs such as bio-based fertilizers) • Digital and technological skills • Waste management and environmental auditing • Sustainability, circularity, and entrepreneurial skills • Lack of courses at HEIs and FET	• Increase the number of courses and develop flexible trainings • Promotion of career pathways and benefits at secondary school level • Engage with stakeholders to algin sector needs with training • Market bio-based products / sustainable finance as part of curricula • Promote multi-disciplinary micro-qualifications • Incorporate train the trainer methods
Forestry managers / proprietors / professionals	• Species identification and species selection • Harvesting, excavating, replanting hauling, and ground preparation	• Increase the number of courses and develop new CPD opportunities through workshops, webinars, and conferences • Integrate practical skills in training delivery through showcasing of best practice methods (e.g., demonstration farms and demonstration forests) • Create a hybrid NFQ Level 7 course in forestry • Develop pathways for ecologists to become forest managers • Focus on stackable short modules via Skillnet to promote multi-disciplinary practitioners • Increase public awareness efforts and opportunities for networking / peer to peer learning

Agriculture, Forestry, and Marine Occupations (including Bioeconomy)	Skills Gaps	Upskilling Actions
Other occupations	• Administration, community engagement, stakeholder co-operation and entrepreneurial skills • Monitoring and implementing skills for land management and nature restoration projects • Digital and technological skills	• Develop new forestry work-based learning opportunities • Provide training for landscapers on the circular economy and use of native flora

3.5 Biodiversity & Environment

In the biodiversity and environment sector, stakeholders described how policy and legislative developments have heightened the focus on occupations and skills related to nature restoration, water quality, and biodiversity. As knowledge of climate change and climate action becomes integral to jobs across sectors, biodiversity and environment occupations have a role to play in providing expert knowledge, whether that be in project design, implementation, or reporting. Stakeholders suggested several upskilling actions across the sector, such as:

- Raise awareness of biodiversity and environment career opportunities, particularly at secondary school level.
- Develop trainings for land management, biodiversity, and sustainability.
- Promote career paths from Levels 5-6.
- Develop work-based learning options to progress learners from NFQ Levels 6-8.
- Create alternative routes for upskilling and reskilling, such as part-time NFQ Level 5-6 courses, acknowledging lower-level qualifications towards certification, and placing value on community-based training schemes

- Prioritise college-level micro-credentials[1] and FET micro-qualifications[2] that grow cross-disciplinary skills.

Table 0.5 illustrates skills gaps and upskilling actions for individual occupations within the biodiversity and environment sector.

Table 0.5: Biodiversity & Environment occupation-specific skills gaps and upskilling actions

Biodiversity & Environment Occupations	Skills Gaps	Upskilling Actions
Ecologists	Practical ecology skills in wetland restoration, field work, river management, surveying, and monitoring Species-specific ecologists Plant identification skills Budgeting skills Project management skills	Focus on practical skills development in ecologist courses, including project management and fieldwork Create ecology work-based learning opportunities Raise awareness of ecology careers at secondary school level
Environmental scientists	Sustainability skills (e.g., circular economy practices, taxonomy alignment, reporting, governance, and implementation of biodiversity targets) Technical skills (e.g., carbon appraisal and lifecycle assessment)	Build reporting skills and knowledge of sustainability and circularity in training Focus training on supply chain transparency and lifecycle analysis Develop course content on the relationship between pollution, water quality, and biodiversity with national and European sustainability frameworks Raise understanding of ISO standards (e.g., ISO 14001 and ISO 5001)
Heritage officers	Traditional construction skills to repair, maintain, and retrofit historic buildings	Training for trades people in lime plastering, historic carpentry, masonry, and thatching

1 Micro-credentials are small, accredited courses designed to meet the demands of learners, enterprise, and organisations, created by Irish Universities Association (IUA) partner universities in consultation with enterprise. Micro-credentials provide learning opportunities which offer a highly flexible, bite sized, and accessible way of upskilling and reskilling (See Irish Universities Association for a more detailed overview).

2 FET Micro-qualifications are a FET offering to future-proof businesses, with programmes comprising of short, stackable accredited qualifications tailored to fit employees' work schedules and provided at little or no cost to employers. Created in partnership with industry, FET micro-qualifications are provided at local level by the ETB network under the Skills to Advance initiative.

Biodiversity & Environment Occupations	Skills Gaps	Upskilling Actions
Other occupations	Landscape management Digital skills Communication skills related to biodiversity	Training in habitat mapping for landscape architects and technicians Managing wetlands or rivers for machinery operators GIS survey skills for digital staff Biodiversity aware communications for comms teams

3.6 Tourism & Hospitality

Stakeholders described that though awareness of the green economy is at the forefront of the tourism and hospitality sector, there is a challenge for businesses to implement green practices. The main skills gap in the sector is knowledge and understanding of green skills, biodiversity, and sustainability. Given that many of the sector's businesses are operating from historic buildings, the traditional construction skills gap was felt to be of critical importance.

Stakeholders suggested that upskilling actions should place sustainability at the heart of the sector, while helping businesses understand how to go about implementing sustainability. Across all tourism and hospitality occupations, upskilling actions included:

- Integrate sustainability into all existing training programmes for all sectoral occupations, including cooking staff, maintenance staff, front of house, management, etc.
- Provide clear information on implementation through peer events or expert advisors.
- Raise awareness of training offerings.
- Offer subsidised trainings to increase uptake.
- Incorporate sustainable craft skills into mainstream construction trainings so that workers would be qualified to work on older and modern buildings.

Table 0.6 illustrates skills gaps and upskilling actions for individual occupations within the tourism and hospitality sector.

Table 0.6: Tourism & Hospitality occupation-specific skills gaps and upskilling actions

Tourism & Hospitality Occupations	Skills Gaps	Upskilling Actions
Hotel and accommodation managers / proprietors / professionals	• Understanding of green skills, biodiversity, and sustainability • Ability to implement actions on green skills, biodiversity, and sustainability • Traditional craft skills to repair, maintain, and retrofit historic buildings • Knowledge of retrofitting	• Integrate sustainability into all existing sector training programmes • Communications skills training • Technical and accountancy skills training • In-person knowledge sharing, peer-to-peer learning opportunities • Provide clear information on how business can implement sustainability (e.g., through peer events or expert advice)
Restaurant and catering managers / proprietors / professionals	• Awareness and actioning of sustainability, awareness of the impact of human activities on the environment, knowledge of best practices, and implementation of green practices	• Subsidised training workshops • Site visits • Knowledge sharing of best practices
Other occupations	• Implementation of circularity • Viably reducing emissions • Accessing resources • Understanding green skills and sustainability	• Training on green practices (e.g., implementing sustainability in business, integrating solar panels or heat pumps, or developing internal training capacity for green skills) • Environmental impact training for businesses • Changing behaviours

3.7 Accounting & Business

In the accountancy and business sector, stakeholders have seen increased reporting requirements and the growth of a more complex regulatory environment. Representative organisations in the sector have developed networks and trainings to respond to this changing context, such as updated accountancy courses and the establishment the International Sustainable Finance Centre of Excellence (ISFCOE).

Given the changes impacting the sector, stakeholders reported a continued need for upskilling, reskilling, and skills development for occupations. Key skills gaps exist in understanding sustainability in finance, in IT skills, and in keeping up to date with legislation and regulation (e.g., auditing of sustainability standards).

Across all occupations, accountancy and business stakeholders recommend:

- Increase the number of available trainings.
- Develop enhanced knowledge supports.
- Focus trainings on sustainability and ESG.
- Continue messaging, peer to peer knowledge sharing events, and collaboration with external partners.

Table 0.7 illustrates skills gaps and upskilling actions identified by stakeholders for specific occupations.

Table 0.7: Accounting and Business occupation-specific skills gaps and upskilling actions

Accounting & Business Occupations	Skills Gaps	Upskilling Actions
Accountants and tax experts	• IT skills • Leadership / advocacy skills • Awareness and knowledge of legislation and regulation (e.g., auditing of sustainability standards)	• Increase number of available trainings for sector • Enhance knowledge supports • Continued promotion of green skills development, ongoing messaging, peer to peer knowledge sharing events, and collaboration with other stakeholders

Accounting & Business Occupations	Skills Gaps	Upskilling Actions
Other occupations	• Understanding sustainability in finance • Knowledge of climate-related economic issues • Awareness of costs associated with climate change for economic forecasting • Procurement skills in the public and energy sector, with particular emphasis on sustainability in procurement	• New trainings with a focus on sustainability and ESG • External training offerings • Advisory supports

3.8 Transversal Skills

Transversal skills, as defined by the European Skills, Competences, and Occupations classification, are 'learned and proven abilities that are commonly seen as necessary or valuable for effective action in virtually any kind of work, learning or life activity and are not exclusively related to any particular context (job, occupation, or academic discipline)' (European Commission & CEDEFOP, 2021).

As part of the industry survey, representatives of professional bodies were presented with a list of transversal skills and asked to identify which skills were most relevant for their profession. Ten of the transversal skills included on this list had been identified by SOLAS as the most frequently occurring skill mentioned in postings for jobs in Ireland over the twelve-month period between October 2022 and September 2023 (SOLAS 2023: 4). In addition to the top ten transversal skills included in the SOLAS Winter Skills Bulletin 2023, this list also included the five skills grouped under the 'applying environmental skills and competences' category (hereafter referred to as "green transversal skills") in the ESCO classification of transversal skills (European Commission & CEDEFOP, 2021).

Table 0.8 shows the ranking of transversal skills from industry and representative bodies' stakeholders across all surveyed economic sectors. Green transversal skills have been highlighted. Rankings of transversal skills corresponding to each sector are provided in Appendix D.

Table 0.8: Survey Ranking of Transversal Skills (N = 89)

Ranking	Transversal Skills	Number of Responses	% Responses
1	Provide leadership (i.e., Guide others and give direction)	66	74.16%
2	Apply quality standards (i.e., Oversee and monitor quality)	66	74.16%
3	Adapt to change (i.e., Be flexible and open to changing circumstances)	63	70.79%
4	Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	61	68.54%
5	Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	60	67.42%
6	Think proactively (i.e., Think ahead and apply forward thinking)	59	66.29%
7	Work in teams (i.e., Support colleagues and handle team dynamics)	56	62.92%
8	Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	54	60.67%
9	Assist customers (i.e., Be friendly with customers and customer-oriented)	46	51.69%
10	Manage time (i.e., Plan deadlines and manage schedules)	43	48.31%
11	Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	41	46.07%
12	Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	37	41.57%

Ranking	Transversal Skills	Number of Responses	% Responses
13	Prioritise tasks (i.e., Draw up timelines and coordinate actions)	35	39.33%
14	Tolerate stress (i.e., Deal with pressure and accept challenges)	33	37.08%
15	Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	30	33.71%

Broadly speaking, the top five transversal skills are consistently highly ranked across all sectors. There are some green transversal skills that increase in importance in specific sectors. For example, compared to other sectors, adopting ways to foster biodiversity is much more highly ranked as a transversal skill by agriculture, forestry, marine and biodiversity, and environment sectors. Similarly, the green transversal skill of adopting ways to reduce pollution is more highly ranked by transport and logistics stakeholders than by other sectors. However, the small sample size of responses in most sectors means that changes in ranking can reflect only two or three differences in response numbers. The ranking of the ten transversal skills that dominate the Irish labour market also varies slightly from one sector to another. For example, as Table 0.8 shows, provide leadership and apply quality standards topped the ranking across all sectors. However, tourism and hospitality stakeholders ranked assisting customers more highly than stakeholders from other sectors. Construction stakeholders, who outnumbered all other sectors, placed a greater importance on working in teams as a transversal skill. Finally, accounting and business stakeholders rated tolerate stress and prioritise tasks as more valuable transversal skills for their sector compared to other stakeholders.

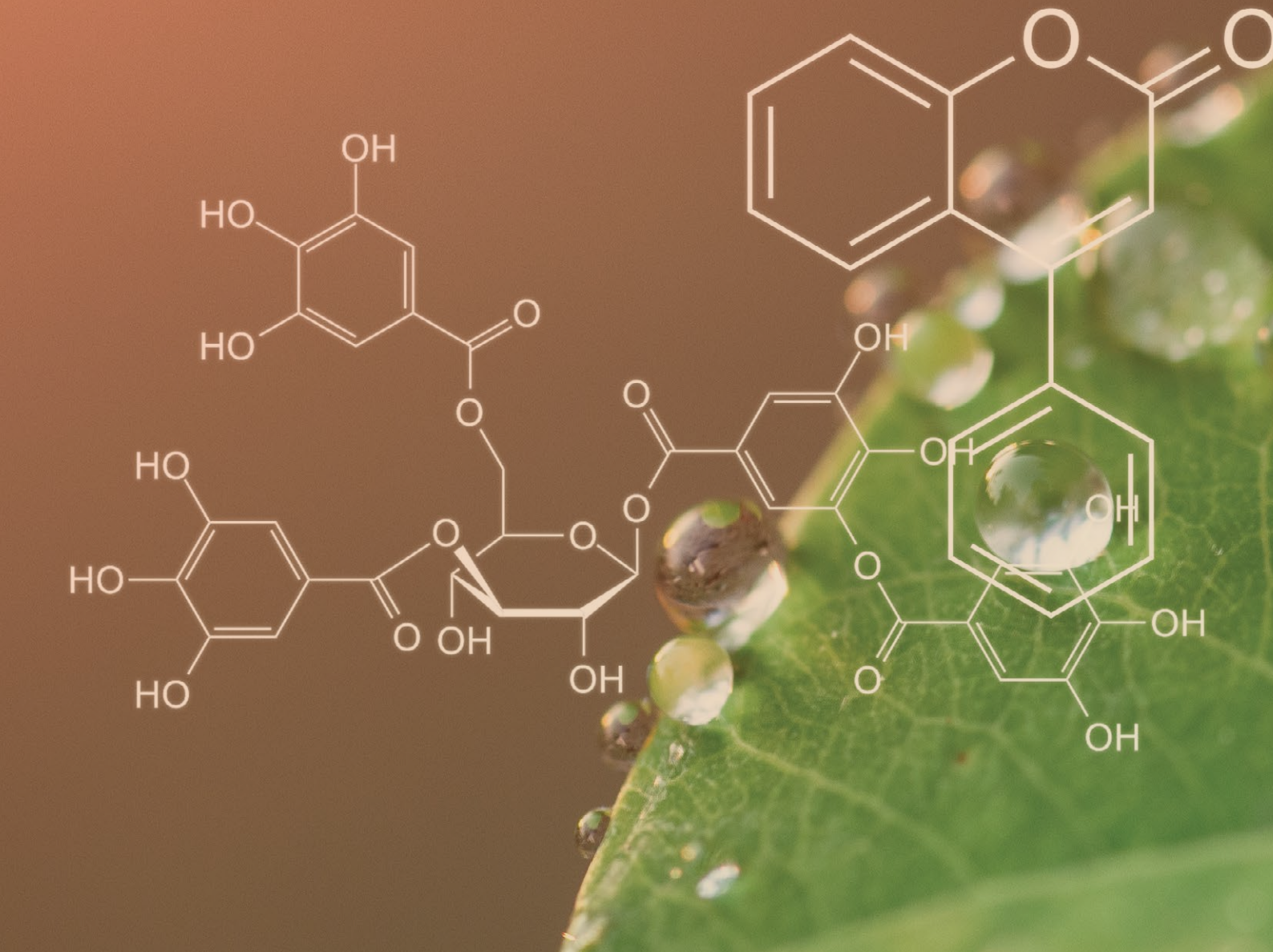
In addition to ranking the 15 skills provided, stakeholders were also asked to add any additional transversal or transferrable skills that are relevant for the greening of their occupation. Table 0.9Error! Reference source not found. shows additional transversal skills mentioned more than once in bold, and all other suggested transversal skills from stakeholders. There are some suggested transversal skills which imply a broader view of the all-encompassing change of the green transition, such as horticulture. Largely however, the additional skills put forward are as broad as those in Table 0.8. More generic transversal skills added include communication / engagement, using new technologies, and critical thinking.

Table 0.9: Transversal Skills Added by Stakeholders (N=33)

Additional Transversal Skills	
Communication / Engagement (i.e., engaging the public in-person and online through social media)	Using new technologies (i.e., in businesses and primary production, understanding digitalisation)
Critical thinking (i.e., learning from the past, problem solving, strategic thinking, showing best practices)	Policy development (i.e., on environmental / climate policy)
Planning (i.e., project planning, forecasting, scenario planning, process mapping, design briefs, project delivery, draughtsmanship)	Horticulture (i.e., showing people how to grow their own food)
Design (i.e., sustainable design, design thinking)	Risk analysis
Finance (i.e., budgeting, personal finance, financial acumen)	Advocacy (i.e., for those impacted by climate change, for legislative action)
Research and development (i.e., innovation and testing)	Sharing knowledge (i.e., sharing peer to peer learnings)
Land management (i.e., machinery operation)	Self-directed learning
Circular economy and bioeconomy knowledge	Understanding decarbonisation
Systems thinking	Commerciality
Emotional intelligence	Creative thinking
Adaptability (i.e., cognitive flexibility, resilience, agility)	Service orientation
Accessing and managing grants / funding	Health and safety

4.

