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Sustainability Growth Innovation

A graphic element for the "Green Skills in VET" logo, featuring a stylized white bracket-like shape with three horizontal bars in yellow, light blue, and dark blue, positioned above a green triangle.

Green Skills in VET

GREEN SKILLS IN VET

FINAL REPORT

Fondazione ADAPT

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EXECUTIVE SUMMARY

Sustainability *is* growth. The policies adopted at European level are not only intended to achieve climate and environmental sustainability. In the words of the EC President, Ursula von der Leyen, the Green Deal represents “our new growth strategy”. This growth strategy requires a careful analysis of the employment impacts that these policies will have on different economic sectors. In this sense, the green transition is a global and transversal process: it impacts all industries, though in different ways.

For the realization of the green transition, skills play a central role. Green skills are crucial to enable the technological and organizational innovation processes to achieve the sustainability targets set at the European level. Furthermore, they are useful to foster the diffusion of a new mindset for the promotion, in every work and life context, of sustainability as an indispensable value.

The “Green Skills in VET” project, co-funded by the European Commission, and implemented by SGI Europe and the European Federation of Education Employers (EFEE), therefore aimed to understand how to improve the relationship and collaborations between SGI Providers and VET Providers, in order to respond to emerging skills needs in 3 sectors (water, energy, transport), in 5 selected countries (Belgium, France, Germany, the Netherlands, Spain, and Portugal).

The research conducted highlighted the complexity of green skills, for which there is still no clear definitions. Thanks to a survey conducted in the countries involved in the project, the importance of developing both technical and transversal green skills has been highlighted: the former will have to be focused on the specific characteristics of the sectors and processes considered. The latter should emphasise the construction of a green mindset, which is necessary because the green transition is a real paradigm shift, with impacts not only technologically but also economically and socially. In this sense, a holistic approach to green skills has been proposed, thinking of them as a continuum: the green transition therefore requires, albeit with different intensity, the transformation of all skills by considering sustainability.

In order to train these new skills, it becomes particularly important to move from a separatist approach, whereby the world of work “uses” the skills built by training systems, to an “integrative” logic, which is based on the continuous co-design and co-management of training, through an alliance between companies – in this case SGI providers – and VET providers. Vocational training can immediately face this challenge, thanks to its peculiar ability to interact with the world of work and to enhance learning processes carried out in informal contexts, helping people experience the innovation that is spreading in the sectors investigated.

Only by knowing innovation directly, thanks to work-based learning in its different forms, is it possible to build green skills that are constantly updated, enabling the technological and organizational processes required by the green transition. Concurrently, green skills need to be correctly identified, based on sectorial characteristics. In this sense, this research highlighted the different employment impacts expected in the sectors considered in light of the green transition, and the most in-demand occupations, particularly in the engineering sector. The importance of green skills for all workers was also emphasized by the SGI employers interviewed. The relevance of combining technical and soft skills was also confirmed, though in different sectorial declinations, through training, upskilling and reskilling based on partnerships between SGI Providers and VET Providers.

This is the path also charted by European institutions, which identify the Centers of Vocational Excellence (CoVEs) model as a successful example of how to integrate training, employment, research, and innovation. Therefore, it is not enough to have a sectoral approach to green skills, but also a local one, based on the construction of local ecosystems made up of vocational training institutions, research centers, companies, and social partners where to carry out the identification of training needs, update the skills of professional profiles, offer continuing education services, develop innovative and laboratory-based teaching, manage internship and apprenticeship paths, and host professionals and researchers to show pupils the latest innovations. Thanks to this approach, a new way of thinking and concretely managing the relationships (also) between SGI Providers and VET Providers is developed.

Related to this point are the good practices mapped by this research (8 in total), which show how collaborations between SGI Providers and VET Providers are already in place, in the countries considered, for competence building. These experiences showed how social partners play a decisive role in the implementation of the green transition, and in building green skills in particular, in collaboration with local and European institutions. It is in this collaborative logic and integration between different policies - for example, in the combination of industrial and training policies - that it is possible to build effective vocational training, capable of responding to the skills needs voiced by companies, thus offering younger people satisfactory career paths and long-term employability.

INTRODUCTION TO THE PROJECT

1. OBJECTIVES

The objective of this report is to illustrate the research findings brought out in the context of 2-years project¹ coordinated by SGI Europe, in partnership with the European Federation of Education Employers (EFEE), and co-funded by the European Commission, aimed at promoting the teaching of green skills within Vocational Education and Training (VET) programmes.

The rationale behind the project is the assumption that building a skilled workforce is indispensable for the materialization of the green transition and that is why the main goal of the Project is to support European employers and employees throughout this journey. Besides the coordinator and EFEE, the project consortium includes the following partners: Empresa Municipal Mixta d'Aigües de Tarragona (Spain), Berliner Wasserbetriebe (Germany), Union Française de l'Electricité (France) (SGI Europe members), and the Confederação Nacional de Educação e Formação (Portugal) and MBO Raad (The Netherlands) in turn, members of the European Federation of Education Employers.