ETBs Perspective on Green Skills Training Development



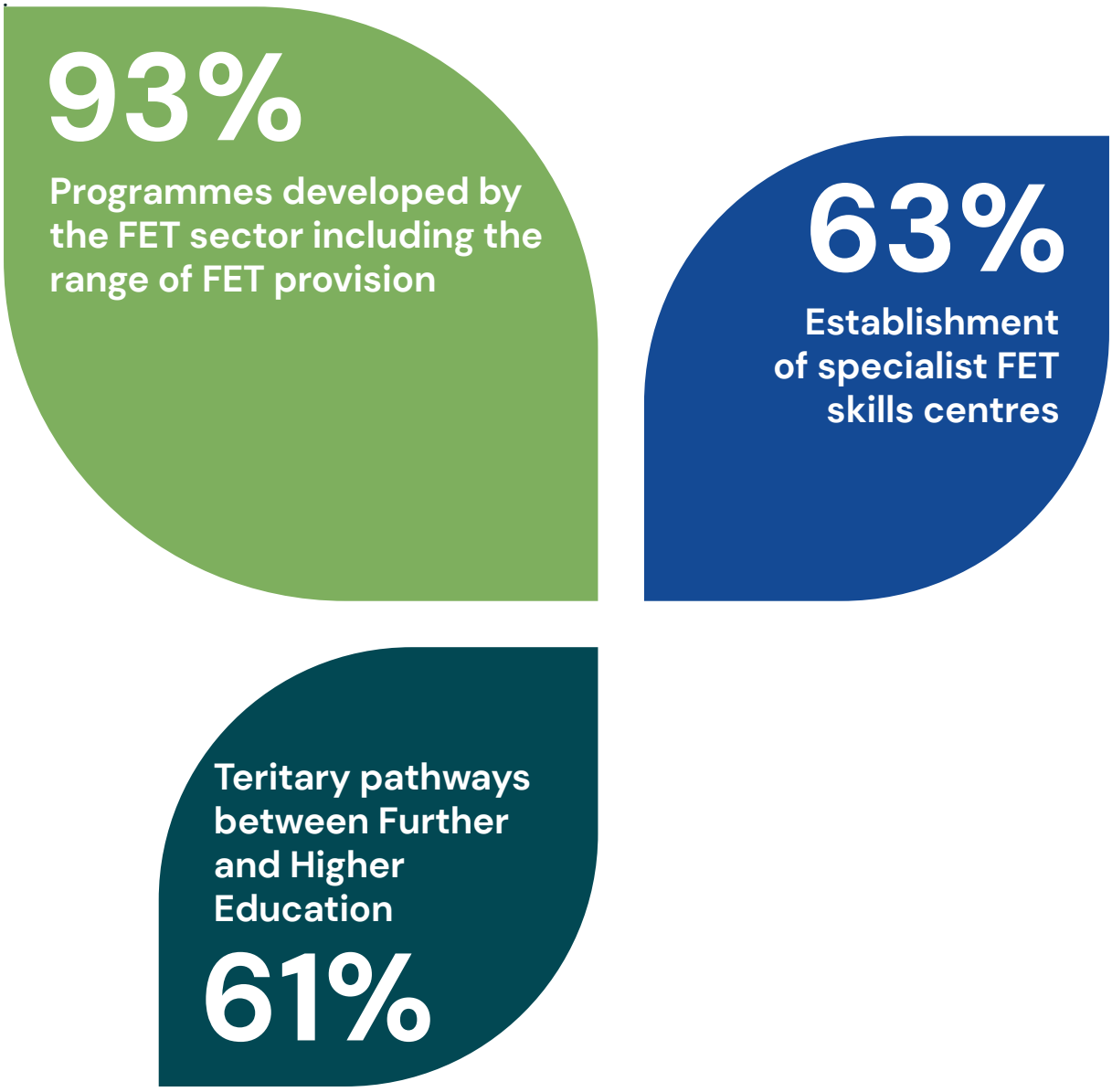
4. ETBs Perspectives on Green Skills Training Development

To inform the development of the Strategy, ETBs were asked to take part in a targeted survey to reflect on emerging skills gaps in their region, and whether new programmes, specialist skills centres, or additional, tertiary pathways could be pursued to address those gaps. ETBs were then invited to attend a virtual workshop where survey results were validated and enhanced with additional feedback. ETBs were also presented with the industry data explored in the previous chapter, in order to inform the workshop feedback. This chapter summarises the views expressed by ETBs and ETBI representatives.

Figure 0.1 summarises the preferences of ETB representatives for the three upskilling actions they were asked to consider as being most appropriate for meeting green skills gaps in their region. Almost all ETB stakeholders believed that new FET programmes could be developed to address this shortage. Additionally, around 60% of stakeholders indicated that specialist FET skills centres and tertiary pathways between further and higher education could also help to fill this gap.

Figure 0.1: "Do you think that the green skills gaps in your region could be met through one or more of the following actions:" (N=43)

The three sections below present the key points raised by ETBs in response to those three questions around new programme development, specialist skills centres, and collaboration with Higher Education Institutes (HEIs). The survey data has been complemented with the feedback provided as part of the workshop organised for ETBs representatives



4.1 FET Programmes

ETBs offered many suggestions for new FET programmes related to green skills, while referencing challenges in programme development. Ideas for new FET programmes ranged from more general green skills development to specific programmes across construction, agriculture, biodiversity, transport, and engineering. ETBs were keen to note how those programmes could best be supported, while also describing the barriers in developing and implementing new programmes. More commonly occurring themes mentioned by ETBs have been highlighted in bold.

Development of New FET Programmes	ETBs Recommendations
General green skills programmes	• Embed climate literacy, biodiversity, and sustainability throughout FET programmes. • Address climate literacy, sustainability, and general awareness of green skills. • Develop general programmes on climate literacy and sustainability in adult and community education (e.g., programmes on home maintenance, smart metering, and / or retrofitting). • Run programmes in conjunction with local community members and community-based organisations. • Support generic green skills programmes via Skills to Advance (including programmes on sustainability strategy topics in energy efficiency, distribution and logistics, and supply chain management). • Create micro-qualifications on green skills for business, and green skills for life.
Supports for programme provision	• Create additional climate, biodiversity, and sustainability content to be taken as either a single module or as part of existing awards. • Support the ongoing professional development of ETB staff to integrate and deliver on new learner outcomes related to green skills. • Promote a culture of green skills amongst learners and the wider community to adopt green practices as part of everyday life. • Update programme content with climate change related information. • Provide sufficient resources to develop new green skills programmes.
Increased programme accessibility	• Design programmes to be flexible and tailored to learner requirements (i.e., part-time / full-time, online / blended, night-time, or modularised). • Prioritise short courses with a focus on practical skills development. • Deliver simple programme content in easily understood language. • Avoid aligning new programmes with historic offerings such as PLC or community education. • Create an information hub with reports, articles, podcasts, and interviews around skills which learners and alumni could access. • Explore other digital solutions (i.e. an app) where learners could access training and receive accreditation.

Development of New FET Programmes	ETBs Recommendations	
New sector-specific programmes	**Construction & Built Environment:** • Further roll out of NZEB and retrofitting programmes • Enhance training in BIM and green building • Further incorporate NZEB Fundamental Awareness courses in relevant programmes • Explore a non-certified retrofit programme for the wider public to increase knowledge of retrofitting • Update the craft apprenticeship curriculum • Provide traineeships in external wall insulation • Develop green construction micro- qualifications	**Engineering, Energy & Manufacturing:** • Establish a Level 5 green engineering programme • Work with relevant industry partners to create opportunities for work-based learning programmes for green engineering • Provide training on green technology, renewable energy systems, modern manufacturing, offshore power generation, and wave energy • Emphasise practical skills development (e.g., installing, maintaining, and repairing renewable energy systems)
	Agri-Food: • Specific training on sustainable agriculture and horticulture • Workshops on climate smart farming and growing vegetables at home	**Biodiversity & Environment:** • Design programmes related to climate, water management, and waste management including biowaste (e.g., a Level 6 PLC on protecting rivers and natural waterways • Create modules or awards in biodiversity, sustainability, or ecological restoration • Provide community education on environmental conservation

Development of New FET Programmes	ETBs Recommendations
Challenges	**Lack of programme development resources.** • Inaccessibility of programmes (e.g., distance, class times, in-person classes). • Requirements to be employed to participate in Skills to Advance. • Meeting short term skills needs to support reskilling of workers. • Meeting QQI requirements to deliver longer courses that do not meet learner and employer needs. • Lack of employer interest in NFQ Levels 4-6 programmes.

4.2 Specialist Skills Centres

As part of the consultation, ETB stakeholders considered whether there was a need for specialist centres which would focus on specific areas of green skills provision. This section presents the two main views expressed around specialist skills centres. It also details the supports and challenges identified by ETBs for the potential development of any such skills centres. More commonly occurring themes mentioned by ETBs have been highlighted in bold.

Specialist Skills Centres	ETBs' Views
The case for specialist skills centres	• New skills centres can meet specialist skills needs for specific occupations. • NZEB model is a useful format which could be replicated for other sectors. • Centres provide dedicated spaces to cater to emerging green skills needs. A lack of a dedicated training centre is limiting the ability of some ETBs to deliver cost-effective training for businesses in their region. • Specialist skills centres are good spaces for providing practical skills development for learners. • Close coordination between ETBs is needed to maximise programme offerings and avoid duplications. • Specialist skills centres could empower ETBs to provided education opportunities which are specific and relevant to learners and businesses, while increasing collaboration throughout the ETB network.

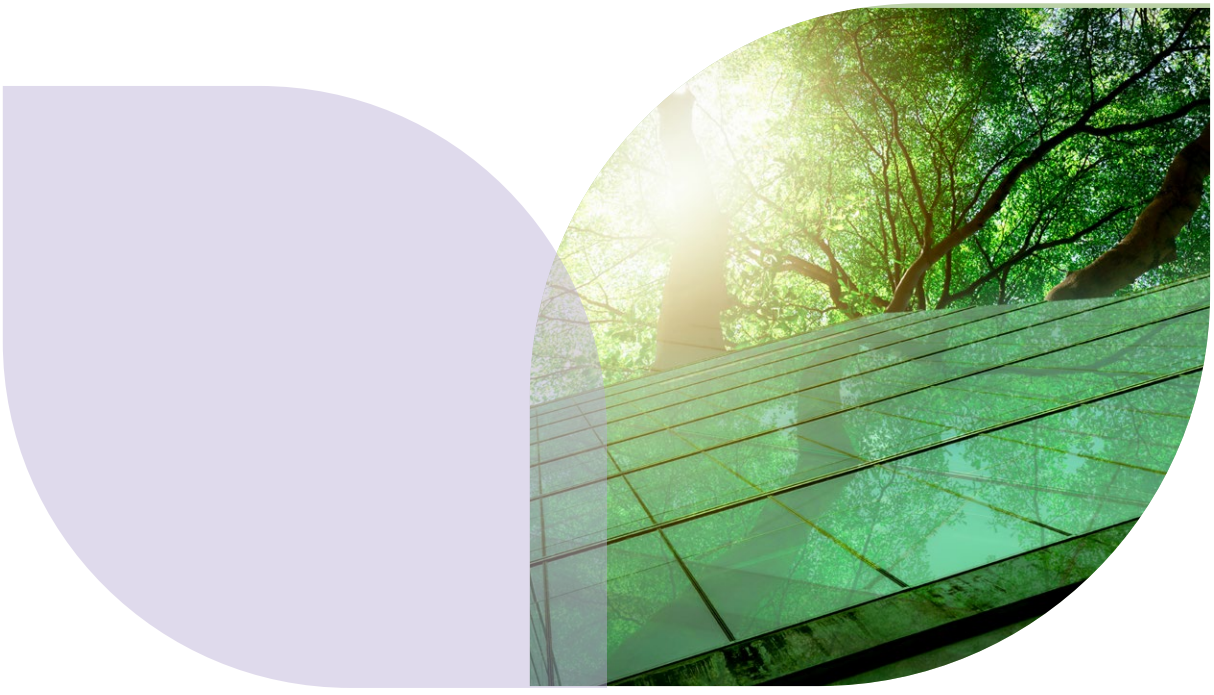
Specialist Skills Centres	ETBs' Views
The case for maximising infrastructure	• Without sufficient awareness of green skills programmes, uptake might be too low to make specialist centres viable. • Participation may be low where people would have to travel long distances and classes were held in person. • Specialist skills centres might result in duplication of existing provision. • Nationally set performance targets for ETBs conflicts with the aim of meeting regional skills gaps. Stakeholders mentioned that tailored green skills provision in their region to meet specific skills gaps would not translate into nationally set performance metrics.
Supports for specialist skills centres	• Analysis of existing skills gaps and skills demands in the ETB region to inform the duration and type of programmes required (i.e., whether a single specialist centre or dispersed smaller education hubs would be more appropriate). • Awareness raising to ensure a high uptake and programme viability. • Dedicated spaces for green skills provision with experienced instructors, hybrid learning suites, and staff equipped with climate, sustainability, and biodiversity training. • Standardised materials across centres. • Operational support through practical investment in facilities and multi-annual funding agreements.
Inhibitors of specialist skills centres	• Lack of space in existing ETB buildings. • High programme uptake necessary. • Risk of disjointed approach to programme development.

4.3 Tertiary Pathways

As part of the survey and workshop, ETBs were asked to reflect on tertiary pathways that could be developed between FET and HEIs. While many ETBs suggested ideas for collaboration, some were more inclined to focus on maximising current FET provision. More commonly occurring themes mentioned by ETBs have been highlighted in bold.

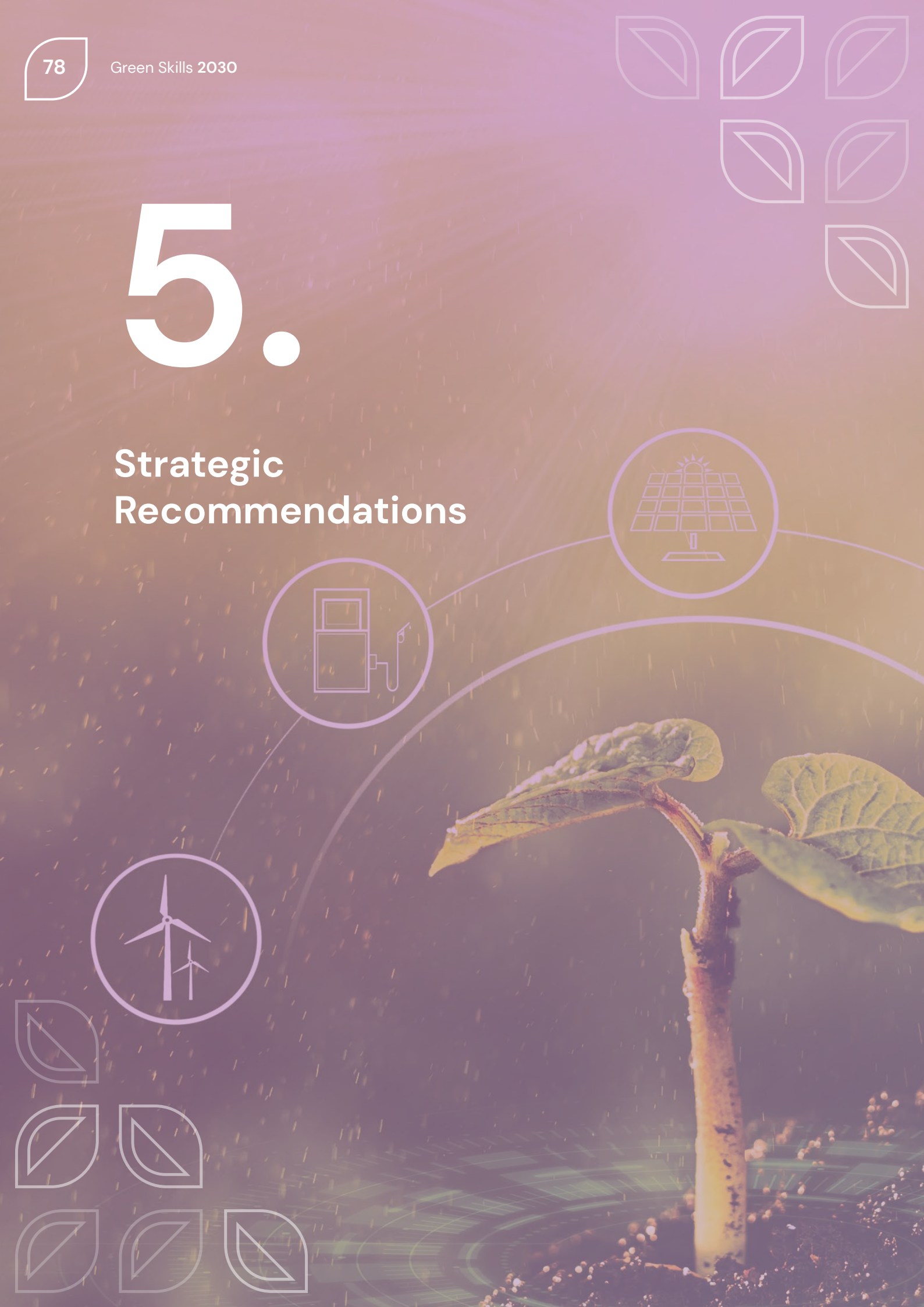
Tertiary Pathways	
New routes between further and higher education	• Pursue better aligned pathways from Level 5 and Level 6 programmes to Level 8 programmes at HEI. • Design Level 5 / 6 programmes in conjunction with HEI so that FET learners are exposed to higher education environments. • Introduce specific climate and biodiversity awards at NFQ Levels 4-6. • Develop integrated programmes where learners split their time between FET and HEIs. • Explore new routes from FET to HEI through an engineering traineeship. • Increase FET programmes' use of HEI sustainability courses.
Challenges to collaboration between further and higher education	• Some ETBs described an unequal relationship between FET and HEIs. • Structural challenges to create equally split programmes between FET and HEI, particularly as regards their validation of those programmes.
Enhance FET delivery	• Work on valuing and enhancing current FET offerings by: Increasing the number of green skills programmes at Level 5 and Level 6. • Developing hybrid learning in FET. • Placing more emphasis on green practices at adult and community education. • Tailor green skills programmes to local needs, upskill and retrain educators, and update existing programme curricula. • Focus on recognising the value of FET programmes to the economy, potentially by providing practical skills development for learners which is critical to employers. • Maintain that apprenticeships, and other FET programmes, are, and should be, a destination in and of themselves.

Tertiary Pathways	
Partnerships to advance green skills	• Promote other partnerships for green skills development (e.g., local bodies, local businesses, and wider industry to provide internships, placement, and work opportunities for FET learners).
Incorporate best practices in FET	• Embed green skills in communities. • Integrate climate awareness into courses, and counter climate scepticism. • Remain learner-focused and create clear visibility on pathways arising out of FET programmes. • Provide sufficient programme resourcing and prioritise flexible and adaptable modules to meet the needs of a changing economy. • Support local SMEs. • Develop structured approaches for FET-HEI collaboration.
Collaboration for FET Programmes	• Ensure a high degree of industry and HEI involvement in programme design and delivery. • Collaborate with outdoor education and training centres on programme development. • Involve industry and higher education providers in designing a suitable set or programmes which could adapt quickly to changing needs.



5.

Strategic Recommendations



5. Strategic Recommendations

The current Strategy sets out five Strategic Priorities (SP) for green skills development. Grounded in the research and consultation process conducted to inform this Strategy, the priority areas also underpin the national strategic approach to developing green skills within the FET sector. As a result, the strategic recommendations apply across the FET sector and are not confined to any one industry sector.