The research concerned current and future skills and training needs of employers of three key services of general interest (water, energy, transport) expected to be affected by the development of the resource efficient and green economy and how education providers can support them in this. In more detail, the specific objective was to highlight the challenges faced by providers of Services of General Interest (SGIs) when it comes to the environmental transition as well as how the education sector can play a supportive role in this. The specific objectives of the research include:

- identifying the current and future demands for skills and occupations in key SGI sectors, as well as singling out any mismatch between skills needs and learning provision.
- Mapping the existing links between the labour market and education institutes and how these links can be improved. Identifying how this collaboration can foster the development of green skills beyond the lifespan of the project but also considering lifelong learning as a central element to the EU labour market.
- Providing a comprehensive overview of the most suitable teaching and training methods between the education and training supply and the SGI providers in order to align these two sectors as much as possible. Attention was therefore paid to the issue of continuous professional development of teaching and training staff, deemed pivotal to achievement of the targets set by the European Green Deal.
- Assessing the quality and extent of the connection between enterprises and education and training providers as well as understanding the consequences for existing and developing professions.
- Disseminating and raising awareness of green skills needs, and addressing which sectors rely on and will be impacted by them the most.

¹ () Hereinafter referred as “the Project”. Grant Agreement No. VS/2021/0017.

2. STRUCTURE OF THE REPORT

This report is made up of four main chapters. The first part takes stock of European policies to support the green transition -namely the ones referring to the Green Deal package- and their impact on the economic sectors prior to the project (Chapter 1). A detailed overview of the “green skills” issue follows drawing on findings gathered through a literature review, complemented by first-hand information collected through an online questionnaire and an in-depth interview phase, the authors firstly provide a reasoned collection of the consolidated definition of green skills, to come to an original definition of the concept of green skills, consistent with the objectives, sectors, branches and practices of the subjects involved in the Project. Subsequently, thanks to the collection and analysis of quantitative information (statistical review) the report deals with the identification of the main green skills shortages within the targeted Member States and economic sectors (Chapter 2).

Information relating to the status of the matching between supply and demand of green skills are further discussed in Chapter 3, taking into consideration, in a complementary way, information and characteristics regarding employment prospects and required skills for supporting the green transition as for evidence gathered thanks to in-depth interviews and findings emerged in the context of three sectoral workshops.

This chapter is also devoted to the illustration of a selection of best practices in the field of collaboration between SGI providers and VET Providers for building green skills and other initiatives consistent with the area of interest of the project. Lastly, perspectives, limits, and future developments for the realization of the green transition, with specific reference to (i) potential impacts of the promotion of “green-oriented” Vocational Education and Training could have on the materialization of the EU Green Deal and (ii) the role of both national and European Social Partners for the success of the EU environmental policy targets and are discussed in Chapter 4.

3. METHODOLOGY

The present report makes use of three main data sources: an explorative online survey, in depth interviews (carried out at sectoral level) and findings of sectoral close examinations and discussions at the sectoral seminars² delivered and carried out in the context of a two-year European sectoral social partners’ project on green skills in vocational education and training.

The three seminars have been structured around the following economic sectors:

- Water (*collection, treatment and distribution of water for domestic and industrial needs; activities relating to the management of waste, such as the collection, treatment and disposal of various forms of waste, including that from households; the provision of remediation services, i.e. the clean-up of contaminated buildings and sites, soil, surface or ground water*)
- Energy (*activities that provide electric power, natural gas, steam, hot water and the like through a permanent infrastructure (network) of lines, mains and pipes. This includes the distribution of electricity, gas, steam, hot water and the like to industry and residential buildings. It includes the operation of electric and gas utilities, which generate, control and distribute electric power or gas. Also included is the provision of steam and air-conditioning supply*).
- Transport (*activities relating to passenger or freight transport by rail, road and water. Considering the social partners involved in the research, priority was given to the topic of public transport*).

With reference to the geographic coverage, the research targeted target six Member States as a matter of priority – the Netherlands, Portugal, Belgium, France, Germany and Spain –, not disregarding, however, the opportunity to also take into consideration experiences and initiatives from other countries where of particular interest to the topics prior to the project.

² () Due to the persistence of the Covid-19 health emergency situation, two out of three the seminars took place online.

Each of the seminars and respective close examinations have been informed consistently with a multi-method methodological approach. In the first instance, a literature and a statistical review were conducted simultaneously.³ In order to integrate the information collected through the background desk research, interviews were conducted among member organisations of social partners seeking good (and less successful) cases and practices at the sectoral, territorial national level. To this end, 17 in depth-interviews have been finalized.⁴

Moreover, an online exploratory questionnaire⁵ has been designed and disseminated to a sample of respondents belonging to the project partners networks. The survey has been drafted in English. The survey was completed by 25 respondents with an adequate balance in terms of feedback received by SGI providers and VET organisations.⁶

³ () During the literature review drafting process, the available scientific literature on the topics to be covered by the report and other relevant published material have been examined, synthesised and critically analysed by identifying gaps in current knowledge, showing limitations of theories and points of view and by formulating areas for further research and reviewing areas of controversy. Besides scientific contributions, pertinent institutional documentation and social partners' publications have been considered and quoted in a manner consistent with the objective of this task.

⁴ () The interviews have been carried out on the basis of recommendations from project partners. The number of interviews does not correspond to the number of interviewees since in 4 cases multiple-respondent interviews have been completed. In 2 cases written answers were provided by respondents. Interviews' guidelines are available in Annex 3, together with a full overview of interviewees and survey respondents with breakdown by country and sectors.

⁵ () The survey has been distributed using the Google Form platform.

⁶ () Each project partner has been involved in the identification of reliable contacts to engage both in interviews and in the questionnaire.

CHAPTER 1 EUROPEAN POLICIES AND THEIR IMPACT ON THE SECTORS CONSIDERED

1. EUROPEAN POLICIES TO SUPPORT THE GREEN TRANSITION (EU GREEN DEAL)

Environmental change has been one of the key drivers of labour demand and skills supply across all sectors for the past years. Since 2019, the European Green Deal (EGD) is the EU's new growth strategy, aiming at transforming the EU into a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from fossil fuel use.