The cross-sectoral actions to grow and embed green skills have been grouped into the five Strategic Priorities for this Strategy, namely:

SP1: Increasing awareness of FET programmes and green skills provision

SP2: Promoting career opportunities arising from the green transition

SP3: Integrating green skills and transversal competences content into all FET programmes

SP4: Developing cross-sectoral green compliance, disclosure, and reporting skills

SP5: Supporting FET green skills programmes design and delivery

The five Strategic Priorities and associated actions have been developed based on the three strands of research that have informed the development of the FET Strategy.

1. Feedback received during stakeholder consultation that applies across the different economic sectors under consideration.
2. Inputs from ETBs related to the supports required by the FET sector to advance the provision of specific and transversal green skills and capacities needed for the transition to the net zero economy through FET Centres and other further and higher education and training providers.
3. Where appropriate, the recommended actions are also linked to key Government, SOLAS, or EU action plans that promote learning for green skills development and environmental sustainability, such as the Climate Action Plan 2024, GreenComp – the European Sustainability Competence Framework, and SOLAS's Green Skills for FET 2021-2030 Roadmap.

The Strategic Recommendations reflect an overall approach to FET green skills development as each strategic priority and its associated actions derive directly from the extensive consultation process undertaken to inform this strategy and are aligned with policy priorities for the FET sector. The actions recommended under each area have been developed based on the feedback provided by industry stakeholders, government departments, and ETBs.

Each Strategic Priority represents themes or suggestions that were frequently mentioned during engagement with these stakeholders. The Strategic Recommendations are therefore particularly valuable as they reflect the key actions recommended by ETBs, DFHERIS, and other governmental stakeholders. These recommendations have been refined in consultation with ETBs, SOLAS, and DFHERIS to ensure overall policy alignment so that the areas of Strategic Priority and respective actions echo national aims to foster green skills and transversal skills opportunities, integrate a sustainability focus across education, and to pursue effective partnerships in meeting priority skills needs.

SP1: Increasing awareness of FET programmes and green skills provision

Irish organisations are being urged to ensure they have the 'green' capabilities required to ensure compliance, keep up with evolving environmental trends, and successfully deliver in a competitive and changing environment. To do so, businesses are advised to 'actively engage with available resources and support mechanisms to propel their sustainability agendas forward' (See Action 6 in SOLAS and Deloitte 2024).

To enable companies to maximise their use of available sustainability supports, existing FET learning opportunities and green skills development programmes should be rigorously promoted and targeted towards businesses. Awareness raising can be supported by

streamlined sources of information, greater understanding of current skills needs, and incentives for businesses to engage in skills development.

Given the increasing demand for green skills, a great deal of work is already under way to raise awareness of existing FET programmes. The opportunities offered by the Irish FET sector are being consistently promoted to offer a wide range of educational opportunities to all types of learners. Stakeholders consulted to inform this Strategy noted the need for further clarity and information on existing green skills programmes at FET level. Several awareness-raising actions that could be taken by FET providers were suggested:

- Developing a centralised information point with up-to-date details about FET programmes with green skills components across sectors aimed at raising awareness of these supports and resources among businesses, learners, and the wider public. This could be achieved through the SOLAS website and FETCH Courses (the Further Education and Training Course Hub).
- Organising workshops, briefings, webinars, and demonstration sessions to raise general knowledge of the green transition for businesses.
- Ensuring ongoing engagements with relevant industry partners are taking place to monitor emerging needs in the green economy and requirements for specific sectors and job roles.

Raising awareness of green skills programmes should also be done through using the "green skills" brand developed by SOLAS in the promotion and marketing of green skills courses. Using a coherent brand across all green skills provision will demonstrate to learners, industry, parents, guidance counsellors and others that FET should be a key consideration for all those wishing to advance their careers in the green transition.

- Using the "green skills" brand across all relevant FET provision and creating targeted campaigns for green skills courses.

SP2: Promoting career opportunities arising from the green transition

A key principle of the Just Transition Framework, which was established in the 2021 Climate Action Plan, is that people must be equipped with the right skills to be able to participate in, and benefit from, the future net zero economy (See Chapter 7 in the Climate Action Plan 2024). FET has a role to 'to create awareness of climate justice, sustainability, and bioeconomy issues across FET learners, FET staff and school students' (SOLAS, 2020b, p.7) The current Strategy is also guiding the response of the FET sector to the future skills requirements of the green economy, including the development of specific and transversal green skills, as well as training supports for vulnerable employees, labour market returners, employers, and enterprises negatively impacted by the transition to the green economy.

Relatedly, FET learners must be supported in their educational pursuits through a 'consistent approach to learner supports across FET' (SOLAS, 2021, p.19). This includes an 'integrated approach to guidance, a universal design for learning approach, and common financial supports for learners' (SOLAS, 2021, p.19). Universal design for learning (UDL) has a key role to play in shaping FET, and FET practitioners should be supported to implement UDL approaches (SOLAS, 2021).

Actions to promote green career opportunities to vulnerable workers include:

- Exploring ways to promote general green skills and sustainability courses in primary, secondary, as well as tertiary education, including both FET and HEI.
- Highlighting career opportunities arising from the green transition and mapping them to current FET training provision offerings across all sectors of the economy.
- Communicating and promoting employment opportunities in the green economy to prospective learners, parents, and careers guidance professionals across all channels of FET provision, including secondary schools, tertiary pathways, and adult education.
- Providing upskilling / reskilling provision in green skills that contributes to retention to ensure that those who enter green jobs have the opportunities to stay in them and progress.
- Encouraging female participation in FET green skills programmes.
- Providing clear signposting for early school leavers and their advocates (either parents or mentors) of green skills development opportunities. This can be achieved by embedding green skills development opportunities in Youthreach and Community Training Centres.
- Continue to expand green skills FET programme offerings, including Skills to Compete programmes, as flexible, short, and stackable qualifications to people who are not currently in employment. Specific green skills participation targets should be included as part of Skills to Compete.
- Partner with external organisation programmes to support green skills offerings for people who are not in employment, such as Generation's coordination of green upskilling programmes for the unemployed with Laois-Offaly ETB, and Sigmar's proposed green skills referral initiative.
- Collaborate with National Council for Curriculum and Assessment (NCCA) on curriculum development related to green skills in the junior and senior cycle.
- Use the new iVET modules as a platform for rolling out TY modules on green skills.
- Working with FET Information and Guidance Services and school guidance counsellors to ensure that career and educational pathways from green skills programmes are clear to all FET learners. This includes informing parents and advocates of advances in sectors which have radically altered roles and occupations as a result of the green transition.

SP3: Integrating of green skills and transversal competences content into all FET programmes

To fully participate in the green transition of our economy and society, learners must be supported to develop sustainability skills and competencies based on knowledge and attitudes that promote sustainable actions.

GreenComp, the European sustainability competence framework, highlights the key role that lifelong learning plays in delivering the education and skills required for climate action and is designed to support education and training programmes for lifelong learning across ages, education level, and learning setting. Many of the twelve competences outlined in the framework are linked to the transversal skills that all learners require to navigate the green transition, such as systems thinking, critical thinking, problem framing, climate literacy, adaptability, and exploratory thinking. These skills have also been highlighted by the stakeholders consulted for the current Strategy as essential in ensuring that learners acquire the knowledge and skills related to environmental awareness and green practices. Therefore, the GreenComp framework can be naturally embedded in FET programmes across a range of disciplines and economic sectors. This is already being achieved through the QQI Learning for Sustainability award, which can be used by education and training providers to design sustainability programmes at NFQ Levels 1-4.

Fostering the growth of green transversal competences is particularly important given the low ranking of green transversal skills by stakeholders consulted to inform this Strategy. As illustrated by the findings in Section 3.8 of Chapter 3, green transversal skills tended to be ranked lower relative to other transversal skills by stakeholders. There is some variation in the ranking of certain green transversal skills by sector, which is presented in Appendix D.4. Overall, the findings from the survey suggest that green transversal skills are not highly prioritised by stakeholders, and that further action is needed to promote and embed green transversal skills.

Given the transformative impact implied by the green transition and the role of the FET sector in enabling lifelong learning and personal development, ETBs should be supported to develop and embed green skills modules within all their programmes, so that learners across economic sectors can gain green skills and competences.

Actions that can help embed green skills and sustainability competences across FET programmes include:

- Auditing / Mapping existing FET provision for all learners, and at all levels against the GreenComp framework to examine areas of compliance and areas where it can be embedded.
- Exploring technical solutions to aid in the aforementioned auditing / mapping process (i.e., data scraping, machine learning etc.).

- Using GreenComp to shape the development of new FET provision for all learners at all levels across FET.
- Providing ongoing continuous professional development to upskill FET facilitators to embed sustainability content in FET programmes using the GreenComp framework.
- Consistently and transparently incorporating green skills modules within all specialised / highly specialised courses across a wide range of disciplines.
- Continuing to support the development of green transversal skills, such as climate literacy, adaptability, exploratory thinking, systems thinking, critical thinking, and problem framing skills as part of FET courses across occupations and disciplines.
- Exploring opportunities to create new climate, biodiversity, and sustainability modules as standalone programmes or within existing awards across all FET courses, without unnecessary duplication.

SP4: Developing cross-sectoral green compliance, disclosure, and reporting skills

With the continued emergence of environmental and sustainability reporting standards, regulation compliance has become a key driver for the sustainability agenda of businesses and organisations across all economic sectors (see for example the key findings of the SOLAS and Deloitte 2024 report). As a result, businesses need supports to develop skills related to regulations, disclosure, and reporting, alongside relevant knowledge of climate action and policies. The need for skills development in sustainability regulation, as well as continuous upskilling in data processing and analytics for employees across teams and business units, is even more acute for small and medium-sized enterprises who often lack the resources to understand and keep up to date with Corporate Sustainability Reporting Directive (CSRD) reporting requirements.

Building on its strong capabilities around energy, building, and the environment, the FET sector is ideally positioned to respond to the need for ESG skills development in the business market by providing training on sustainable measurement, monitoring, and reporting that Irish businesses need to meet the country's ambitious climate action targets across all industries.

Actions that can contribute to the development of ESG compliance and reporting skills include:

- Continue to develop and roll out further FET micro-qualifications in Sustainable Leadership, Sustainable Finance, and Sustainable Reporting.
- Advocate for green skills training to be included as part of the Safepass programme for construction workers and for similar programmes to be introduced for workers in other sectors.

- Plan future FET provision that responds to the sustainable / green skills needs of enterprise in Ireland, including data and analytics capabilities as well as compliance with environmental regulations and ESG reporting frameworks.
- Continue to provide targeted, stackable, and accredited courses to support the development of ESG reporting skills and capabilities.
- Develop training offerings focused on carbon accounting, lifecycle analysis, carbon embodiment, and other relevant measurement practices.
- As part of promoting upskilling programmes, highlight the benefits of adopting green practices for organisations that can help increase business success while contributing to sustainable living and working.
- Ensure the ETBs and other providers are exemplars of sustainable business practices including through demonstrable implementation of the requirements of the Public Sector Climate Action Mandate with annual Roadmap updates, leadership by a Climate Action and Sustainability Champion, and transparent sharing of progress towards related targets.

SP5: Supporting FET green skills programmes design and delivery

The FET sector plays a key role in providing life-long learners, employees, and employers with the skills they need to seize new career opportunities in the green economy. To fulfil its mission, the FET sector must be supported to progress the green transition and support climate action in Ireland through the nationwide roll-out of a green skills suite of programmes, which include the Skills to Advance initiatives and FET micro-qualifications. These programmes must be carefully designed to meet the current and future skills gaps in the Irish marketplace, while also being fully accessible to all FET learners and employees.

A significant amount of work has already occurred to develop FET green skills programmes. This work can be built upon through flexible and adaptable programmes, an increase in programme resources, and through strategic collaboration with stakeholders. The section below sets out actions under three key areas – programme design and delivery, collaboration, and resources.

Green Skills Programmes Design and Delivery

- Prioritise the delivery of short and targeted courses that address specific green skills as well as digital and technology skills gaps at all professional levels in the Irish marketplace.
- Enhance the accessibility of current and future programme offerings by ensuring that they can be delivered through in-person, online, and blended learning and at convenient times to meet the needs of FET learners and employees.

- Deliver programmes in clear language, at an appropriate level, that is aligned with 'plain English' guidelines.
- Continue to integrate transversal competences, such as problem solving, climate literacy, and effective communication, in the curricula of green skills programmes where appropriate.
- Continue the development of a framework that allows learners to stack FET micro-qualifications and achieve nationally recognised certifications.
- Engage with Recognition of Prior Learning to review means of accounting for life experience of FET learners.
- Emphasise practical skills development and promote best practices through peer-to-peer learning opportunities where appropriate (such as demonstration settings for specific sectors) in the design of green skills programmes.
- Monitor the emergence of new products and technologies so that ETBs and FET Centres can respond by developing programmes that can deliver the new digital and data analytics skills required by current and emerging occupations across different industries.
- Provide sufficient programme development resources for ETBs, including financial and non-financial supports, to fund the design and delivery of new courses as the need for new skills emerges for workers to perform in the net zero economy.
- Appoint staff in each ETB with dedicated responsibility for green skills development and competency in education for sustainable development.

Collaboration with Key Stakeholders

- Continue and enhance the involvement of industry partners and innovation centres in the design of FET programmes and initiatives, particularly through medium- to long-term partnerships with national coordination and regional implementation (e.g., through the developing network of Centres for Specialist Skills Development).
- Engage with Regional Skills Fora and business to prioritise programmes that are relevant to industry needs and that can be adapted to new and emerging digital and technological trends.
- Promote strategic collaboration between education providers, academia, business and industry, local and regional authorities, and professional bodies to develop programme offerings that respond to the identified green skills needs, other than existing tertiary degree offerings.
- Collaborate with HEI to create better aligned pathways from further to higher education and to provide opportunities for FET learners to experience higher education environments. These pathways could be informed by data monitoring of the FET sector conducted by the Central Statistics Office (CSO).

- Explore opportunities to develop integrated programmes linking further and higher education that allow learners to split their time between FET training centres and HEIs and work with the National Tertiary Office where appropriate.
- Explore collaborative opportunities with National Innovation Centres where appropriate (e.g., Teagasc Ashtown Food Research Centre, Bia Innovator Centre, BioConnect Centre, National Bioeconomy Campus, etc.).
- Pilot programmes that bring FET and HEI learners into the same setting and enable fruitful knowledge-sharing.
- Enhance partnerships between FET providers and HEIs to design and deliver high-quality and relevant green skills programmes.

Enhanced Resources for ETBs and FET Centres

- Ensure that FET staff benefit from ongoing professional development and have a solid understanding of climate change, sustainability, and human impacts on the environment.
- Utilise the resources available through the newly established Professional Learning & Development (PL&D) Hub to provide and promote upskilling training programmes for FET staff across all green skills areas and industry sectors.
- Enhance the use of existing FET resources (for example, encouraging cooperation between ETBs to coordinate common responses to skills needs).
- Explore digital solutions to improve the accessibility and flexibility of green skills programmes.
- Invest in physical resources to enable delivery of specialist requirements of green skills needs (for example, through strategic partnerships between ETBs as physical space providers and developers / manufacturers as suppliers of up to date, on-demand enabling equipment and technologies via flexible, industry-focused leasing and swap-out arrangements that benefit learners and enterprise by ensuring the currency of training). Specialisation by individual ETBs into particular green skills specialisations, as per the 3S National Smart Specialisation Strategy for Innovation 2022-2027, will maximise the impact of investment in physical and intellectual resources, with digital solutions enabling consistent, all-Ireland delivery.

6.

Sectoral Recommendations

6. Sectoral Recommendations

This chapter identifies opportunities to enhance the provision of green skills programmes for all FET learners and puts forward recommendations across the seven economic sectors on which the Strategy focuses. The findings of the literature review, policy analysis, and assessment of best practices in skills development have been taken into consideration for the drafting of these recommendations.

The recommendations are divided into sector-specific recommendations and cross-sectoral recommendations. Sector-specific recommendations outline responses to skills needs in the seven economic sectors considered. Cross-sectoral recommendations set out key issues to be addressed that are not confined to any one particular sector.

Both cross-sectoral and sector-specific recommendations are also strongly informed by the insights and feedback offered by the key stakeholders consulted, including representatives of professional bodies and government departments, ETBs, HEIs, and other relevant education and training providers.

6.1 Sector-Specific Themes & Actions

This section identifies opportunities to enhance the provision of green skills programmes within the seven economic sectors on which the Strategy focuses. The sector-specific recommendations are strongly informed by the insights and feedback gleaned from the key stakeholders consulted, including representatives of professional bodies and government departments, ETBs, and other relevant education and training providers. The findings of the literature review and policy analysis of national and international skills strategies have also been considered in the drafting process.

The recommendations proposed for the seven key economic sectors that were singled out throughout this document are framed by three common themes:

FET Programmes Development

Recommendations under this theme outline a range of indicative programmes that should be considered for development to meet the green skills gaps that were identified by stakeholders for specific occupation groups.

Opportunities for Specialist FET Skills Centres

Recommendations under this theme single out areas of delivery that – according to stakeholders – could benefit from the establishment of specialist skills centres.

This model may be more appropriate for occupations that require highly specialised skills and where the costs of required infrastructure are sufficiently high to warrant the establishment of a limited number of centres in regions that would benefit from them most (e.g., eMobility, wind energy, offshore power generation).

Alternatively, a wider network of smaller centres might be appropriate to provide training for occupations that are not as resource-intensive (e.g., horticulture, hospitality), as could specialist skills hubs which act as centres of knowledge creation and transfer within the FET sector, but do not necessitate additional capital infrastructure.

Overall, specialist skills centres can be developed where they build upon and enhance the existing strengths of particular regions based on their skills needs. They do not necessarily have to consist of new physical spaces but can be a collaboration of multiple ETBs, with one ETB being the primary coordinator. The exact governance and branding of these centres will have to be explored further. However, a key strength of this type of specialist skills centres is that they will allow individuals and organisations to easily access and navigate FET offerings related to specialist skills needs that are prioritised under the green transition.

There is also an opportunity for FET specialist skills centres to be informed by research and innovation. Through collaboration with universities, FET can provide cutting edge education and training for learners, particularly in areas related to the green transition and digital technology.

Pathways between Further and Higher Education

Recommendations under this theme illustrate a range of initiatives aimed at continuing and enhancing collaboration between further and higher education providers to develop and deliver the necessary programmes to meet the identified green skills needs.

Developing more joined up tertiary education and training programmes is a key objective of a unified tertiary system. The policy platform for creating a unified tertiary system suggests the need for clear and extensive pathways for learners, as well as creating more integrated learning and development opportunities for learners, researchers, and innovators.