The EGD inevitably poses an immense challenge for the skills systems of EU Member States, which will be tasked with transforming the skills of the population to meet the needs of the transition into a carbon neutral economy. Solid skills development ensures higher-quality education, potentially nurturing environmentally concerned young adults. It also fuels innovation and attracts investment in R&D, which can lead to state-of-the-art green technological advancements. A pool of highly skilled workers will be essential in adopting green technology faster and more efficiently, as long as a country's public and private sectors take appropriate initiatives towards reducing its carbon footprint.

Implementing the EGD will affect all EU sectors and occupations, albeit in different intensities and directions. To better understand the implications in jobs and skills, as well as the role of VET in supporting the green transition, the present research explores employment effects, skill requirements and implications for vocational education and training (VET) at national, sectoral and occupational level. The main aims are to investigate the expected impact of the EGD and other EU environmental and climate change policies on future skills demand within and across sectors, and to provide insights for effective training and education policies and initiatives.

Before analysing how current climate challenges are impacting on the three target sectors of this research, it is appropriate to provide an overview of its expected impact in terms of employment on all economic sectors according to the most recent surveys on the subject.

2. EUROPEAN POLICIES TO SUPPORT VOCATIONAL EDUCATION AND TRAINING

After focusing on the European policies concerning the support and implementation of the green transition, it is now sensible to draw on the communications from the European institutions related to VET and its strategic role in terms of productivity growth and sustainable European economic growth. Only the most recent initiatives taken on these issues at the European level will be considered.

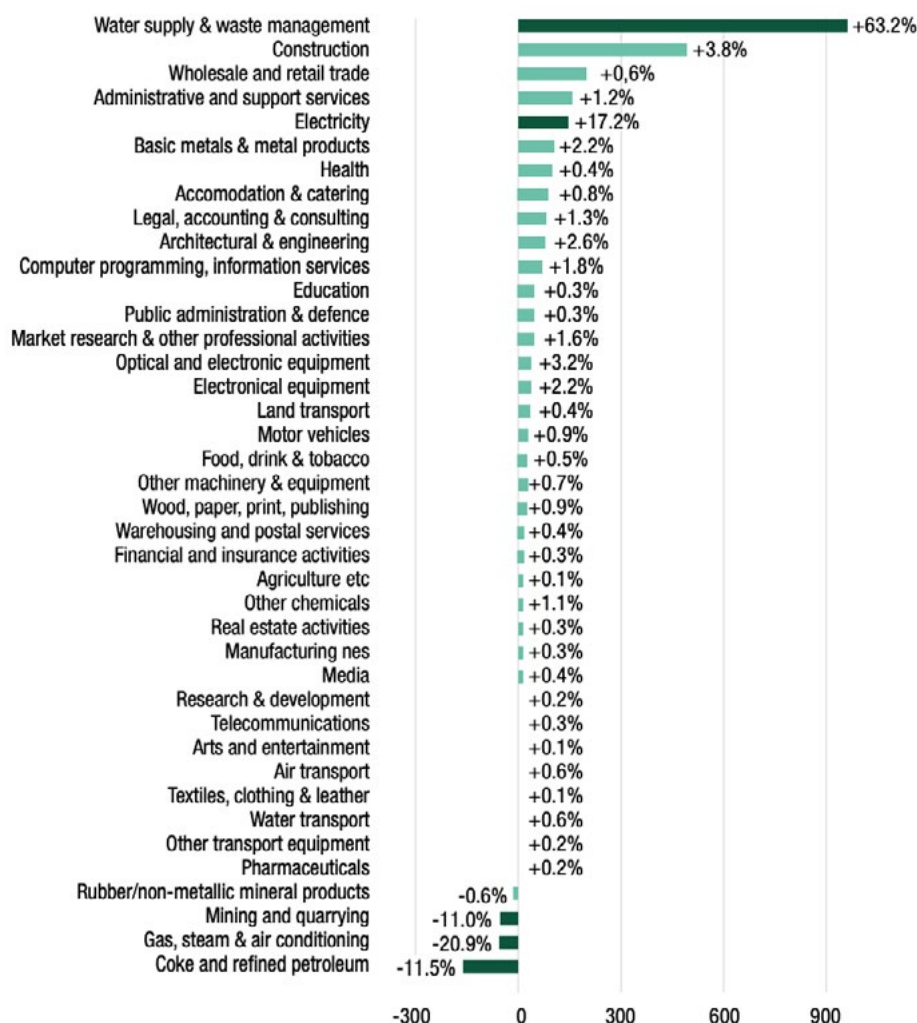
An update to the Riga Conclusions of 2015 is contained in the EU Council Declaration of November 2020 in Osnabrück,⁷ which defines a new European VET framework for the 2021-25 period. It integrates the vision and strategic objectives of Council Recommendation of 24 November 2020 on vocational education and training for sustainable competitiveness, social fairness and resilience.⁸

⁷ () European Commission, *Osnabrück Declaration on Vocational Education and Training as an Enabling Factor for Recovery and the Just Transitions to the Digital and Green Economy*, 30 November 2020.

⁸ () Council of the European Union, *Council Recommendation of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience 2020/C 417/01*, 2020.