A number of pathways enabling learners to pursue further green skills training within higher education are recommended in this Strategy for certain study areas and occupations. In addition to offering the path to a HE degree, the development of tertiary

pathways – or joint programme development between FET and HE institutions – can enable some learners to augment skills or qualifications already held or to take advantage of the facilities available at certain HEIs.

The suite of programmes considered under these tertiary pathways must be sufficiently accessible and flexible – including full- and part-time, online, in person and blended learning, college-level micro-credentials and FET micro-qualifications – to offer employers and learners opportunities to progress or stack qualifications to achieve combined outcomes.

Key recommendations are identified for each theme across the four key economic sectors, as shown in sections 6.2-6.8.

6.2 Construction & Built Environment (including Water and Waste Management)

Themes	Actions
FET Programmes Development	Building upon existing programmes and partnerships (e.g., developed by Laois and Offaly ETB and TU Dublin), continue to support the upskilling of construction workers in Modern Methods of Construction (MMC), and new technologies such as Building Information Modelling (BIM), and Revit Structures.
	Embed sustainability and carbon management modules into continuous professional development programmes aimed at the built environment sector, including planning office personnel and architectural technicians.
	Enhance existing programmes aimed at preserving traditional building skills, including conservation and restoration, for workers in areas such as lime plastering, brick repointing, historic carpentry, masonry, thatching, and salvaging.
	Provide upskilling opportunities for bricklayers and masons on sustainable techniques, such as the use of compressed earth blocks, water and waste management, and dry stonewalling.
	Support project management, green procurement, risk assessment, carbon literacy, carbon accounting, and circular economy and bioeconomy training for construction and built environment project managers.

Themes	Actions
FET Programmes Development	Continue to develop energy efficiency training courses, such as internal and external insulation, heat pump installation and maintenance, and energy efficient HVAC systems across the six Centres of Excellence.
	Expand work-based learning for retrofitting skills covering areas such as airtightness, ventilation, internal and external wall insulation, BIM, green construction, and window installation.
	Embed modules focused on the use of digital technologies across relevant construction and built environment programmes.
	Embed content on transversal skills and Education for Sustainable Development competencies, such as communication and climate literacy skills, for retrofit contractors so that professionals can better communicate the benefits of retrofitting to clients and the public.
	Promote training on the reuse of waste materials for road construction operatives.
Opportunities for FET Specialist Skills Centres	Continue to promote and expand the Mount Lucas National Construction Campus and the offerings of the six existing Centres of Excellence, looking beyond NZEB and ZEB to ensure futureproof green construction skills, including digital and green technologies.
	Support the Mobile NZEB Training Unit and the National MMC Demonstration Park in Mount Lucas to showcase the use of green technologies in construction and promote available training and upskilling offerings.

Themes	Actions
Pathways between Further and Higher Education	Engage with higher education providers to review NFQ pathways for craft trades and assess how the current craft training providers (i.e., ETBs, Technological Universities, Institutes of Technology) can collaborate to design progression routes for craft apprentices to Level 7 courses and beyond, including advanced technological and green skills programmes.
	Work with HEIs to develop pathways from NFQ Level 5 / 6 in Sustainable Construction to NFQ Level 7 / 8 degrees in Sustainable Building Technology (e.g., NZEB Centre of Excellence and TUS-DASBE).
	Consider developing more NFQ Level 5 / 6 programmes in Sustainable Construction with closely aligned pathways into Level 7 / 8 programmes on Planning and Environmental Management.
	Enhance further and higher education co-operation to promote retrofitting and energy efficiency programmes to early school leavers.
	Explore collaborations with HEIs and private bitumen companies to develop training on the use of recycled and bio-based materials and cold-mix asphalts in road construction.

6.3 Engineering, Energy & Manufacturing

Themes	Actions
FET Programmes Development	Update curricula with green and sustainable approaches and Education for Sustainable Development competencies on existing apprenticeships for electricians and electrical fitters.
	Offer training on carbon literacy, ESG, and energy systems for energy managers.
	Work with Engineers Ireland, the Sustainable Energy Authority of Ireland (SEAI), the Irish Solar Energy Association (ISEA), Wind Energy Ireland, the Biomethane Implementation Group, and the Green Tech Skillnet to develop training in the installation, maintenance, and repair of renewable energy systems (e.g., anaerobic digestion, biogas separation, heat pumps, solar panels, and wind turbines).
	Work with Engineers Ireland, Wind Energy Ireland, Green Tech Skillnet, SEAI, ISEA, and HEIs to develop upskilling opportunities in energy storage and battery technology.
	Work with Eirgrid to develop programmes to dovetail with FET provision including conversion programmes for suitably qualified people
	Continue to develop online learnings such as the "Energy & You" module to increase learner awareness and understanding of energy use.
	Focus engineering training supporting workers in traditional sectors to shift to renewable sectors, with an emphasis on thermal and electrical engineering.
	Develop content on circular economy, bioeconomy/ biorefining, carbon appraisal, and biodiversity that can be integrated into Level 5 and Level 6 engineering programmes at FET level.
	Based on the work of the Expert Group on Offshore Wind, support the promotion and provision of maritime and seafaring courses, including the training of Remotely Operated Vehicle (ROV) operatives.

Themes	Actions
FET Programmes Development	Capitalise on the work of Kerry ETB and their Wind Turbine Apprenticeship to scale offshore renewable energy (ORE) and Commercial Diving training to other relevant locations for offshore wind exploitation.
	Continue to collaborate with industry, education providers, and NMCI to ensure there is sufficient health and safety training for professionals working in offshore wind settings.
Opportunities for FET Specialist Skills Centres	Support the delivery of the T-SHORE Project and collaborate on the joint development of ORE skills offerings.
	Support the development of green technologies training offerings for the manufacturing sector at the AMTCE Centre of Excellence in LMETB.
	Work to maximise geographic advantages that support offshore wind energy with local agencies, HEIs, and other relevant groups to develop a tertiary framework of qualifications in offshore renewable energy (ORE) and establish a specialist FET skills centre to serve this area.
Pathways between Further and Higher Education	Work to maximise geographic advantages that support anaerobic digestion, biorefining, and sustainable agri-food processing with Teagasc local agencies (such as the Teagasc Ashtown Food Centre), HEIs, and other relevant groups (e.g., Bia Innovator Centre in Athenry, BioConnect Centre in Monaghan, Moorepark Food Hub and Moorepark Technology Ltd in Cork, the National Bioeconomy Campus at Lisheen, Co. Tipperary) to develop a tertiary framework of qualifications in food and bio-based product processing.
	Collaborate with HEIs to develop progression pathways from Level 5 / 6 courses in Renewable Energy Technology to Level 7 / 8 awards in Renewable Energy.
	Explore opportunities to develop Levels 5-7 certifications or micro-qualifications in sustainable textile manufacturing in collaboration with HE providers who offer advanced degrees in fashion and textiles.
	Work with HEIs to develop a Level 5 'Green Engineering' programme that would allow learners to progress to advanced courses in sustainable energy and green technologies.

6.4 Transport & Logistics

Themes	Actions
FET Programmes Development	Develop and update vehicle related apprenticeships and post-apprenticeship courses with practical training for motor mechanics to maintain electric vehicles, including electric trams and buses.
	Expand training offerings for bus, coach, and HGV drivers in environmental awareness and eco-driving.
	Continue to promote the adoption and expansion of the SMART Driving / ECO-driving programme for HGV drivers, transport, and distribution managers.
	Collaborate with the Association of Energy Engineers (AEE) to promote and expand transport energy audit and fuel performance management training for transport and distribution managers.
	Address skills gaps in electric vehicles, supply chain, and logistics management through upskilling opportunities for those already working in the sector.
	Evaluate potential training offerings for electric vehicle charger installation and maintenance.
	Evaluate potential training offerings for alternative fuels and biofuels.
	Assess the need to develop health & safety awareness training.
Opportunities for FET Specialist Skills Centres	Develop a National eMobility Capability Centre to coordinate training and upskilling courses across multiple areas of the eMobility Sector.
Pathways between Further and Higher Education	Explore progression pathways to the Logistics Associate Apprenticeship, which would provide the required green skills training for the freight, logistics, shipping, and distribution industries.

6.5 Agriculture, Forestry & Marine (including Bioeconomy)

Themes	Actions
FET Programmes Development	Explore opportunities to increase the number of programmes that integrate sustainable food, bioeconomy, climate neutral systems and technology and to adapt these courses to industry needs.
	Work with Skillnet business networks, such as Macra Agricultural Skillnet, ICOS and Farm Business Skillnet to expand and enhance training and upskilling for farmers, agriculture, and horticulture workers in sustainable food production. This training should address organic agriculture, land management, eco-system services (including carbon farming, biodiversity, soil, and water quality), and nature-based solutions. Training and upskilling should also be developed on the use of digital technologies, renewable energy, and the effective exploitation of bioresources to the highest possible value (including biorefining on farms and across rural areas).
	Collaborate with Teagasc to enhance and expand the delivery of existing certified horticulture courses at FET Centres.
	Continue to promote upskilling in environmentally friendly practices in agriculture, (i.e., sustainable agriculture provision in Mayo, Sligo Leitrim ETB).
	Explore ways to develop a professional pathway, certify, or further upskill local community members working on nature restoration or environmental monitoring projects.
	Provide training for landscape architects on the circular economy, bioeconomy, reuse of materials, and use of native flora.
	Develop training on climate resilient practices for forestry workers.
	Work with Skillnet Ireland to design FET stackable micro-qualifications (or college-level accredited micro-credentials) with cross-disciplinary elements for forestry workers.

Themes	Actions
Opportunities for FET Specialist Skills Centres	Work with Teagasc, Coillte and ETBs to provide spaces for the showcasing of sustainability best practices in the sector (e.g., demonstration farms or demonstration forests).
	Assess need and examine feasibility of establishing a specialist skills centre dedicated to sustainable agriculture.
Pathways between Further and Higher Education	Work with HEIs to develop progression pathways from Level 5 / 6 courses in Organic Farming to NFQ Level 7 / 8 awards in Sustainable Agriculture, Food and Bio-based Systems.
	Collaborate with HEIs including the BiOrbic National Bioeconomy Research Centre and the CircBio Research Centre in MTU to review gaps in bioeconomy-related training provision.
	Collaborate with HEIs that offer third-level courses in forestry – such as UCD, SETU, TUD and ATU – to create a hybrid NFQ Level 7 course for forestry workers.
	Work with HEIs to develop stackable micro-credentials for agriculture, forestry, and marine roles to promote multi-disciplinary farming, forestry, fisheries, and aquaculture practitioners.

6.6 Biodiversity & Environment

Themes	Actions
FET Programmes Development	Create training offerings for machinery operators to manage wetlands and rivers.
	Engage with agriculture representative groups to discuss and explore opportunities for peer-to-peer learning amongst farmers on land management and biodiversity.
	Develop training for landscape architects and architectural technicians to create habitat maps.
	Develop Geographic Information Systems (GIS) training offerings for digital staff.

Themes	Actions
FET Programmes Development	Develop a programme offering for communication teams around biodiversity.
	Scale up the Nature Skills Training programme for public sector staff and contractors working in sensitive environments, piloted by Laois and Offaly ETB.
	Focus upskilling for ecologists on practical ecology skills and on project management skills.
	Develop trainings related to climate, water management, and waste management, as well as ecological restoration.
	Establish a Level 6 programme on protecting rivers and natural waterways.
	Promote green skills courses focused on biodiversity and nature-based skills.
Opportunities for FET Specialist Skills Centres	Use existing infrastructure to develop a FET centre for climate and biodiversity that would provide bespoke programmes in these areas for FET learners across sectors. Co-operation with the All-Island Climate and Biodiversity Research Network and other stakeholders could inform the programme offerings for this centre.
	Work with the Heritage Council, the Design and Craft Council, Kilkenny Carlow ETB, the South East Energy Agency, Kilkenny County Council, and other heritage stakeholders to assess the potential for developing a FET Skills Centre focused on Heritage, Sustainability and Climate Action.
Pathways between Further and Higher Education	Collaborate with HEIs, the National Parks and Wildlife Service (NPWS), the Office of Public Works (OPW), the Skillnet Climate Ready Academy and ETBs to develop certified ecological training programmes for staff, contractors, professionals, and other FET learners.
	Pursue increased collaboration with HEIs, particularly the Co-Centre for Climate, Biodiversity, and Water in Trinity College Dublin to support FET programme development on climate, biodiversity, and water.

Themes	Actions
Pathways between Further and Higher Education	Support ETBs and HEIs to develop pathways from NFQ Level 5 / 6 in Applied Ecology or Environmental Studies to Level 7 / 8 degrees in Environmental Science and Climate.
	Assess the potential for developing more major awards across Levels 4-6 in climate and biodiversity delivered in FET Centres across the country that would provide progression pathways into HE programmes in environmental science.
	Collaborate with HEIs and other partners to enhance the delivery of work-based learning ecology training and other certified courses with an emphasis on applied ecology and project management skills development.

6.7 Tourism & Hospitality

Themes	Actions
FET Programmes Development	Develop programme content for tourism and hospitality professionals on communication and accountancy skills relating to sustainability.
	Communicate the benefits of green practices for tourism and hospitality professionals.
	Provide green skills workshops for restaurant and catering managers and professionals.
	Continue to promote the 50 Shades Greener programme to hospitality businesses across the country to promote awareness of the costs and benefits of switching to greener practices.
	Work with ETB Outdoor and Education Training Centres to enhance the provision of environmental knowledge as part of outdoor education programmes.
Opportunities for FET Specialist Skills Centres	Work with Bord Bia and Skillnet Ireland to assess the feasibility for establishing a specialist centre that would focus on developing sustainability training for culinary and hospitality/restaurant skills.

Themes	Actions
Pathways between Further and Higher Education	Explore collaborations with HEIs, Fáilte Ireland and flagship tourism and recreation destination providers – such as Coillte – to develop tertiary degrees or micro-credentials in sustainable destination management, outdoor recreation management, and commercial management of recreation.

6.8 Accounting & Business[3]

Themes	Actions
FET Programmes Development	Educate employers about their responsibilities in relation to green reporting skills and promote appropriate training offerings.
	As part of green upskilling, work with representative bodies to raise awareness and educate accountants and tax experts on changes related to the green transition.
	Support the development of green procurement and regulatory compliance skills.
Opportunities for FET Specialist Skills Centres	Using existing resources, develop a specialist skills centre with a focus on sustainability, ESG, and Lean Management for businesses and SMEs.

3 Please note that stakeholders did not identify any green pathways between further and higher education in this sector.

7.

Implementing Green Skills 2030: Next Steps

7. Implementing Green Skills 2030: Next Steps

Delivery

Green Skills 2030 is ambitious in scope, and it is vital that SOLAS work in close partnership with all stakeholders within FET, particularly ETBs, to ensure its successful delivery. The development of an implementation plan and targets in collaboration with the FET sector, will be required to focus attention on successful delivery of both the strategic and sector-specific elements of Green Skills 2030. It will be necessary also, to ensure ongoing collaboration with industry partners and across government so that new developments and expert knowledge can be incorporated across the lifetime of the strategy. An agile, responsive approach is needed with flexible delivery options is key to ensuring that all types of learners can be catered for, enabling FET to establish itself as a key driver of the green transition in Ireland.

The Next FET Strategy & Strategic Performance Agreements

The next FET Strategy (2025-2029) is currently in development, and Strategic Performance Agreements between SOLAS and ETBs are under review in preparation. It is critical that the current FET reform agenda, the upcoming FET Strategy (2025–2029) and Green Skills 2030 align together, complement each other, and provide a synergy of outcomes. Identification and twinning of actions during periodic reviews will also support the achievement of common strategic objectives. Additionally, SOLAS will work with DFHERIS to identify areas of priority within Green Skills 2030 for consideration in the next iteration of the performance agreements.

Governance

The delivery of Green Skills 2030 will be overseen by the "Green Skills 2030 Implementation Group." It is envisioned that membership of the group will include representatives from: SOLAS, ETBs, ETBI and DHFERIS who will:

- Develop an implementation plan to ensure successful delivery of the Strategy.
- Advise on data collection procedures to monitor implementation and progress measures.
- Review the strategy throughout its lifetime so it remains fit for purpose.
- Recommend actions to address any identified risks to implementation.
- Liaise with other units across each representative's organisation to ensure alignment with organisational goals, policies, and procedures.

- Ensure that implementation plans are aligned to Government policies, strategies, and legislation where relevant.
- Follow upcoming directives at National / EU-level to ensure compliance.
- Engage with industry stakeholders to remain up-to-date on critical industry needs and consult on implementation matter, where appropriate.

This group will report into the appropriate SOLAS Directorate and Executive.

Communications

Building on the roll-out of the "green skills" brand will be key to growing the vision of Green Skills 2030. It will necessitate innovative, sector-wide communications to demonstrate the ambition of FET as a key learning destination for the Green Transition, and grow its profile alongside "This is FET" to communicate the value of FET as environmentally, economically, and personally transformative.

A Appendix 1: Context Setting Background

A.1 Green Terms and Definitions

The Green Transition

The green transition encompasses a societal as well as an economic transformation. Not only is the demand for jobs and skills related to the green economy increasing, but there is a recognised need to embed environmentally friendly practices in communities through lifelong learning. This is because the policies to facilitate the green transition will have a transformative impact on how people live and work. The green transition involves significant changes in the labour market and workers will need support to adapt to changing occupational roles. On a societal scale, the green transition will advance knowledge and awareness of sustainability, nature, and the environment amongst individuals.

FET has a clear role to support this transition, as recognised in the Osnabrück Declaration and EU GreenComp sustainability competence framework (Cedefop, 2020; Bianchi et al, 2022). A robust FET sector can facilitate the transition from less environmentally friendly to greener activities and can offer pathways for people into emerging green jobs. Given that many of the impacts of the green economy will involve the greening of already existing jobs, the FET sector has a vital role in the development of green skills provision for people whose jobs are changing. The FET sector is also flexible enough to respond to quickly developing skills needs, the current development of programmes for offshore wind-related occupations being a prominent example.

The Green Economy

The shift from current economic practices to more environmentally friendly practices will trigger structural changes across all sectors (Cedefop, 2018). Such is the scale of the shift that transitioning to a green economy is estimated to create 25 million new jobs globally by 2030 (ILO, 2019). Around 7 million jobs are estimated to be lost as a result of this shift, of which 5-6 million could be reallocated to new roles (ILO, 2019).

While the impact of moving to a green economy is readily identifiable, defining the green economy is not as simple. By some definitions, the green economy merely describes specific sectors which are intrinsically related to sustainability and the environment and are therefore “green”. Sectors like renewable energy, water, and wastewater services would fit under this green economy umbrella, as well as the circular economy and bioeconomy – economies within an economy. Other definitions, however, describe the green economy as encompassing the economy in its entirety, signifying a transformation of occupations

and businesses across all sectors. The fuzziness of the green economy's definition has existed since the term was initially coined by a group of authors in 1989 (Faccer et al, 2014; Pearce et al, 1989). The authors deployed the descriptor 'green economy' in the title of a research paper exploring the concept of sustainable development on behalf of the British government. Other than title reference, the green economy itself was not defined. In the wake of the financial crisis of 2008, the term was used by the UN Environment Programme (UNEP) as a means to interlink responses to economic and environmental crises. UNEP defines the green economy as 'one that results in improved well-being and social equity, while significantly reducing environmental risks and ecological scarcities' (Faccer et al, 2014). To further complicate matters, green economy is often used interchangeably with green growth, low carbon economy, and zero carbon economy (Expert Group on Future Skills, 2021; Redmond and McFadden, 2023). Understandings of the green economy have also taken
a clear social dimension, as language around a 'just transition' for people affected by the transition to lower carbon activities has come to the fore of policy discussions, as has an emphasis on reducing gender inequality (EGFSN, 2021; OECD, 2023). Overall, a green economy appears to be something that uses less carbon, is better able to use resources, is more socially inclusive, and is tied to the digitalisation of advanced economies (Carrion-Flores and Ines, 2010; Voigt et al, 2014; Loiseau et al, 2016).

Despite the lack of clarity around the definition of a green economy, it is clear that promoting green activities will have a seismic impact on economic sectors. The UNEP estimate that the transition to a green economy on a global level could create 60 million new jobs (Redmond and McFadden, 2023). Achieving an economy that is green will bring new opportunities for employment, while also changing current occupational practices. Crucially, the green economy will bring with it green jobs, the filling of which will be dependent on the education and training of existing and new workforces (Redmond and McFadden, 2023).

Green Jobs

Directly implied by the idea of a green economy, jobs themselves can be described as being green. Similar to definitions of a certain green shade of an economy, definitions of green jobs vary depending on interpretation. A more common understanding is that green jobs are good jobs. This is perhaps best shown by the International Labour Organisation's (ILO) definition of green jobs as –

decent jobs that contribute to, preserve, or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging sectors such as renewable energy and energy efficiency (ILO, 2016).

LinkedIn, which provides the Industrial Development Agency Ireland (IDA Ireland) with labour market analysis statistics, defines green jobs as 'those that cannot be performed without extensive knowledge of green skills' (IDA Ireland, 2022).

The definition of green jobs, however, has largely been expanded upon to emphasise the importance of quality jobs to achieve a just transition away from carbon intensive occupations (EGFSN, 2021).

In addition to green jobs, which normally refers to new jobs emerging within a green economy, there is the concept of greening jobs. This refers to the greening of existing jobs by the adaptation of new environmentally friendly practices (although in Ireland, the EGFSN has classified green jobs as including existing occupations which adopt new practices) (EGFSN, 2021). In reality, the greening of existing jobs is where the transition to a green economy has its biggest impact, as skillsets are revised and updated to carry out new tasks (Cedefop, 2019, ILO 2019). The greatest demand to achieve the green economy is therefore placed on existing occupations where people will have to learn new skills to be able to work in a greener way. Jobs are more likely to have to undergo greening in the manufacturing and agriculture sectors, while sectors like renewables, construction, and environmental goods and services will see new jobs arise (ILO, 2019).

As part of the transition to a greener economy, the European Green Deal is estimated to create around 2.5 million new jobs in the EU, provided that skills needs are met (Cedefop, 2021). Compared to greening jobs, green jobs tend to emerge at higher levels of education (ILO, 2019). Given that a significant number of occupations will then have to undergo retraining, the further / vocational education and training sector takes on a critical role in providing new skillsets, updating curriculums, and setting qualifications for people to gain the skills needed in the green jobs that will drive the green economy (Cedefop, 2019). An additional challenge is brought by the clear gender imbalance of existing green jobs. Across OECD regions some 72% of green jobs are currently held by males, with the imbalance accentuated in some sectors (OECD, 2023). Training and education programmes will need to find ways to increase the number of women entering these occupations, particularly in STEM subjects (European Commission, 2023). Ultimately, the supply of green jobs will need to be secured for the future in ways that enhance equality and increases opportunity by providing workers with critical green skills.

Green Skills

For both jobs that are becoming greener and emerging green jobs, workers will require specific skills so that their activities support the transition to a low carbon economy. The European Skills, Competences and Occupations (ESCO) defines green skills as –

the knowledge, abilities, values and attitudes needed to live in, develop and support a society which reduces the impact of human activity on the environment (Cedefop, 2012; ESCO, 2022).

Green skills encompass a broad set of skills. ESCO list 381 skills, 185 knowledge concepts, and 5 transversal skills under its green aspect (ESCO, 2022). They can vary between being specific technical skills associated with certain occupations, to being much wider

transferrable skills that are applicable across job types (Cedefop, 2019). These transversal skills are critical for embedding greener activities across the economy, and for allowing workers to develop environmental awareness and adopt more sustainable behaviours that reduce impacts of climate change. The transition to a greener economy will depend on investment in training and upskilling programmes so that workers can acquire the green skills which are needed in new and changing occupations (ILO, 2019). In a sense, the transition to a green economy can be conceptualised as a supply and demand scenario where on one side environmental policy to meet climate targets has led to a sharp increase in demand for green jobs, while on the other, labour market and education / training policy is working hard to meet supply green skills. A strong further education and training base is needed to deliver the skills required.

A.2 International Best Practice for Addressing Green Skills Provision

This section presents an overview of different models for skills provision (see Table 0.1), as well as a comparison between differing levels of involvement of the private sector (see Table 0.2) and higher education in FET (see Table 0.3). Evidence for this section is drawn from multiple countries, including those with high levels of coherence between environmental policy and skills provision, and with well-developed inter-ministerial coordination mechanisms (ILO, 2019).

Table 0.1: International best practice of addressing green skills provision

State	National systems addressing the supply of green skills
Germany	In Germany, the provision of Vocational Education and Training (VET) is coordinated between publicly funded vocational schools and private businesses. This dual system of VET sees people participating in programmes spend half of their time in schools and half of their time in industry. The development of VET training programmes is therefore centred around dialogue and reaching consensus between industry and trade unions. Both groups are involved in an Advisory Board which designs training programmes for VET, including training for green skills.
France	In France, the Plan for Green Jobs 2010 created 11 sectoral committees with responsibility for identifying and supplying green occupations and green skills. The National Observatory for Jobs and Occupations in the Green Economy (Onemev) is a rare example of a dedicated facility that identifies green and greening occupations, jobs shortages, and continuing education need related to the green transition. France also has 14 Professional Advisory Committees which have a remit to set course parameters. These committees develop new programmes, adapt existing courses, review course offerings, and develop new programmes every five years. Each committee has a representation from social partners.

Spain	The Spanish Observatory of Professions of the National Qualifications Institute (INCUAL) monitors changing occupations and skills needs and identifies appropriate training responses. INCUAL consists of consultation with private enterprise and social partners. In addition, the Observatory of Occupations analyses quickly growing occupations each year, including green occupations. The State Foundation for Training for Employment, which manages lifelong learning for people in jobs, also retains a function for forecasting and planning skills demands to prepare appropriate responses.
UK	In the UK, the identification of skills need is largely carried out by sector specific skills councils. These sector skills councils (SSCs) develop skills assessments largely based on the needs of specific employers in a given sector. The identification of emerging skills in these assessments aligns with understandings of the green economy and green skills.
India	The Indian Skills Council for Green Jobs was established in 2015 to address the skills requirements of technologies required to create a more climate resilient and energy efficient economy. The council has identified skills needs for green jobs and has designed and implemented courses and trainings to meet skills needs.
Denmark	In Denmark, further education provision is largely coordinated through 50 Trade Committees which include stakeholders from trade unions and businesses. These committees set the outcomes, assessment durations, and standards for all VET programmes. Denmark has a large number of councils and committees in VET with a high level of social partner engagement with vocational colleges. At a more regional level, the Energy Academy on the island of Samsø runs workshops and exhibitions that attract international visitors. The Vocational Education Centre South (EUC Syd) also provides green skills provision at a more regional level across 75 study programmes, a specialist centre for construction workers, and a test centre for the practical use of energy efficient tools and materials.
Estonia	Estonia's OSKA system has responsibility for labour market monitoring and skills forecasting. OSKA does not clearly identify the green economy, green skills, or green jobs, but it does involve a good degree of stakeholder engagement so that recommendations on changing occupations and skills can be made. The coordination council for OSKA consists of trade unions as well as business representatives. The data gathered by OSKA is fed into the Ministry of Economic Affairs and Communications so that forecasts can be adjusted.

Canada	The Canadian Future Skills Council advises on new skills and workforce trends, including the need for training and upskilling in relation to retrofitting of domestic homes. The council includes the involvement of government, industry, labour, indigenous groups, and not-for-profit organisations. The Canadian domestic home retrofitting plan is supported by training and upskilling programmes to create a skilled workforce to support retrofitting as well as the auditing of buildings.
Sources: Skillnet 2022, IEA 2022, Cedefop 2015, Cedefop 2018, ILO 2019, OECD 2023	

Role of private sector in green skills training

It is relatively common for the private sector to be involved in the provision of green skills training, particularly where there is a lack of systematic approaches to green skills development (ILO, 2019). In some instances, private sector actors are closely incorporated into government skills development bodies whereas, in other instances, private sector actors are more clearly taking the lead in providing green education and training. As shown in Table 0.2, the degree of private sector involvement varies greatly.

Table 0.2: International examples of private sector involvement in green skills training

State	Private sector involvement in green skills training
Germany	The German dual system for VET sees apprentices spend half of their time in businesses. The structure and shape of training programmes is developed through dialogue and consensus between industry and trade unions. Outside of this formal system, the private sector has also established inter-company vocational centres which act as educational spaces on environmental issues and promote training and education for green skills. The German chemical industry has created a sustainability initiative known as Chemie between the sector's industry association, trade unions, and employer association, which is intended to anchor sustainability as a guiding principle in the sector.
France	In France, state-approved organisations manage company contributions to training as a proportion of their payroll. Businesses are actively encouraged to pay for skills training on behalf of their workers through payroll.

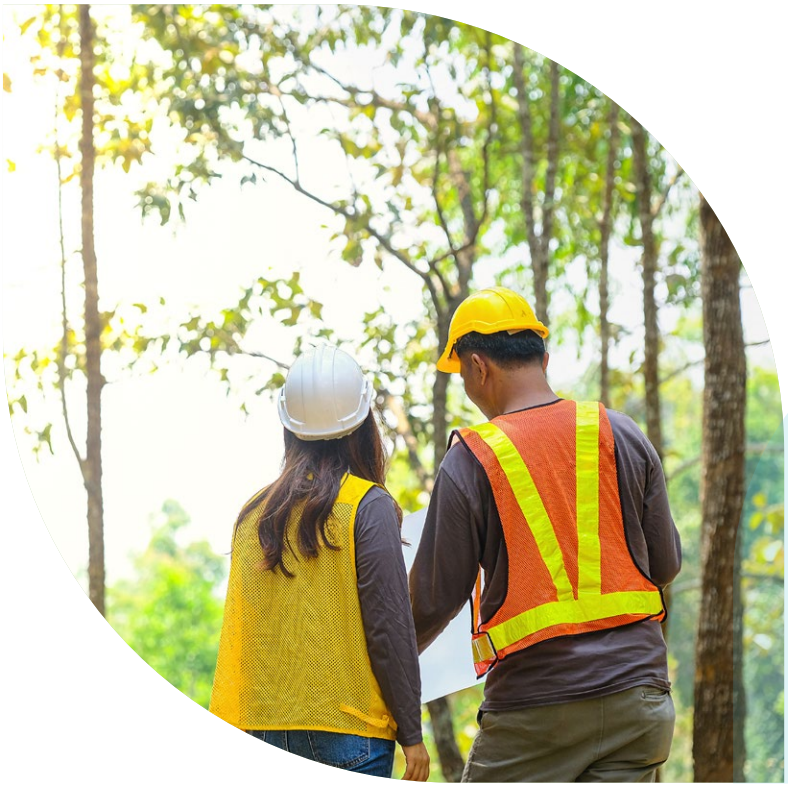
Spain	Businesses in Spain sit on the General Council of Vocational Training, an advisory body to government which provides insight and recommendations on skills needs. It is also possible for private companies to suggest new VET programmes to the Ministry of Education. Some companies can embark on their own skills initiatives, such as the Acciona training programme undertaken with the University of Alcála. The programme provided near to 35,000 hours of training on green and environmental subjects in 2015.
UK	In the UK, the onus for green skills training is largely placed on the independent efforts of business. For example, the Skills Academy for Sustainable Manufacturing and Innovation is based in a Nissan factory. There is some coordinated work between industry and trade unions to meet emerging skills needs associated with the green economy. The Trade Unions Congress has developed Unionlearn, a platform which offers a range of activities focused on the green economy.
India	Private industry is consulted as part of India's Skills Council for Green jobs. The council coordinates between government and industry to address emerging skills needs.
Sources: Cedefop 2018, Skillnet 2022, IEA 2022	

Higher education provision for green skills

As well as the private sector, higher education institutions have a role to play in the provision of green skills training. Providers of higher education have a critical role in bringing through the next generation of students equipped with green skills, either through enhanced tertiary pathways or further educational offerings. Equally important is the higher education sector's capability to support the retraining of existing workforces in green skills.

Table 0.3: International examples of higher education provision for green skills

State	Higher education involvement in providing green skills
Denmark	Danish higher education institutes have offerings in multiple green economy related courses, including a bachelor's in environmental technology, energy technology, and planning. Master's courses in water and the environment, and environmental and natural resource economics are also available in Denmark.
France	Some French universities offer specialised courses in sustainable manufacturing and energy efficiency, while others are involved across 10 programmes related to eco-industries. Universities in France also provide vocational licenses in areas where a skill need has been identified. These licences include skills related to the green economy, such as eco-design.
Estonia	The Estonian environmental strategy to 2030 is actively encouraging the proliferation of environmental programmes and courses in colleges.
Sources: Skillnet 2022, Cedefop 2018	



A.3 National and International Policy Context

EU Level

The European Green Deal

The European Green Deal aims to make Europe the first climate neutral continent, supported by investments of one third of the €1.8 trillion NextGenerationEU Recovery Plan and the EU's seven-year budget. The European Commission has adopted a set of proposals and initiatives to make the EU's climate, energy, transportation, and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030. The move towards a low carbon and greener economy will create more than one million jobs by 2030 and will require the reskilling and upskilling of more than 120 million Europeans (GreenComp, 2024). As part of the European Green Deal, the European Industrial Strategy has created tailored approaches for both larger European industries as well as SMEs to adapt to the green transition.

EU GreenComp

A key policy action of the European Green Deal is to develop a sustainability competence framework which would encourage lifelong learning on environmental sustainability. This framework has been created in the form of the EU GreenComp. GreenComp aims to inform education programmes and promote knowledge and attitudes which support responsible action related to sustainability. GreenComp does this by providing a framework of four key competence areas with 12 skills which apply to all learners, and across all learner settings. These competences and skills are listed below:

1. Embedding sustainability ideas: valuing sustainability, supporting fairness, and promoting nature.
2. Embracing complexity in sustainability: systems thinking, critical thinking, and problem framing.
3. Envisioning sustainable future: futures literacy, adaptability, and exploratory thinking.
4. Acting for sustainability: political agency, collective action, and individual initiative.

Overall, GreenComp helps to review course curricula, informs learning for teacher education, and guides self-assessment / reflection, policy development, certification, assessment, monitoring, and evaluation. *European Skills Agenda 2020*

The European Skills Agenda is a five-year plan to 2025 to support individuals and businesses in upskilling and reskilling. The agenda has twelve flagship actions which

include financial and administrative supports for strategic national upskilling actions, education, and training, and for skills which will support the transition to a green economy. These include actions on the EU Pact for Skills and EU Alliance for Apprenticeships.

EU Pact for Skills 2020

The EU Pact for Skills is a partnership to promote joint initiatives for upskilling and reskilling, as well as ways to address labour shortages (Directorate-General for Employment, Social Affairs and Inclusion, 2024). The pact states that to navigate the green transition, employees need to be equipped with the necessary skills. Pact for Skills members include national and subnational bodies, companies, social partners, as well as community organisations. The pact offers members three dedicated hub services to connect members, share learnings, and provide information on funding opportunities.

EU Alliance for Apprenticeships 2020

The EU Alliance for Apprenticeships (EUfA) seeks to bring together stakeholders to strengthen the quality and mobility of apprenticeships (European Commission, 2020). The EUfA provides support for organisations delivering apprenticeships and acts as a platform for sharing of best practices with Cedefop and the European Training Foundation. The EUfA raises awareness of apprenticeships, and engages companies, social partners, and VET providers in implementing the European Framework for Quality and Effective Apprenticeships (European Commission, 2020).

The Energy Performance of Buildings Directive (EPBD) 2024 and Energy Efficiency Directive 2023

To improve the energy performance of buildings, the EU established a legislative framework which includes the EPBD and the Energy Efficiency Directive. The EU's revised Energy Performance of Buildings Directive (EPBD) aims to fully achieve a decarbonised building stock by 2050 and directly contributes to the EU's energy and climate goals. 85% of EU buildings were built before the year 2000 and 75% of those buildings have a poor energy performance (European Climate, Infrastructure and Environment Executive Agency, 2024).

The current Energy Efficiency Directive was adopted by the European Parliament and Council and entered into force in October 2023. The directive introduces a series of policies intended to accelerate energy efficiency and established an EU legally binding target to reduce the EU's energy consumption by 11.7% by 2030 (Directorate-General for Energy, 2023).

The directives promote policies which aim to achieve an energy efficient and decarbonised building stock by 2050, create a stable environment for investment decisions related to building construction, and enable consumers and enterprises to make informed decisions which helps them save both energy and money. The directive also

aims to support better air quality, the digitisation of energy systems for buildings and encourages the use of sustainable mobility via improved infrastructure.