FIGURE 1

FORECAST EMPLOYMENT IMPACT OF THE EGD (DIFFERENCE BETWEEN EGD SKILLS FORECAST SCENARIO AND BASELINE IN 000S AND %) BY DETAILED SECTOR, EU-27



Source: Cedefop (2021). The green employment and skills transformation: insights from a European Green Deal skills forecast scenario, p. 27.

The construction of a socially excellent and socially inclusive VET is presented as necessary for the competitiveness of European enterprises and for the proper functioning of the labour market (i.e. tackling unemployment), as it “equips the workforce with knowledge, competences and skills relevant to a changing labour market and enables the upgrading and re-skilling for inclusion and excellence”.⁹

Furthermore, quality VET is seen as a factor for innovation. The declaration focuses on four specific objectives to be achieved in the five-year period considered:

1. Resilience and excellence through quality, inclusive and flexible VET;
2. Establishment of a new culture of lifelong learning (importance of continuous VET and digitalization);
3. Sustainability, a green thread in VET;
4. European education and training sector and the international dimension of VET.

⁹ () European Commission, *Osnabrück Declaration on Vocational Education and Training as an Enabling Factor for Recovery and the Just Transitions to the Digital and Green Economy*, cit.

Each objective can be achieved through support mechanisms laid down by the EU institutions and national governments. In considering the principle of subsidiarity, the involvement and participation of the various stakeholders, including social partners, companies, trade associations, regional and local administrations, job centres and VET providers, is crucial. Without claiming to be exhaustive, it should be noted that:

- In the context of Objective 1 of the declaration, there is also a call for improved permeability between VET and academic pathways, including ‘work-based’ learning, and enhanced cooperation between VET, higher education and research centres.
- Objective 2 emphasizes that, with new occupational profiles and professions, continuing education and lifelong learning are important to help people improve and retrain their skills. Adult learning requires, a cultural change, integrating training and work and calling all stakeholders to build quality, accessible, inclusive, relevant and sustainable lifelong learning systems.
- Furthermore, objective 3 concerns environmental sustainability, which it defines as “a cross-cutting interest that is intertwined with labour demand, education, skills, occupations and the geographical distribution of jobs and personnel”,¹⁰ thus closely linked to VET. **Over the past decade, the European Union has stressed that the development of new skills is necessary to meet the economic, production and employment challenges of the labour market. The European Skills Agenda for Sustainable Competitiveness, Social Equity and Resilience** is a five-year horizon plan drafted by the European Commission in 2016 to support individuals and companies to develop and improve more skills. This programme represented an important moment in European education policy, in that the focus is on skills and people. The objective of the Agenda is to ensure the right to training and lifelong learning, two elements on which the European Union has chosen to build the recovery following Covid19.

Through the Communication of the Commission “A skills agenda for Europe for sustainable competitiveness, social equity and resilience” of 2020, the European Commission relauches the Skills Agenda within the Next Generation EU Plan, placing it within a broad framework of renewal in connection with the policies on the European Education Area and the green and digital transition. In the 12 ‘actions’ identified in the Agenda, number 4 concerns vocational education and training. The initiative for strengthening VET:

- proposes a new EU vision for VET policy to equip young people and adults with the skills they need to thrive in the labour market, including transversal skills, and to support green and digital transitions by ensuring inclusion and equal opportunities and making European VET the main promoter of skills development;
- presents principles to implement this vision, including a stronger focus on permeability with other education sectors, increased learning mobility and close cooperation with employers. It also promotes VET as an attractive choice for both women and men and the inclusion of vulnerable groups;
- sets targets for VET systems to increase the availability of work-based learning and mobility opportunities, as well as the employability of VET graduates;
- proposes a set of actions to be implemented at EU level to support VET reform, in particular as regards improving the digital preparation of VET institutions and professors, apprenticeships and centres of vocational excellence, in line with smart specialisation strategies and/or regional innovation and growth strategies.

¹⁰ () *Ibidem*.

In the Agenda, the first action is the ‘Pact for Skills’, which was officially launched in November 2020 through a special document containing a ‘Charter of Principles’ regarding the objectives of the Pact,¹¹ which aims to:

- Promote a culture of ‘life-long learning’ at all levels;
- Build a broad partnership for competence development;
- Monitor and anticipate market demand for skills;
- Tackling discrimination to ensure equal opportunities.

The pact aims to reduce skills mismatch by encouraging investment in upskilling and reskilling. This aim is not only to empower member states but other political, economic and social forces (workers, companies, sector associations, regions and local authorities, chambers of commerce, employment services). The interest of the European institutions in VET was manifested with the above-mentioned Council Recommendation of 24 November 2020 on vocational education and training for sustainable competitiveness, social equity and resilience, which calls for the revival of VET at both national and EU level, through cooperation between governments and the implementation of the ‘European Quality Assurance Reference Framework for Vocational Education and Training’ (EQAVET). VET is identified as a tool to develop the skills required by the labour market, as well as a driver of innovation in view of the green and digital transition. In 2020, the Commission identified investment in quality education and training as one of the responses to the COVID19 crisis affecting Europe,¹² defining six aspects through which to implement the development of the European education area: quality, inclusion and gender equality, green and digital transition, teachers and trainers, higher education, geopolitical dimension.

It is also worth mentioning the EC’s commitment in the promotion of the European Alliance for Apprenticeships (EaFA),¹³ an international network of VET providers, social partners, enterprises, research centres, aimed at the dissemination of high-quality apprenticeship schemes, founded in 2013 and recently renewed in 2020. While reviewing the aims and tools adopted by the Alliance, emphasis was placed on the design of green apprenticeships, work-based pathways based on the integration of training and work and aimed at developing green skills in sectors particularly impacted by the transition.