The EU Bioeconomy Strategy 2018

The European Commission defines the bioeconomy as the 'means of using renewable biological resources from land and sea, like crops, forests, fish, animals and microorganisms to produce food, materials and energy'. As part of the EU's efforts to create more sustainable and greener economies, the EU Bioeconomy Strategy aims to create a viable, efficient, and environmentally friendly bioeconomy across Member States (European Commission, 2022). The strategy aims to achieve its goals by offering funding for bioeconomy businesses and initiatives, by promoting standards in the bioeconomy, and by launching pilot bioeconomy projects. The EU will also seek to support Member States to develop their own bioeconomy strategies, while engaging stakeholders to create and utilise sustainable bioeconomy solutions (European Commission, 2022). Skills are an important part of this effort, and the strategy sets out an action to promote education, training, and skills across the bioeconomy. The European Commission has clearly identified the central role for the VET sector to play in producing the green skills needed for the bioeconomy to succeed (European Commission, 2022).

National Level

Climate Action Plan 2024

The Climate Action Plan 2024 is the third annual update of Ireland's Climate Action Plan, which was launched in 2019. The Climate Action Plan emphasises the need to develop and retain Ireland's domestic labour force in the renewable energy sector, while also creating an environment which is attractive to workers from abroad. The Climate Action Plan identifies the challenges that the sector has in meeting its renewable energy generation targets, which include increasing renewable energy generation to supply 80% of demand by 2030 and reaching 9GW of onshore wind, 8GW of solar and at least 5GW of offshore wind (Climate Action Plan, 2024). Achieving these objectives will require significant resources being put into educating the emerging workforce and the upskilling and reskilling of the existing workforce across several different sectors to ensure they have the requisite knowledge when it comes to green skills.

National Biodiversity Action Plan 2023 to 2030

As part of efforts to protect, maintain, and restore Ireland's biodiversity, the Irish government has written and published its 4th National Biodiversity Action Plan (NBAP). The NBAP sets an ambitious aim for biodiversity protection and enhancement between 2023 and 2030, involving a whole-society approach. To achieve these aims, NBAP recognises that specialised nature skills training will be required across the public sector and its contractors (NBAP, 2024). NBAP commits to increasing skills levels by scaling a

pilot Nature Skills Training Programme (which is a collaboration between SOLAS, NPWS, OPW and Laois and Offaly ETB) and by assessing biodiversity skills needs for businesses (NBAP, 2024). The aim of the Nature Skills Training programme is to provide an opportunity for staff of and contractors for the OPW, Local Authorities and other public sector bodies to learn how to protect and conserve nature in their day-to-day work.

NBAP proposes to work with the EGFSN to develop an audit of the skills needs to complete the objectives of the plan. Closely related to NBAP, the Heritage Council and County City and Management Association launched the Biodiversity Officer Programme to recruit biodiversity officers for all 31 local authorities in Ireland (NBAP, 2024). This is in addition to the Wildlife (Amendment) Act 2023, which created an obligation on every public body listed in the act to have regard to the objectives and targets of the NBAP (Irish Statue Book, 2023).

Powering Prosperity – Ireland's Offshore Wind Industrial Strategy 2024

Powering Prosperity – Ireland's Offshore Wind Industrial Strategy (2024) is Ireland's first offshore wind strategy and aims to establish a successful offshore wind energy industry in Ireland which maximises the economic benefits associated with the government's ambitions to deliver on their offshore wind targets (Department of Enterprise, Trade and Employment, 2024). The strategy includes 40 actions that will be implemented in 2024 and 2025 which were created in a collaboration between the Department of Enterprise, Trade and Employment (DETE) and other government agencies involved in the Offshore Wind Delivery Taskforce (DETE, 2024).

Bioeconomy Action Plan: 2023-2025

The bioeconomy is a key element in Ireland's green transition. The Bioeconomy Action Plan published by the Department of the Environment, Climate and Communications and the Department of Agriculture, Food and the Marine is the first national action plan for the Irish bioeconomy. The purpose of the plan is to further develop Ireland's bioeconomy in delivering on the vision of the 2018 National Policy Statement on the Bioeconomy in making Ireland a global leader in the bioeconomy (Department of Agriculture, Food and the Marine, 2023). The implementation of the action plan is supported by a high-level Bioeconomy Implementation and Development Group which meets quarterly to ensure delivery of actions and monitor progress of the plan.

The Circular Economy and Miscellaneous Provisions Act 2022

As part of Ireland's efforts to transition to a greener way of living, the Circular Economy and Miscellaneous Provisions Act (2022) aims to shift the country towards sustainable patterns of production and consumption. The Act defines the circular economy in Irish law and provides a framework for a transition to a circular economy. It incentivises the use of recycled and reusable materials, aims to eliminate disposable drinks cups, and legislates

against fly-tipping and littering.

Housing for All – A New Housing Plan for Ireland 2021

The Irish government's housing plan to 2030, Housing for All, describes the policy approach to building new homes. The plan estimates that an additional 33,000 homes will need to be built on average every year (DHLGH, 2021). The scale of new homebuilding has obvious impacts of increased demand for skilled construction workers, with an estimated 27,500 new construction workers required (DHLGH, 2021). The plan therefore recognises the need to increase the skills to deliver this significant number of homes per year through new training opportunities and the expansion of apprenticeship places with employers (DHLGH, 2021). In response to construction sector labour forecasts, Housing for All notes the role of SOLAS and DFHERIS in developing an integrated FET response to emerging skills needs (DHLGH, 2021).

Zero Emission Vehicles Ireland (ZEVI) Implementation Plan 2022

The Zero Emission Vehicles Ireland (ZEVI) Implementation Plan 2022 was drawn up to provide a proposed set of actions that help to support the delivery of the electric vehicle charging infrastructure strategy which spans EV charging schemes, policies, and other related strategies. The implementation plan will be reviewed on a regular basis up until 2025 (Department of Transport, 2022).

The National Retrofit Plan 2021

As part of the 2021 Climate Action Plan, a National Retrofit Plan which sets out Ireland's retrofitting targets was published (DECC, 2022). This plan was written to outline how the government would deliver 500,000 home energy upgrades to B2 Building Energy Rating (BER) standard by 2030 (DECC, 2022). The plan directly addressed skills as one of the key barriers to retrofitting Ireland's building stock and recognised the need to introduce measures to increase the number of skilled workers to support retrofitting. One of these measures was the development of the EGFSN report on the skills needs required by the transition to a zero carbon economy, including in retrofitting.

Skills for Zero Carbon 2021

Skills for Zero Carbon (2021) looks at the demand within Ireland for renewable energy, residential retrofit, and electric vehicle deployment skills from the period 2021 to 2030. The report published by the EGFSN consisted of a labour market analysis to identify and quantify the scale of the skills needed to transition to a zero carbon economy, identification of pathways to ensure that the required skills are available to facilitate this transition, and a series of recommendations that ensure the future skills needs are fully addressed by stakeholders in the public and private sector through the Irish education and training system (EGFSN, 2021).

Action Plan for Apprenticeship, 2021–2025

Ireland's Action Plan for Apprenticeships, 2021–2025 is a strategic roadmap introduced to enhance and expand the apprenticeship system (DFHERIS, 2021). The plan aims to address skills gaps, support economic recovery, and provide opportunities for individuals to gain valuable skills and qualifications through apprenticeship programmes. The plan outlines the objectives to establish a world-class apprenticeship system in Ireland that meets the evolving needs of the economy, fosters innovation, and provides diverse opportunities for individuals to develop their skills and careers. This will be done through expanding the range and scope of apprenticeship programmes including emerging fields such as green energy.

Second National Strategy on Education for Sustainable Development – ESD to 2030

The Second National Strategy on Education for Sustainable Development – ESD to 2030 is co-sponsored by the Department of Education, Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) and the Department of Children, Equality, Disability, Integration and Youth. Education for Sustainable Development aims to ensure that all learners have the knowledge and skills needed to promote sustainable development.

ESD to 2030 has five priority areas, in-line with UNESCO's framework for ESD for 2030, namely: Advancing Policy; Transforming Learning Environments; Capacity Building of Educators; Empowering and Mobilising Youth; and Accelerating Local Level Action.

The accompanying ESD to 2030: Implementation Plan 2022–2026 sets out the roadmap to achieving Sustainable Development Goal (SDG) target 4.7 by 2030 across the Education Sector from Early Learning and Care to third-level and beyond to non-formal and informal education. ESD to 2030 supports the implementation of the Climate Action Plan, the Sustainable Development Goals National Implementation Plan, The EU Green Deal, and the UN's Agenda 2030 (17 Sustainable Development Goals).

National Further Education and Training Strategy 2020

Future FET: Transforming Learning the National Further Education and Training (FET) Strategy (2020-2024) is aimed at transforming learning and to transition towards a more integrated FET system (SOLAS, 2020). The strategy highlights the need for FET to focus on meeting Ireland's critical skills needs.

Notably, the strategy points to the requirements for ETBs to develop courses which can in turn provide the necessary skills to meet industry requirements in Ireland. Moreover, considering the goals set out in Ireland's Climate Action Plan, the strategy calls for FET providers to implement course offerings which will build the necessary skills surrounding green energy, building retrofit and the wider environment. Within the plan, a FET College of the Future which will build upon current FET facilities is proposed and a key characteristic

is to achieve a green campus which embeds sustainable development principles across all operations and ensures students are supplied with green skills necessary.

The strategy also emphasises the importance of providing Consistent Learner Supports as part of the Future FET Strategic Framework. This includes a 'central resource for learner support services to service all ETB / FET activity, ensuring all learners are supported in a consistent manner, with a universal design approach underpinning learning development and delivery' (SOLAS, 2020a, p. 38). Furthermore, emphasis is placed on developing and applying good practice guides and toolkits on inclusive practices based on a universal design for learning (UDL) approach.

Future Jobs Ireland 2019

Future Jobs Ireland 2019 is a government-led initiative aimed at preparing Ireland for the future world of work by focusing on innovation, skills development, and sustainable economic growth (DETE, 2019). Future Jobs outlines a vision for Ireland as a leader in innovation and a hub for high-quality jobs, with a particular emphasis on addressing challenges posed by technological advancements and global trends. Future Jobs Ireland aims to promote sustainable development and environmental sustainability by supporting the transition to a low carbon economy, fostering innovation in clean technologies, and creating green jobs.

Ireland's National Skills Strategy 2025

Ireland's National Skills Strategy (NSS) established the direction of skills policy in Ireland and aims to place elevating skills development as a key priority in policy development (DFHERIS, 2016). The strategy acknowledges that a workforce with the skills to adapt to an evolving employment landscape is crucial for the competitiveness of the economy and outlines measures for upskilling and reskilling of workers.

The OECD assessment of Ireland's National Skills Strategy 2025 reviews how the NSS could adapt to ensure that it is keeping up with developments in the skills and employment landscape (OECD, 2023). This adaptation is crucial for Ireland to remain competitive in attracting global talent given that significant changes have taken place in the eight years since its publication. The OECD report points out the requirement to invest in greater resources for the Irish workforce. The emphasis on green skills at an EU- and international level highlights the need for the NSS to adapt and ensure that the Irish workforce is well versed in the necessary green skills across sectors.

This requires an adaptive and targeted strategy which focuses on green skills, and significant investment to raise awareness and knowledge of green skills.

Policy Platform: Progressing A Unified Tertiary System for Learning, Skills, and Knowledge (2022)

The unified tertiary system policy aims to allow FET, HE, and research and innovation to work closer together. The policy platform document sets out the vision and objectives for a more unified tertiary system. The vision of the policy platform is to create a well-functioning, unified tertiary system for knowledge and skills, composed of complementary FET, HE, and research and innovation sectors. This vision is to be achieved by offering a wide range of more integrated learning and development opportunities for learners and researchers; creating inclusive cultures; enabling the system to adapt to change; developing more unified regional systems; and by meeting the skills, knowledge and talent needs of individuals, the economy, and society.

A.4 Sectoral FET Green Skills Provision

Note on Green Skills Programme Data

This list presents a sample of green skills FET provision. There may be additional provision not captured at the time of publication (October 2024) or indeed provision no longer available at the time of reading. Additionally, while some programmes may not reference green skills or topics in their title, their programme description details green skills elements. The below lists excludes apprenticeships which can found at www.apprenticeship.ie

Construction & Built Environment

Course Title	NFQ Level	Mode
Airtightness and vapour control installer	5	Part-time
Architectural technology and design (computer aided design)	5	Full-time
Architectural technology with sustainable construction (construction technology)	5	Full-time
Building construction pre-apprenticeship (construction technology)	5	Full-time
Building energy rating assessment	6	Part-time
Carpentry techniques (construction technology)	5	Full-time
Cleaning skills	4	Full-time
Construction – NZEB / retrofit	3	Full-time
Construction skills	4	Part-time
Construction technology with draughting (construction technology)	5	Full-time
Construction technology with renewable energy (construction technology)	5	Full-time

Course Title	NFQ Level	Mode
Domestic BER course	6	Part-time
Dry lining (with NZEB Fundamental Awareness)	4	Full-time
External wall insulation installer	5	Full-time
Forklift, Safepass, manual handling, and environmental awareness	3	Full-time
Forklift truck operator	N/A	Full-time
Introduction to retrofit	5	Full-time
NZEB Retrofit	N/A	Part-time
NZEB – ventilation	N/A	Part-time
NZEB for carpenters	N/A	Part-time
NZEB for electricians	N/A	Part-time
NZEB for plasterers	N/A	Part-time
NZEB for site supervisors	N/A	Part-time
NZEB fundamental awareness	N/A	Part-time
NZEB thermal insulation installation	5	Part-time
NZEB / retrofit – schools programme	N/A	Part-time
NZEB / retrofit – workshop	N/A	Part-time
NZEB / retrofit for sales – pilot	N/A	Part-time
NZEB Retrofit building energy rating assessor	6	Part-time
Pre-apprenticeship: carpentry and joinery (construction technology)	5	Full-time
Pre-apprenticeship: construction (construction technology)	5	Full-time
Pre-apprenticeship: electrical (construction technology)	5	Full-time

Course Title	NFQ Level	Mode
Pre-apprenticeship: construction skills (with NZEB fundamental awareness)	4	Full-time
Residential retrofit site coordination	N/A	Full-time
Residential retrofit site coordination	N/A	Part-time
Retrofit assistant	3	Full-time
Retrofit for homeowners – pilot	N/A	Part-time
Retrofit insulation skills	5	Part-time
Retrofit skills	5	Part-time
Sustainability and the built environment (construction technology)	5	Full-time
Sustainable construction technologies (construction technology)	5	Full-time
Sustainable energy and construction technology (construction technology)	5	Full-time
Sustainable interior design	5	Full-time
Technical employability skills	3	Full-time

Engineering, Manufacturing, & Renewable Energy

Course Title	NFQ Level	Mode
Cleanroom operations & environmental awareness	5	Full-time
Construction technology / renewable energies & civil engineering (construction)	5	Full-time
Domestic heat pump awareness	4	Part-time
Domestic heat pump installation	6	Part-time

Course Title	NFQ Level	Mode
Domestic heat pumps	5	Part-time
Domestic solar photovoltaic course	6	Part-time
Engineering technology with electronics (engineering technology)	5	Full-time
Microgeneration	6	Part-time
Solar PV (photovoltaic)	6	Part-time
White goods field service engineering	6	Full-time

Transport & Logistics

Course Title	NFQ Level	Mode
Advanced bicycle mechanic technician	N/A	Full-time
Advanced bicycle mechanic technician	N/A	Part-time
Approved driving instructor	N/A	Full-time
Bike maintenance	N/A	Part-time
Bus driving – D licence	N/A	Full-time
Bus driving with tourism	N/A	Full-time
Bus driving / mini-bus driving	N/A	Full-time
Driver theory preparation	N/A	Part-time
Electric / Hybrid vehicle routine maintenance	4	Part-time
Electric / Hybrid vehicles	3	Full-time
Electric / Hybrid vehicles	5	Full-time
Smart driving	5	Part-time
Supply chain operations	5	Part-time

Agriculture & Forestry

Course	NFQ Level	Mode
Advanced organic horticulture	6	Full-time
Artisan bread making	4	Part-time
Community gardening	N/A	Part-time
DIY artificial insemination (AI) training	5	Part-time
Gardening	N/A	Part-time
Gardening and our climate	N/A	Part-time
Gardening greener	N/A	Part-time
Growing herbs culinary and ornamental	N/A	Part-time
Horticulture	N/A	Part-time
Intermediate organic horticulture	4	Part-time
Introduction to organic horticulture	3	Part-time
Introduction to organic horticulture	4	Part-time
Life science horticulture	N/A	Part-time
Organic gardening	N/A	Part-time
Organic gardening	5	Full-time
Organic horticulture	4	Part-time
Organic horticulture	5	Full-time
Organic horticulture	5	Part-time
Organic production	5	Part-time
Organic vegetable gardening	N/A	Part-time
Organic vegetable crop production	3	Part-time

Course	NFQ Level	Mode
Sustainable agriculture	5	Part-time
Sustainable cooking	N/A	Part-time
Sustainable gardening	N/A	Part-time
Wellbeing through gardening	N/A	Part-time

Biodiversity & Environment

Course Title	NFQ Level	Mode
Applied ecology & biodiversity studies (applied ecology)	5	Full-time
Bee keeping for beginners and improvers	N/A	Part-time
Biodiversity & the natural environment	5	Part-time
Biodiversity gardening	N/A	Part-time
Ecology and practical fieldwork (applied ecology)	5	Full-time
Gardening for biodiversity	N/A	Part-time
Gardening for wildlife	N/A	Part-time
Introduction to biodiversity	N/A	Online
Introduction to biodiversity in our community	N/A	Part-time
Permaculture & biodiversity	N/A	Part-time
Pre-university environmental and biodiversity studies (applied ecology)	5	Full-time
Pre-university environmental science (laboratory techniques)	5	Full-time

Tourism & Hospitality

Course Title	NFQ Level	Mode
Course Title	NFQ Level	Mode
Coastal guiding	6	Full-time
Environmental sustainability management in hospitality	6	Full-time
Environmental sustainability management in hospitality	6	Part-time
Environmental sustainability management in hospitality	6	Online
Fifty shades greener (sustainable practices)	N/A	Full-time
Fifty shades greener	N/A	Part-time
Fifty shades greener	N/A	Online
Irish tour guiding	6	Part-time
Mountain skills	N/A	Part-time
Pathways to a career in the outdoors for senior cycle students	N/A	Part-time
Pathways to a career in the outdoors for transition year students	N/A	Part-time
Surf instructor & beach lifeguard traineeship	N/A	Full-time
Tourism studies	4	Part-time