Finally, in February 2021 a Council Resolution on a strategic framework for European cooperation in education and training towards a European education area and beyond (2021-2030)¹⁴ was approved, which represents an evolution of works for the European education area, following the ET 2010 and ET 2020 policies and relaunching some recent indications of the European Commission.

The ‘European Education Area’ indicates the collection of the education and training systems of the various European countries that, through cooperation mechanisms, allows the mutual recognition of degrees and qualifications, ensuring the mobility of students and workers. The advantages of such a system include the increased dissemination of knowledge and skills, high quality standards, more employability throughout Europe.

Although the Resolution envisages a ten-year timeframe, the identification of a European education area can be done as early as 2025. The resolution indicates a number of benchmarks to which the Member States should refer¹⁵ in order to improve education and training.

¹¹ () For the Pact for Skills official website, see: <https://ec.europa.eu/social/main.jsp?catId=1517&langId=en>.

¹² () *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Making a European Education Area a reality by 2025 of 30 September 2020.*

¹³ () European Commission, *European Alliance for Apprenticeships Action Plan 2022*, 2020.

¹⁴ () See: [https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32021G0226\(01\)&from=IT](https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32021G0226(01)&from=IT)

¹⁵ () “They should only be based on comparable and reliable data and take into account the different situations in individual member states. They should not consider concrete targets to be achieved by individual countries by 2025 or 2030. As described in this resolution, Member States are invited to consider setting equivalent national targets.”

Among these, it is worth highlighting the one specifying that the percentage of VET graduates benefiting from work-based learning during their VET should be at least 60% by 2025.

The proposal for the construction of a European Education Area is certainly not new in terms of European policies, but it is the result of a long-term action starting from the Lisbon Strategy. It gained momentum at the 2017 Göteborg Social Summit, which concerned the establishment of a European Pillar of Social Rights,¹⁶ where the importance of the European institutions to vocational education and training, as defined in Articles 165 and 166 of the TFEU, is reaffirmed. On this basis, education, training and lifelong learning are prioritized in the Pillar:

*Everyone has the right to quality and inclusive education, training and lifelong learning in order to maintain and acquire skills that enable them to participate fully in society and successfully manage labour market transitions.*¹⁷

The Council Conclusion “Towards the perspective of a European Education Area” of May 2018 makes reference to the Pillar, which considers “the recognition of higher education and secondary education qualifications, including vocational education and training (VET) qualifications”¹⁸ as building blocks in the perspective of the European area, emphasising the need for systems that “encompass all levels and types of education and training, including adult education and vocational education and training”.¹⁹

3. AN INTRODUCTION TO THE IMPLICATIONS OF THE GREEN DEAL TO THE PROJECTS TARGETED SECTORS

The European Green Deal²⁰ aims to achieve the goal of climate neutrality by 2050: climate change and environmental degradation are a threat not only for Europe and for the Member States but for the whole world. The environmental challenges that the program intends to address concern not only the objective to lower greenhouse gases (GHGs), but to a comprehensive and efficient use of resources in order to generate the least possible waste, increase growth and at the same time generate economic and social wellness associated with the correct use of sustainable sources.

The European Green Deal stands alongside a series of further measures to support and promote initiatives for the fight of climate change; over time, they have added up to create the European program for the definition of a greener Europe. European Commission's President, Ursula von der Leyen, addressed the European Green Deal program as “our new growth strategy” that will also allow the reduction of emissions and the creation of new jobs. To lead that way and to accelerate the path toward climate and environmental sustainability, the European Commission presented the European Climate Pact²¹ on 9 December 2020, which intervenes one year after the inauguration of the European Green Deal. By associating a dual attribute, environmental and social, the European Climate Pact demands for stronger action coming from citizens, with the aim of strengthening awareness on initiatives to support action for the climate, inviting all social partners to support and participate by tackling “climate change and environmental degradation and -grasping- the opportunities that come with decisive action and sustainable lifestyles”.

¹⁶ () *Interinstitutional Proclamation on the European Pillar of Social Rights*, Gothenburg 17 November 2017.

¹⁷ () European Pillar of Social Rights, Chapter I: *Equal Opportunities and Access to the Labour Market*.

¹⁸ () Council Conclusions, *Towards the perspective of a European Educational Area*, 2018 (2018/C 195/04).

¹⁹ () *Ibidem*.

²⁰ () Communication from The Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *The European Green Deal*, 2019 (COM/2019/640 final).

²¹ () *European Climate Pact*. For the European Climate Pact official website, see: https://climate-pact.europa.eu/index_en.

Aware of the cross-sectoral nature of the actions in support of the fight against climate change, and by means of these principles of inclusiveness, cooperation and partnership, specific actions and disciplines have been planned to realize the declared objectives for each sub-sector, production area and territorial area.

The European Green Deal, by virtue of the potential vastness of the scope of action of such a high objective as is climate sustainability, decarbonisation and “zero emissions”, need to rethink policies for several areas (productive and service, administrative and private ones) such as clean energy supply across the economy, industry, production and consumption, large-scale infrastructure, transport, food and agriculture, construction, taxation and social benefits. In particular, among others, sectors particularly affected by the environmental and consequently economic and social transition will be the sectors of water, transport and energy.