Accounting & Business

Course Title	NFQ Level	Mode
Course Title	NFQ Level	Mode
Door security and security guarding skills & environmental sustainability	4	Full-time
Energy management & cost reduction at home & in the workplace	5	Part-time
Environmental studies with business (business studies)	5	Full-time
Environmental sustainability in the workplace	5	Part-time
Environmental sustainability in the workplace	5	Online
Environmental sustainability in the workplace	5	Part-time
Introduction to energy management	N/A	Online
Introduction to water conservation	N/A	Online
Remote work ready: build your sustainable future	5	Full-time
Resource efficiency for a sustainable workplace	5	Online
Sustainable supply chain procurement	5	Part-time
Workplace & facilities management Level 3	5	Part-time
Workplace & facilities management Level 2	4	Part-time

Art & Design

Course Title	NFQ Level	Mode
Alterations and clothes upcycling introduction	N/A	Part-time
Animation	6	Full-time
Art and craft restore and reuse	N/A	Part-time
Art and crafts upcycling	N/A	Part-time
Art climate justice	N/A	Part-time
Art creative recycling	N/A	Part-time
Art sustainability	N/A	Part-time
Clothing upcycling	N/A	Part-time
Craft - upcycling	N/A	Part-time
Creative textiles	3	Part-time
Decoupage for climate justice	N/A	Part-time
Dressmaking-upcycling	N/A	Part-time
Embroidery	N/A	Part-time
Fashion design and textile studies portfolio (design)	5	Full-time
Furniture making & restoration skills (furniture design and making)	5	Full-time
Furniture restoration	5	Part-time
Furniture upcycling	N/A	Part-time
Hand-knitting, crochet & sustainable textiles	N/A	Part-time
Illustration (art & design)	6	Full-time
Interior design with upcycling and refurbishment skills	5	Full-time

Course Title	NFQ Level	Mode
Introduction to clothes upcycling	N/A	Part-time
Mend & repair clothes	N/A	Part-time
Mend repair upcycle fabric	N/A	Part-time
Recycled art	N/A	Part-time
Recycling through mosaic	N/A	Part-time
Repair & rewear	N/A	Part-time
Sewing	N/A	Part-time
Sewing & clothes upcycling	N/A	Part-time
Sewing for improvers	N/A	Part-time
Sewing, knitting and crochet	N/A	Part-time
Small furniture restoration	N/A	Part-time
Sustainability & crafts	N/A	Part-time
Sustainable art	N/A	Part-time
Sustainable fashion	N/A	Part-time
Sustainable sewing	N/A	Part-time
Sustainable sewing & upcycling	N/A	Part-time
Upcycling - sewing	N/A	Part-time
Using recycled fabrics in innovative ways	N/A	Part-time

Transversal Skills

Course Title	NFQ Level	Mode
Caring for the environment	N/A	Part-time
Career taster course	4	Part-time
Climate justice	3	Part-time
Climate justice	N/A	Part-time
DIY Skills	N/A	Part-time
Energy & you: reduce your use	N/A	Part-time
Energy & you: reduce your use	N/A	Online
Energy saving in the home	N/A	Part-time
Environmental sustainability	N/A	Part-time
Environmental sustainability awareness	4	Part-time
Geography & climate justice	N/A	Part-time
Green skills	N/A	Part-time
Green skills for life	N/A	Part-time
Introduction to climate change	N/A	Part-time
Introduction to sustainability	N/A	Online
Introduction to sustainability awareness	N/A	Part-time
MSWord	3	Part-time
Setting learning goals - sustainability	1	Part-time
Sustainability	1	Part-time
Sustainability	N/A	Part-time
Sustainability	N/A	Online
Sustainability (for special education needs)	2	Part-time
Sustainability personal effectiveness	4	Part-time
Sustainable living	N/A	Part-time
Upcycling	N/A	Part-time
Upcycling, building garden pallet furniture.	N/A	Part-time

B Appendix 2: Consultation Overview

B.1 Industry Survey Questions

1. How has the nature of your selected occupation changed in the last 10 years as a result of the policy and legislative developments related to climate change?
2. Please elaborate on how you expect these changes will continue to evolve.
3. Based on this definition and your previous reflections, what skills gaps have arisen in your selected occupation considering policy and legislative developments related to climate change?
4. In the context of the changing nature of work and the skills required for the green transition, which transversal / transferable skills included in the list below are most relevant to your selected occupation?
5. Please add below any other relevant transversal/transferable skills that have not been included in the previous list:
6. Considering the green skills gaps that you highlighted on your responses to this survey so far, do you think that they can be met through:
   - Upskilling within existing occupation(s);
   - New occupation(s) to fill the skills gaps highlighted;
   - A combination of both upskilling and new occupations to meet skills gaps.
7. Can you please give examples of upskilling actions that could be taken to meet the existing green skills gaps mentioned?
8. If new occupations are required to fill the green skills gap mentioned, please give some examples of these occupations, and briefly note the skills gap that they would address.
9. Do you have any final comments regarding the greening of the occupation(s) that you have been commenting on in this survey so far?

B.2 Government Departments Survey Questions

1. Please indicate which Department your response to this survey is associated with.
2. From the list below, please tick all sectors that are most relevant for your unit or team.
3. Please name the other sector(s) that are most relevant for your unit or team.
4. How has the nature of occupations within your selected sector(s) changed in the last 10 years as a result of the policy and legislative developments related to climate change?

5. Please elaborate on how you expect these changes to continue to evolve.
6. Could you broadly reflect on skills gaps that have emerged in your selected sector(s) due to policy and legislative developments related to climate change?
7. Do you have any comments or suggestions around approaches needed to fill or address the skills gaps mentioned above?

B.3 Local and Regional Bodies Survey Questions

1. Please indicate which stakeholder group you represent.
2. Please select your organisation from the list below.
3. Can you reflect on the gaps in green skills training and upskilling that have emerged (for your own personnel or for external training that you may provide to business and individual learners) due to policy and legislative developments related to climate change?
4. Are there any specific sectors where these skills gaps are more acute in your region?
5. What kind of supports (e.g., targeted funding, expanded public-private collaborations, enhanced FET partnerships) would be required to fill the green skills gaps mentioned previously?
6. Do you have any other comments or suggestions around approaches to programme development or delivery needed to fill or address the green skills gaps mentioned above?
7. Are there any barriers you envisage which may restrict the ability to develop or deliver the programmes needed to fill or address the green skills gaps mentioned above?

B.4 Education and Training Boards Survey Question

1. Please indicate which organisation you represent:
2. From an Education and Training Provider's perspective, could you reflect on the gaps in green skills education that have emerged due to policy and legislative developments related to climate change?
3. Are there any specific sectors where these skills gaps are more acute in your region?
4. Does your organisation provide programmes focused on green skills provision independently or through a Centre of Excellence? If so, please list them in the space below.
5. Do you think that the green skills gaps in your region could be met through one or more of the following actions: (please select all that apply)

6. Programmes developed by the FET sector including the range of FET provision (e.g., PLC, community education, adult education, traineeships, apprenticeships etc.)?
    - Establishment of specialist FET skills centres (93% - 40)
    - Tertiary pathways between Further and Higher Education (63% - 27)
    - Please give an example of indicative programmes that could be developed by the FET network to meet the identified skills needs including the range of FET provision (e.g., PLC, community education, adult education, traineeships, apprenticeships etc.)? (60% - 26)
7. Do you foresee a need to establish specialist FET skills centres to meet the identified skills needs?
8. If so, in what specialist areas?
9. Can you give some examples of possible tertiary pathways between Further and Higher Education to meet the identified skills needs?
10. Do you have any comments or suggestions around approaches to programme development or delivery needed to fill or address the green skills gaps mentioned above?

B.5 Engagement Summary

Survey Response Rate

Survey	Number of Respondents
Industry Survey	101
Government Departments Survey	37
ETB / ETBI Survey	45
Local Authority / LGMA / Regional Skill Fora Survey	19

Workshops Attendance

Workshop	Number of Attendees
Energy / Engineering / Manufacturing	15
Construction / Built Environment	26
Transport / Logistics	9
Agriculture / Forestry / Fishing	6
Biodiversity / Environment	10
Tourism / Hospitality	2
ETB / ETBI	17

Stakeholders Engaged[4]

Construction and Built Environment	
APK Architecture Design Ltd	Association of Plumbers and Heating Contractors Ireland
Atlantic Technological University	Chartered Institute of Architectural Technologists
CIF	CitA
CMG Architectural Design Technology and Building Surveying	Dermot Troy Design
Future Cast	Healy Cornelius Design Ltd
Higgins Waste and Recycling Services	IAPA
Irish Green Building Council	Irish Landscape Institute

4 Please note this is not an extensive list of all stakeholders who were contacted to take part in the development of Green Skills 2030, but only lists those who responded.

Construction and Built Environment	
Irish Planning Institute	Kerry College Monavelly Campus
Lee Roche Construction Ltd	MosArt
Nottingham Trent University	PHAI
Raven Construction	RIAI
Ruby Architectural	SEAI
Technological University of Shannon	Technological University Dublin
The Dry-Stone Wall Association of Ireland	

Engineering, Energy, and Manufacturing	
Bord Gais Energy	Electricity Association of Ireland
Eirgrid	Engineering Industries Ireland. IBEC
Energia Group	Enterprise Ireland
Engineering Skillnet	SSE
ESB	The Irish Maritime Development Office
Glanmire Precision (Valwin Ltd)	Wind Energy Ireland
Sustineo	University College Cork

Transport and Logistics	
AEMS ECOfleet	Ballybofey Car Company
Bus Eireann	CILT Mobility and Supply Chain Skillnet
Cleary Motors	Fred Kilmartin Ltd
National Maritime College of Ireland	Randle Bros

Transport and Logistics	
SIMI	Suzuki Motor Corporation
Volvo Car Ireland	

Agriculture, Forestry, and Marine	
Coillte	Marion Keogh Garden Design
Teagasc	Technological University of Shannon

Biodiversity and Environment	
An Taisce	Bus Eireann
CIEEM	Dublin Bus
Life IP Wild Atlantic Nature	Munster Technological University
Sustainable Futures, University College Cork	The Heritage Council

Tourism and Hospitality	
Approved Tourist Guides of Ireland	Beyond the Trees Avondale
Irish Heritage Trust	Irish Self-Catering Federation
Fáilte Ireland	Restaurants Association of Ireland
Taste Wicklow VIP	50 Shades Greener

Accounting and Business	
Chartered Accountants Ireland	CPA Ireland Skillnet
Drivalia Lease Ireland Ltd	Newgate Motor Group

Government Departments	
Department of Agriculture, Food, and the Marine	Department of Children, Equality, Disability, Integration, and Youth
Department of Defence	Department of Education
Department of Enterprise, Trade and Employment	Department of Environment, Climate, and Communications
Department of Foreign Affairs	Department of Finance
Department of Further and Higher Education, Research, Innovation and Science	Department of Health
Department of Housing, Local Government, and Heritage	Department of Justice
Department of Social Protection	

ETBs / ETBI	
City of Dublin ETB	Cork ETB
Cavan and Monaghan ETB	Dublin and Dun Laoghaire ETB
Donegal ETB	Kerry ETB
Galway and Roscommon ETB	Kilkenny and Carlow ETB
Kildare and Wicklow ETB	Limerick and Clare ETB
Laois and Offaly ETB	Mayo, Sligo, and Leitrim ETB
Longford and Westmeath ETB	Waterford and Wexford ETB
Louth and Meath ETB	Education and Training Boards Ireland
Tipperary ETB	

Local Authorities	
Cavan County Council	Cork County Council
Donegal County Council	Dun Laoghaire-Rathdown County Council
Galway County Council	Limerick City and County Council
Offaly County Council	South Dublin County Council
Tipperary County Council	

Regional Skills Fora	
Dublin Regional Skills Fora	Mid-East Regional Skills Fora
Midlands Regional Skills Fora	South-East Regional Skills Fora

C Appendix 3: Occupation Analysis

As part of the consultation, industry stakeholders were asked to select an occupation that their organisation or association represented or that aligned most closely with their own occupation. The survey questions elicited reflections about how the selected occupation is evolving in response to the broader legislative and policy landscape related to climate change in Ireland, as well as responses on any new occupations that stakeholders felt were emerging in their sector.

Construction & Built Environment

Changing nature and evolution of construction & built environment occupations.

Occupations	Stakeholder Views
Architects and town planners	Architects have seen a changing focus on energy efficiency, ventilation, and sustainable design. This includes an emphasis on building physics, low embodied carbon design, as well as planning for climate mitigation measures such as stormwater volumes. Critical to supporting these new approaches to work will be innovative methodologies such as MMC, nearly zero energy buildings (NZEB), and wider digitalisation of work activities. Policy and legislation are setting increased standards and reporting requirements for professionals to meet. Practitioners are increasingly aware of these standards and expect further requirements around biodiversity promotion, green technology installation, and carbon accounting. Architects have a role in the conservation and re-use of existing and historic buildings. Retrofitting and restoring Ireland's significant amount of pre-existing building stock will require specific craft, digital, and sustainability skills which are in short supply. Knowledge of conservation, traditional building techniques, and nature-based solutions will be needed.
	New occupations included carbon accountants, soil specialists, post-development environmental inspectors, hydrothermal / thermal bridge modellers, and building energy performance assessors. Areas in which occupations could emerge were research, contracts and procurement, and community engagement,

Occupations	Stakeholder Views
Bricklayers and masons	Bricklayers and masons have seen a substantial change through new practices related to sustainability. These practices include dry stone construction and NZEB standards. However, the maintenance of existing structures will require already existing skills, such as the repair of traditional chimneys and traditional solid masonry wall physics.
	Suggested new occupations in the sector included conservation rangers with responsibility for supporting the maintenance of land and traditional structures, and dry-stone engineers with expertise in dry-stone structures and their use in water management, flood relief, and erosion prevention
Carpenters and joiners	Carpenters and joiners expect increased short-term costs because of a shifting emphasis on energy efficiency standards. Respondents noted rising short term associated with transport, but also pointed to greater efficiencies and cost savings in the long term because of new heating and energy systems.
Chartered Architectural Technologists	There is considerable change in the methods and technology of construction. This has been driven by changing standards and updates in legislation which place an emphasis on mandatory BER assessments, new specifications and use of materials, and the emergence of sustainable products. Given these changes, upskilling through CPD will be needed for professionals. The shift that has already occurred in building regulations is expected to continue. This includes an emphasis on higher energy efficiency standards and performance for both new builds and retrofitting. Specific growth areas could be in passive house standards, occupancy performance, and new means of insulation.
	New occupations mentioned were building life cycle accountants and clerks of works, with respondents noting the need for more architectural technologists and more green skills within roles.
Construction and building trade supervisors	There has been an increase in administrative and monitoring work, which is expected to continue going forwards. To be compliant, supervisors foresee ongoing challenges related to providing technical data and completing paperwork in order to meet building performance regulations and achieve certification.

Occupations	Stakeholder Views
	New occupations were reported by supervisors such as airtightness installers, heat pump engineers, heat recovery installers, NZEB site managers, site quality assurance manager ventilation installers, inspectors, and external wall insulators.
Plasterers	Plasterers are in high demand for their skills as part of the need to retrofit existing buildings. External finishing skills as part of insulation are critically important. However, there is a concern that because the role is physically demanding, there will be a continued shortage of plasterers. Other types of external finishing may then need to be found.
	Given the shortage of plasterers, it was suggested that others will need to be found to work as finishers for external insulation. Potentially, people could train just for external finishing, rather than becoming qualified wholly as a plasterer. Other new roles included green technology specialists and climate officers.
Plumbers, heating, and ventilation engineers	A significant change has been experienced in terms of the technology for the plumbing, heating, and ventilation of homes. Plumbers, heating, and ventilation engineers have a vital role to play in the retrofitting of already existing buildings. More training is needed so that practitioners can install new technologies and work in emerging areas, such as freshwater capture and reuse.
Production managers, directors, and professionals in construction / built environment	Managers, directors, and professionals have seen a marked shift in construction methods, which they expect to continue. This includes more of a focus on MMC off-site manufacturing, energy efficiency, digitalisation, BIM, and circularity. Compliance and reporting are increasingly important for the sector. As building standards improve, there is a higher level of quality assurance through compliance work to meet regulations. Additional training and upskilling opportunities are needed to keep up to speed with these changes. This is particularly the case for digital technologies, reducing emissions, ensuring compliance, as well as for creating an adaptable workforce. A lack of expertise for managers in historic building repair and conservation was also noted.

Occupations	Stakeholder Views
Road construction operatives	Road construction operatives foresee a continued need for new knowledge and skills. There has been an increased interest in sustainability and the reuse of materials, and the sector is likely to see the use of road plannings in asphalt mixes, lower asphalt temperatures, and the use of different energy sources.
Scaffolders	An acute shortage of scaffolders is contributing to rising costs for construction and external wall insulation.
Other	Other occupations see a significant change in terms of national and EU legislation which has impacted the sector by setting carbon reduction targets and measures. This has resulted in changing practices and greater awareness of compliance. Going forwards, the European Performance of Buildings Directive (EPBD) and Corporate Social Responsibility Directive (CSRD) will further impact the sector, resulting in greater demand for skills via training.
	New and emerging occupations in the sector mentioned were ecologists, specialist trainers, and independent renovation advisors

Source: Data collated from the surveys of representative bodies and government departments and specialist workshops.

Engineering, Energy & Manufacturing

Changing nature and evolution of engineering, energy, and manufacturing occupations.

Occupations	Stakeholder Views
Electricians and electrical fitter	Electricians and electrical fitters noted significant change in terms of the shift to renewable energy. This has brought changes in energy lighting systems, the growth of electric vehicles, and the development of more elaborate and efficient heating systems. An acute need for electricians was reported, given retrofitting targets. Practitioners expect training in solar, electric vehicle, and HVAC systems to become a greater part of the phase two apprenticeship. They also foresee a need for ongoing government support to incentivise and encourage a carbon neutral approach.