The European Green Deal states that achieving a climate neutral and circular economy requires the full mobilisation of industry: in particular, in these years there has been a loss of about 90% of biodiversity loss and water stress due to greenhouse gas emissions and resource extraction and processing of materials, fuels and food. Therefore, dealing with the water sector means also to intervene in other production areas. Creating a toxic-free environment, a sustainable and a zero-emission ecosystem requires more action to prevent pollution from being generated as well as measures to clean and remedy it, starting from the water system. Improving water quality means to improve environmental and climate performance of the other ecosystems, the industries that use water as a raw material.

Transport is another main sector responsible for a quarter of the EU's greenhouse gas emissions. If the objective of climate neutrality wants to be achieved by 2050, according to the Green Deal a 90% reduction in transport emissions is needed. The Commission strategy is to adopt a sustainable and smart transport (acting in road, rail, aviation, and waterborne transport), to address this challenge and tackle all emission sources.

The last sector implied in the research is totally linked to the objectives of the European Green Deal: in order to achieve all the benefits in the other sectors thanks to the green transition, there is a need to rethink policies, production and furniture for clean energy. Energy is a driver, an engine for all the other sectors. First objective of the Commission is an alignment of the energy taxation in the Member States: this will mean to develop a common base in the EU for working on R&D, on investments without any sort of financial and economic gaps in the territories.

All the actions taken in the transition must follow the principle “Leave no one behind” (LNOB), the central, transformative promise of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) but also endorsed by the European Commission in the definition of the so called “Just Transition”. There is a strict link between ecological transition and social-economic transition: promoting actions to lower carbon dependence and promote climate neutral activities, means also to protect citizens, workers in particular the vulnerable groups in the transitions, providing them with the necessary tools to reskill their competences in new ways of production, new jobs, but in general in all the transition plans.

WATER SECTOR

EU water policy has deeply changed in the recent times due to the new rules on circular economy and the objectives and the ambitions of the European Green Deal that aims to reorganize and align the water reuse, waste and, in general, the water legislation, across the EU, according to the principles of sustainability and circularity. Water management, in all its forms, will be part of the main programs of green transition in the next few years: this means not only to act in some targeted sectors that, more than the others, use water resources (such as agriculture), but also to review and to improve EU water legislation for preserving freshwater resources, to tackle urban waste water, to prevent pollution and to preserve human health and environmental sustainability.

Undoubtedly, one of these can be recognized in the water sector, which is closely linked to the ecological transition also in the words of the President of the Commission and the Commission communication itself on the European Green Deal.

Looking at this sector, it is noted that only this year, in May 2021, the Commission has concretized its intentions and principles for the water sector, as for other ambits, in the EU Action Plan: "Towards Zero Pollution for Air, Water and Soil"²² one of the main results of the Green Deal in the integrated and planning vision towards the 2050 goals. In fact, if it is true that the primary areas of initiative can and must be highly polluting sectors, the so-called "brown sectors", it is equally true that European policies must be spent to prevent pollution in natural ecosystems which inevitably affect human health, emphasizing possible solutions in coordination with new digital solutions.

On 16 December 2020, the European Parliament formally adopted the revised Drinking Water Directive:²³ it concerns the quality of water intended for human consumption. If the objective concerns human health from adverse effects of any contamination of water, the directive also embraces the use of tankers, the use of plastic bottles and the whole productive chain of drinkable water. Other great sectors of actions are the planning, the regulation, but also the monitoring in all the Member states which are asked to transpose the directive into national legislation in two years, and last but not least information and reporting action.

Again, new parameters will be inserted with reference to bathing water²⁴, with a specific directive,²⁵ flanked by a specification on urban wastewater treatment, introducing the possibility of permanent monitoring to detect potentially harmful factors for human health and for the environment.

In fact, it is noted that in the current system of laws, European disciplines environmental protection and in particular air and water environment as much as possible: with specific regard of the second sector, speaking of water and marine pollution, the achievement of a status of sustainability and the simultaneous good overall status of the waters involves an intervention in the directives of all the sub-sectors involved and a strong action of all the stakeholders.

Lastly, new rules for water reuse²⁶ will apply from 26 June 2023 and are expected to stimulate and facilitate the reprocessing of water in the EU. In the lack of a similar and coherent framework between Member states for water reuse, there is a strong need for reformation of the regulation of the sector to expand the potential benefits and to limit the loss of potential resources. The regulation, situated in the context of the European Green Deal principles and the new Circular Economy Action Plan, adopted in 2020, prioritizes the water sector in the adoption of new methods in the circular economy chains. The focuses are on the harmonization of the minimum standards of water quality for its safe reuse, the harmonization of the monitoring requirements and validation, the settlement of risk management provisions on health and environment.

²² () Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *Pathway to a Healthy Planet for All. Eu Action Plan: 'Towards Zero Pollution For Air, Water And Soil'*, 2021, {SWD(2021) 140 final} - {SWD(2021) 141 final}.

²³ () *Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption.*

²⁴ () See: https://ec.europa.eu/environment/water/water-bathing/index_en.html.

²⁵ () See: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12658-Bathing-water-quality-re-view-of-EU-rules_en.

²⁶ () *Regulation (Eu) 2020/741 of the European Parliament and of the Council of 25 May 2020 on minimum requirements for water reuse.*

TRANSPORT SECTOR

Another great sector implied in the European Green Deal programs of transition towards a greater sustainability and less emission is the transport sector. According to the European Commission communication on the Green Deal, transport is responsible for over a quarter of EU's GHG's emissions and is continuing growing, in order to achieve the objective of climate neutrality, the zero-emission objective of 2050, there is a strong need to reduce emissions in general but, specifically for this sector, the research underlined a need for reduction equal to 90% in transport by 2050.