Occupations	Stakeholder Views
Electricians and electrical fitter	New occupations may therefore emerge in expert tutors and demonstrators.
Energy managers and professionals	There has been a marked increase in focus on energy efficiency measures, low carbon energy initiatives, and requirements set out under the Energy Efficiency Directive and Corporate Sustainability Reporting Directive (CSRD). Professionals suggest that European and national policy will continue to set new requirements which will drive green solutions for a low carbon economy. Future developments may include new onshore wind sites, and greater need for energy capacity.
	Given more dynamic consumer-producer relationships in energy generation, a key new occupation could be electricity market operatives who have a detailed understanding of the market, pricing, and grid itself. Other new occupations might be domestic external insulators, external finishers, sustainable supply chain managers, and environmental health and safety specialists.
Engineers	Engineers reported an ongoing shortage of workshop and technical skills, as well as a lack of gender balance. Overall, engineers noted a shift from purely mechanical engineering to a mix of mechanical and technical engineering. Demand is expected to increase for thermal and electrical engineers in the future, as well as ecological engineers. Skills gaps are predicted to emerge in critical thinking, the use of advanced materials, and data analytics.
Manufacturing occupations	In textiles and fashion, there has been a move to sustainability supported by EU Strategy for Sustainable and Circular Textiles. However, there are little current obligations for sustainability as part of manufacturing textiles / fashion in Ireland. Potential policy options might include placing a surcharge on cheap imported clothes to provide protected status for homegrown manufacturers and support Irish-made initiatives.
Production and process engineers	Production and process engineers have experienced material shortages, emphasis on improvement, and a need for data analysis in manufacturing. Practitioners expect that they will need to better link manufacturing to ESG to show improvements and quality in production and processing. A specific change may affect production and process engineers with the emergence of the bioeconomy, particularly for those involved in food manufacturing.

Occupations	Stakeholder Views
Other	Other occupations reported that the impact of national and European policy, particularly of the Energy Efficiency Directive and ESG, has promoted energy efficiency and green measures in organisations. Some occupations have seen little change, while others have tailored their messaging and job applications to be greener. Respondents described ongoing shortages in the sector, noting a particular lack of gender balance. Going forwards, respondents suggested there would be a need for greater resources to meet CSRD requirements and greater energy efficiency measures through directives.

Source: Data collated from the surveys of representative bodies and government departments and specialist workshops.

Transport & Logistics

Changing nature and evolution of transport & logistics occupations.

Occupations	Stakeholder Views
Bus and coach drivers	Bus and coach drivers have been driving electric and hydrogen buses and expect more electric vehicles in the future.
Large goods vehicle drivers	There is a motivation in the sector to transition to electric energy, and more electric vehicles will take to the roads going forwards.
Maritime professionals	Maritime occupations are a key part of the supply chain and are increasingly impacted by electrification.
	A new occupation associated with maritime occupations could be a yard planning consultant, with responsibility for managing fire risks related to the transport of EVs on vessels
Transport and distribution managers / professionals	Managers and professionals in transport have seen and foresee a greater focus on carbon dioxide in fuel costs.

Occupations	Stakeholder Views
	New occupations could include transport energy auditors, transport energy managers, and eco-driving coaches
Vehicle technicians, mechanics, and electricians	Vehicle workers are experiencing a shift from internal combustion engines to electric vehicles. Those working with vehicles need more training in electrics and diagnostics. There is an expectation that electric vehicle sales will continue to grow, followed by developments in other fuels such as hydrogen.
Other	The other occupation category identified an increased focus on green training needs following legislative developments, as well as higher costs for the purchase of vehicles. Going forwards, the transport and logistics sector requires investment in green skills training to enable sustainable and circular operations. Supports are needed for training in operation roles to align day-to-day work with climate targets.
	Suggested new occupations were return centre managers, return centre sorters, repairers and refurbish workers, and return routers

Source: Data collated from the surveys of representative bodies and government departments and specialist workshops.

Agriculture, Forestry & Marine

Changing nature and evolution of agriculture, forestry, and marine occupations.

Occupations	Stakeholder Views
Agriculture and horticulture managers / proprietors / professionals	Agriculture and horticulture professionals have seen a review and update process for courses to meet future skills needs. Course content is expected to continue to focus on green skills and sustainability in collaboration with industry and policy makers. A shift has also occurred in agronomic and agroecological practices (e.g., regenerative organic agriculture), which will continue with greater consumer awareness and incentives for producers.
	New occupations may arise in research and innovation, digital specialists, or organic cropping specialists

Occupations	Stakeholder Views
Bioeconomy professionals	The rise of the bioeconomy will create additional skills demands for the primary production sector, as well as the wider economy. Skills needs in the bioeconomy vary greatly between those for agriculture and the blue economy compared to those for construction, textiles, or bioenergy. However, there is currently a lack of skills development programmes across higher education institutions and FET.
Forestry managers / proprietors / professionals	Forestry occupations have been affected by changes in species selection, focus on trees in urban design, proactive pest and disease management, and increased public awareness. Professionals reported a shortage of trained practitioners in the sector. Going forwards, there is an expectation of increased community engagement, citizen science, use of climate data, green urban infrastructure, adaptive management practices, and research and innovation. More education programmes are felt to be needed to meet future demand for workers.
	New occupations might include climate arborist, urban foresters, climate outreach coordinators, and climate adaptation researchers.
Other	Other occupations have seen a greater demand for wood as a building material and changing soil practices. This is related to the growth of MMC, and new waste management protocols. However, there is a lack of training in timber and wood-based building for architects and engineers, and transport costs are higher for imports of plants and seeds. Moving into the future, other occupations foresee increased use of off-site building, growth of mass-timber construction, and continued high import costs for seeds and plants.
	New occupations suggested were housing planners, developers, architects, and construction workers with expertise in retaining nature as part of site development. Landscape architects and garden designers may emerge as part of design teams

Source: Data collated from the surveys of representative bodies and government departments and specialist workshops.

Biodiversity & Environment

Changing nature and evolution of biodiversity & environment occupations.

Occupations	Stakeholder Views
Ecologists	Overall, stakeholders described how there is an acute shortage of ecologists in Ireland. There has been a greater focus on biodiversity at a local authority level, particularly given the establishment of the Biodiversity Officer Programme. Further policy developments such as the National Biodiversity Action Plan and Nature Restoration law are driving this emphasis on biodiversity. Going forwards, skilled ecologists and habitat managers will be needed as climate change impacts increase focus on nature-based solutions, habitat restoration, urban greening, water management, flood attenuation, and river management.
Environmental scientists	Environmental scientists have seen a greater need for nature conservation skills, an increased emphasis on sustainability and circularity, and more of a focus on reporting. The need for green skills has permeated across occupations, resulting in a greater need legislative understanding and practical skills. Legislation and compliance will drive the trend for monitoring, measurement, and verification, while heightening discussion on sustainability disclosures and increasing resources dedicated to reporting and conservation.
	Potential new occupations could include taxonomy specialists, green procurement departments, and compliance reporting roles with a focus on due diligence and materiality.
Heritage officers	Heritage officers have experienced a greater policy emphasis on sustainability and reuse. Going forwards, respondents expect the impacts of more extreme events associated with climate change will drive the need for further policy interventions.

Source: Data collated from Surveys of Representative Bodies, Government Departments.

Tourism & Hospitality

Changing nature and evolution of tourism & hospitality occupations.

Occupations	Stakeholder Views
Hotel and accommodation managers / proprietors / professionals	Hotel and accommodation occupations have seen a continued need to educate visitors on green practices and changing standards since COVID-19. Going forwards, they expect ongoing quality assurance, public awareness, and the diversification of other occupations into hospitality (e.g., farmers diversifying into glamping).
	Emerging new occupations which were suggested were sustainable travel agents, sustainable leaders / champions, and conservation experts. Stakeholders also described the role of building system managers in overseeing sustainable energy use, water use, and waste management in tourism and hospitality settings.
Restaurant and catering managers / proprietors / professionals	Restaurant and catering manager reported greater demands on businesses to be climate conscious, and to demonstrate this to customers through sustainable cups, crockery, and cooking methods. In the future, there is an expectation that more responsibility will be placed on businesses to reduce emissions and implement sustainable practices.
Other	Other tourism occupations described the growing importance of sustainability in messaging, business models, and day-to-day activities (e.g., sustainable communications focus, sustainable productivity, sustainability development, leave no trace, electric vehicles, and recyclable materials. This trend is expected to continue, as demand for sustainable tourism increases with further reporting and certification requirements related to green practices).

Source: Data collated from Surveys of Representative Bodies, Government Departments.

Accountancy & Business

Changing nature and evolution of accountancy & business occupations.

Occupations	Stakeholder Views
Accountants and tax experts	In the last few years, the significance of climate change has increased in accountancy occupations. Representative organisations are involved in sustainability and green economy policy, while organisations have experienced the rise of cloud computing and digital platforms. The introduction of CSRD and European Sustainability Reporting Standards (ESRS) will increase the interest and work being done on sustainability in the sector.
Other	For other occupations in the sector, there has been a greater focus on ESG and corporate social responsibility, as well as the introduction of carbon and environmental targets (e.g., moving away from internal combustion engines). The shift to new technologies is expected to continue, and the introduction of new technologies from manufacturers, as well as the availability of infrastructure, will affect market trends.
	A suggested new occupation was ESG consultants for businesses.
Source: Data collated from Surveys of Representative Bodies, Government Departments,	

D Appendix 4: Transversal Skills

The tables below present the top transversal skills selected by stakeholders in their chosen sector. Each table shows the list of transversal skills in descending order of the skills most selected. Green transversal skills have been highlighted.

Table A4.1: Ranking of Transversal Skills by Construction and Bult Environment Stakeholders (N=39)

Transversal Skills	No. of times selected
Apply quality standards (i.e., Oversee and monitor quality)	29
Work in teams (i.e., Support colleagues and handle team dynamics)	25
Provide leadership (i.e., Guide others and give direction)	23
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	23
Adapt to change (i.e., Be flexible and open to changing circumstances)	22
Count of Think proactively (i.e., Think ahead and apply forward thinking)	22
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	20
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	20
Assist customers (i.e., Be friendly with customers and customer-oriented)	15
Manage time (i.e., Plan deadlines and manage schedules)	15
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	13
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	12
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	10

Transversal Skills	No. of times selected
Tolerate stress (i.e., Deal with pressure and accept challenges)	7
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	6

Table A4.2: Ranking of Transversal Skills by Engineering, Energy, and Manufacturing Stakeholders (N=13)

Transversal Skills	No. of times selected
Provide leadership (i.e., Guide others and give direction)	10
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	10
Apply quality standards (i.e., Oversee and monitor quality)	9
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	9
Adapt to change (i.e., Be flexible and open to changing circumstances)	8
Work in teams (i.e., Support colleagues and handle team dynamics)	8
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	8
Assist customers (i.e., Be friendly with customers and customer-oriented)	8
Think proactively (i.e., Think ahead and apply forward thinking)	7
Manage time (i.e., Plan deadlines and manage schedules)	7
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	7
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	7

Transversal Skills	No. of times selected
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	6
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	6
Tolerate stress (i.e., Deal with pressure and accept challenges)	5

Table A4.3: Ranking of Transversal Skills by Transport and Logistics Stakeholders (N=17)

Transversal Skills	No. of times selected
Provide leadership (i.e., Guide others and give direction)	11
Count of Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	11
Apply quality standards (i.e., Oversee and monitor quality)	10
Adapt to change (i.e., Be flexible and open to changing circumstances)	10
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	9
Think proactively (i.e., Think ahead and apply forward thinking)	9
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	8
Assist customers (i.e., Be friendly with customers and customer-oriented)	7
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	7
Work in teams (i.e., Support colleagues and handle team dynamics)	6
Manage time (i.e., Plan deadlines and manage schedules)	6

Transversal Skills	No. of times selected
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	5
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	5
Tolerate stress (i.e., Deal with pressure and accept challenges)	5
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	3

Table A4.4: Ranking of Transversal Skills by Agriculture, Forestry, and Marine Stakeholders (N=10)

Transversal Skills	No. of times selected
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	6
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	5
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	5
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	5
Provide leadership (i.e., Guide others and give direction)	4
Apply quality standards (i.e., Oversee and monitor quality)	4
Adapt to change (i.e., Be flexible and open to changing circumstances)	4
Think proactively (i.e., Think ahead and apply forward thinking)	4
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	4
Work in teams (i.e., Support colleagues and handle team dynamics)	3

Transversal Skills	No. of times selected
Assist customers (i.e., Be friendly with customers and customer-oriented)	2
Manage time (i.e., Plan deadlines and manage schedules)	2
Tolerate stress (i.e., Deal with pressure and accept challenges)	2
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	1
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	0

Table A4.5: Ranking of Transversal Skills by Biodiversity and Environment Stakeholders (N=7)

Transversal Skills	No. of times selected
Adapt to change (i.e., Be flexible and open to changing circumstances)	5
Provide leadership (i.e., Guide others and give direction)	4
Apply quality standards (i.e., Oversee and monitor quality)	4
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	4
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	4
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	4
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	3
Think proactively (i.e., Think ahead and apply forward thinking)	3
Work in teams (i.e., Support colleagues and handle team dynamics)	3

Transversal Skills	No. of times selected
Assist customers (i.e., Be friendly with customers and customer-oriented)	3
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	3
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	3
Manage time (i.e., Plan deadlines and manage schedules)	2
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	2
Tolerate stress (i.e., Deal with pressure and accept challenges)	2

Table A4.6: Ranking of Transversal Skills by Tourism and Hospitality Stakeholders (N=8)

Transversal Skills	No. of times selected
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	8
Assist customers (i.e., Be friendly with customers and customer-oriented)	7
Provide leadership (i.e., Guide others and give direction)	6
Adapt to change (i.e., Be flexible and open to changing circumstances)	6
Think proactively (i.e., Think ahead and apply forward thinking)	6
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	6
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	6
Apply quality standards (i.e., Oversee and monitor quality)	5

Transversal Skills	No. of times selected
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	5
Work in teams (i.e., Support colleagues and handle team dynamics)	4
Manage time (i.e., Plan deadlines and manage schedules)	4
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	4
Tolerate stress (i.e., Deal with pressure and accept challenges)	4
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	3
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	3

Table A4.7: Ranking of Transversal Skills Accounting and Business Stakeholders (N=6)

Transversal Skills	No. of times selected
Provide leadership (i.e., Guide others and give direction)	6
Adapt to change (i.e., Be flexible and open to changing circumstances)	6
Think proactively (i.e., Think ahead and apply forward thinking)	6
Work in teams (i.e., Support colleagues and handle team dynamics)	6
Show responsibility (i.e., Be ready to take on responsibility and to act responsibly)	5
Manage time (i.e., Plan deadlines and manage schedules)	5
Prioritise tasks (i.e., Draw up timelines and coordinate actions)	5
Tolerate stress (i.e., Deal with pressure and accept challenges)	5
Apply quality standards (i.e., Oversee and monitor quality)	4
Adopt ways to reduce pollution (i.e., Use public transport and prevent pollution)	4
Engage others in environmentally friendly behaviours (i.e., Promote sustainability and encourage others to protect the environment)	3
Assist customers (i.e., Be friendly with customers and customer-oriented)	3
Adopt ways to reduce negative impact of consumption (i.e., Recycle, reduce energy use, avoid single plastic items)	2
Evaluate environmental impact of personal behaviour (i.e., Consider impact of personal actions on environment)	2
Adopt ways to foster biodiversity and animal welfare (i.e., Adopt a sustainable eating habit)	0

E Appendix 5: Regional Green Skills Needs Analysis

Region	Skills Gaps	Upskilling Actions	Skills Supply Supports
Border	• Construction, energy, retrofitting • Energy auditing, heat pump installation, plumbing, electrical joining, tiling, painting • Window and door installation • Alternative fuels, EV charger installation and maintenance	• Targeted funding • Partnerships (public-private, FET-HE) • Local champions • Awareness raising for early school leavers • Cross-border certification	• Strategic approach to national skills development
West	• Procurement • Recycled materials in road construction and ground granulated blast furnace slag (GGBS) in road construction	• Training for local authorities on recycled materials and cold mix-asphalts in road construction • Training on electric vehicles and alternative fuels • Partnerships with HE and bitumen companies	• Flexible training supports • Professional development for ETB staff • Permanent green skills curricula • NZEB

Region	Skills Gaps	Upskilling Actions	Skills Supply Supports
Mid-West	• Construction, MMC, modular housing, wall preparation and finishing • Energy efficiency, retrofitting, renewable energy • Sustainable agriculture, biodiversity, and sustainability • Leadership, and communication	• Training in green procurement • Clear and simple training • Practical training • Local green skills champion / ambassador • Raise awareness / counter scepticism around green skills	• Stakeholder engagement • Professional development for ETB staff • Integrate sustainability in all programmes • Mandatory courses • Investment in FET • Targeted supports • Simple application processes • Flexible training • Incentives for employers to release workers
South-East	• Construction, NZEB, and traditional manufacturing • Hospitality, climate literacy, and awareness of regulations	• Educate employers on available courses and regulatory requirements • Practical training • Partnerships with local businesses and sectoral groups	• Stackable micro-credentials • Awareness of green skills • Inclusive courses • Collaboration with HEIs

Region	Skills Gaps	Upskilling Actions	Skills Supply Supports
South-West	• Construction, NZEB, waste and water management • Renewable energy, retrofitting, and EVs • Sustainable agriculture and horticulture	• Targeted education and training, practical training • HEI partnerships • Centres of learning for lower NFQ levels • Increased apprenticeships • Experienced trainers	• Partnerships • Integration of new technology • Mandatory training
Dublin	• Construction, green building • SMART driving, electric bus-tram maintenance • Electrical, science, engineering • Retail and catering • Manufacturing, woodworking, and agriculture	• Flexible micro-credentials • Mapping skills needs • Training on circular economy, sustainability, and transversal • Central information point for business	• Green skills in programme outcomes • Education for ETB staff • Integrate sustainability, climate, biodiversity into curriculums • Hybrid delivery • National strategic approach • Increased awareness of regulations

Region	Skills Gaps	Upskilling Actions	Skills Supply Supports
Mid-East	• Tourism and hospitality, sustainable agriculture • Construction, waste management, manufacturing, health, education • Renewable energy, retrofitting, engineering	• Industry partnerships • Expansion of 'Green for Micro' programmes	• Resourcing • Subject matter specialists • Competency centre model
Midlands	• Construction, traditional construction, MMC, scaffolding, external wall insulation, slingers, signallers • Retrofitting, renewable energy, energy efficiency • Manufacturing, sustainable agriculture	• Hiring supports to construction companies • Awareness of apprenticeships and legislative requirements • Green skill register	• Mandatory training • Collaboration with policymakers and representative groups
Source: Based on ETB and Local & Regional Bodies Survey Responses			

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