Sustainable transport has different meanings: not only a change in the car fleet is needed but also strong intervention in terms of costs is required, to make cleaner alternatives affordable, accessible for consumers and not only healthier for human health and for the environment. In this sense, the Commission underlines how the transport habits have to change as a whole: in the production, but also in the distribution, as a change in the mentality, in the legislation and the infrastructures that support the transition of the sector.

According to these objectives, the Commissions has adopted the "Sustainable and Smart Transport Strategy"²⁷ together with an Action Plan of 82 initiatives in December 2020, to address and tackle all emission sources in the sector. As underlined in the European Green Deal, there is a strong need not only to make the road transport more efficient, but also to shift a substantial part of the actual inland freight onto rail and inland waterways in order to significantly decrease the emissions of the sector. The European Commission affirms how green alternatives are needed widely, driven with the right incentives and infrastructures. To achieve these objectives different steps have been settled: by 2030, the aim is to change widely the car fleet in Europe and to have a least 30 million zero-emission cars in high-speed rails that will be doubled; also, strong investments

and developments are foreseen in the automated transport and zero-emission marine vessels in order to make the transport carbon-neutral and to have at least 100 European cities climate neutral. Also, zero-emission aircrafts will be developed and used and by 2050 not only all road transports will be zero-emissions but also rail traffic will be doubled together with a high-speed way of connection.

Sustainability is again the main principle in the transition: this means that greening the transports needs an upboost in the investments, production of zero-emissions vehicles, marine transport, airplanes, rails, and related infrastructures; it also means to revise the pricing legislation: it does not only mean to use sanction for the use of carbon or high emissions vehicles but also to think about incentives for users of efficient and clean transport. These objectives can be achieved only by innovation and a strong digitalization of the processes: making the transport sector more sustainable means also fully supporting research, innovation and development and the use of data and artificial intelligence.

These missions, strongly underlined both in the Green Deal and in Horizon Europe, need support in terms of research and innovation processes, in order to adapt the whole sector to the new requirements of the green transition. The partnership between the different stakeholders (industries, consumers, regions, Member states, EU institutions), will help in the research and development of new technologies such as batteries, low-carbon processes, bio-based fuels and hydrogen processors (according to the European Hydrogen strategy,²⁸ that underlines the possible uses of hydrogen as a feedstock, a fuel or an energy carrier and storage).

In particular, this last element is part of the key strategies for greening Europe: in fact, it has a strong potential not only for being "a clean energy", but also for its storage capacity, that can help the connection between location and more distant demand centres,

²⁷ () Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions, *Sustainable And Smart Mobility Strategy – Putting European Transport On Track For The Future*, 2020, (COM/2020/789 Final).

²⁸ () Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions, *A hydrogen strategy for a climate-neutral Europe*, 2020, (COM/2020/301 Final).

in addition to electrification and other renewable and low-carbon fuels. Indeed, hydrogen is a promising option where electrification is difficult to use.

ENERGY SECTOR

To fully achieve and deliver the objectives of the European Green Deal it is undeniable the urge to rethink policies about energy in order to supply clean energy from renewable and sustainable sources in all the other sectors.²⁹ Indeed, energy is the driver, the engine for economy, for industry, transport, agriculture, construction and so for all the other production, distribution and consumption chains. To achieve the objectives of sustainability, zero-emissions, decarbonisation it is essential to start from a reformation of the energy sector.

The first step, and the first aim of the European Green Deal is decarbonisation: this means that by 2030³⁰ GHGs emissions should be reduced to at least 55% compared to 1990; then by 2050 emissions should be totally cut. Decarbonising the energy sector means to make it efficient by largely developing renewable sources and, contemporary, phasing out of coal and decarbonising gas. At the same time, the new and clean energies must be not only secure for the environment and the health but also affordable. This means that there is a need of an integrated strategy between EU, Member states, businesses and consumers to ensure a fully integrated energy market non only between different territories in the EU but also between energy sector and other sectors.

The collaboration with all the stakeholders is essential to the full transition of the sector: the initiatives proposed by the Commission include open platforms with the operators of the most energy-intensive sectors, to address and respond to the barriers and the needs of the renovation.

The other essential stakeholders are Member States: the Commission states out the need for lifting national barriers that inhibit energy investments in efficient use or new technologies but also in renovation of existing sources and infrastructures that can be included in the climate-neutral energy strategy.

Strong emphasis is placed on the importance of the technological transition: to fully develop the potentials of renewables, but also to make them affordable and secure, there is a need to ensure a collaboration between the green transition and the digital transition of the sector. This means not only a greater investment in the R&D sector, but also in smart infrastructures to help consumers but in general Member States to fully achieve the benefits of the energy transition at affordable prices. The program of the Commission consists of new innovative technologies such as smart grids, hydrogen networks or carbon capture, storage and utilisation, energy storage, also enabling sector integration, but also in the upgrading of existing technologies and infrastructures, if they are fit for the objective of climate-neutrality.

The energy sector, as it is stated in the European Green Deal, is also part of the European Climate Pact that focuses on initiatives to build dialogue between Commission, citizens and other partners. The aim is to empower territories, regions and Member states, including energy communities, emphasizing possible collaborations. In addition, a strong focal point is the coalition and coordinated programs between EU and Member states in order to ensure coherence in the actions and tools used for the achievement of climate-neutrality.

²⁹ () Considering the purposes of the present report it is worth mentioning that on July 6, 2022 European Union lawmakers voted to allow natural gas and nuclear energy to be labelled as “green investments” and including them in the so-called EU-Taxonomy which is a classification system, establishing a list of environmentally sustainable economic activities. Therefore, although an in-depth analysis of the dynamics of matching demand and supply of green skills in these two sectors exceeds the scope of this Report, it is nevertheless worth pointing out that, considering both the inclusion of these sectors in the Taxonomy and the insights shared by one respondent within the interviews round, in the future, when considering the energy sector and its employment dynamics with reference to the green transition, it will be necessary to also examine the performance of green labour markets and job profiles in the natural gas and nuclear sectors.

³⁰ () See: *2030 climate & energy framework*.

CHAPTER 2. GREEN JOBS AND GREEN SKILLS

1. WHAT ARE GREEN JOBS?

The first observations dedicated to the green transition and, more generally, to the themes of sustainability have immediately highlighted the connections between these transformative processes and the impacts they generate on the world of work.

The introduction of regulations aimed at reducing environmental impact has therefore immediately attracted the attention on the effects they generate on employment.

A few years ago, the OECD saw a possible, limited, positive or almost zero balance (between new jobs created and old jobs destroyed).³¹ So did the ILO,³² which estimated a limited growth in employment rates between 0.5% and 1.1% in energy-intensive sectors worldwide. UNEP³³ estimated a shift from 2.3 million to 20 million workers by 2030 in the renewables sector, while the European Commission estimates growth of 1 million new jobs created directly in the renewables sector by 2010.

Of course, one must also consider how these estimates are made, i.e., taking into account what factors. Already more than 10 years ago, the literature showed how these processes were determined by the complex balance that would be created between the regulatory framework concerning the limitation of environmental impacts and the policies adopted because, if the latter had been developed in synergy, it would have been possible to obtain a growth in employment based on the stimulus generated on innovation and investment in more efficient production techniques and thus increase the demand for goods and services obtaining, in conclusion, a positive effect on employment.

BOX 1 GENERAL DEFINITIONS

Green transition: Transition to environmentally sustainable economies and societies (ILO, 2019)

Greening the economy: The process of reconfiguring businesses and infrastructure to deliver better returns on investments of natural, human and economic capital, while at the same time reducing greenhouse gas emissions, extracting and using fewer natural resources, creating less waste and reducing social disparities (ILO, 2019)

Twin transition: the transition to a fair, climate-neutral, digital Europe (European Commission, 2020)³⁴

Just transition: greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind (ILO, 2016)³⁵

³¹ () OECD, *Environment and Employment: An assessment, Working Party on National Environmental Policy*, 2004.

³² () ILO, International Institute of Labour Statistics, *World of Work Report 2009. The Global Jobs Crisis and Beyond*, 2009.

³³ () UNEP, ILO, IOE, ITUC, *Green Jobs: Towards decent work in a sustainable, low-carbon world*, 2008.

³⁴ () Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions, *Commission Work Programme 2020. A Union that strives for more*, 2020, (COM/2020/37 Final).

³⁵ () ILO, *Guidelines for a just transition towards environmentally sustainable economies and societies for all*, 2016.

More recent estimates, such as those provided by the ILO in 2018 ⁽³⁶⁾, foresee a positive balance of 18 million new jobs (24 million jobs created, 6 million jobs lost), although in some areas of the world this estimate could be the opposite (Middle East, Africa), given the current economic and productive structure of these contexts. Globally, according to the OECD, considering all productive sectors, they could be limited, not generating revolutionary transformational phenomena in employment rates, although obviously they will change the percentage of employment distributed in the various sectors.³⁷ At the European level, the Commission points out that although, traditionally, the estimated impacts on employment were limited, the most recent data suggest, at least for the European context, an increase in employment of 1% (about 2 million jobs).³⁸

Other estimates focus on particular sectors, such as those most impacted by the green transition. For example, as far as the energy sector is concerned, estimates provided by IRENA³⁹ indicate an

increase, at a global level, in the renewable energy sector that will reach 42 million employees in 2050, four times the number employed in this sector in 2018, to which will be added 21 million employees in the field of energy efficiency measures and 15 million in that of system flexibility.

Before delving into training policies in support of the green transition, it is necessary to dwell on the impacts generated on the occupational structure of the various countries. While there is no general consensus on these effects, it is necessary to understand how jobs are changing, to understand which professions are in decline, which will be in demand, and which will be created as a result of the green transition. In other words, it is first crucial to understand what green jobs are - and what they are - the jobs that are most closely tied to the green transition.

There are several definitions in the literature, a selection of which are found in Box 2.

BOX 2 GREEN JOBS DEFINITIONS - A SELECTION

«Green jobs are decent jobs that contribute to preserving or restoring the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help to improve efficiency in the use of energy and raw materials, limit GHG emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change» (ILO, 2019)

«Green jobs are “covering all jobs that depend on the environment or are created, substituted, or redefined (in terms of skills sets, work methods, profiles generated, etc.) in the transition process towards a greener economy» (European Commission, 2013)

«United States’ Bureau of Labour Services uses an output and a process approach to define green jobs: (a) “jobs in business that produce goods or provide services that benefit the environment or conserve natural resources” and (b) “jobs in which workers’ duties involve making their establishment’s production processes more environmentally friendly or use fewer natural resources» (Autor 2020)

«The United Nations defines green jobs as sectors and jobs in which waste creation and pollution is minimised (UNEP et al., 2008). The International Labour Organisation (ILO) includes in its definition of green jobs any sector that has a lower-than-average environmental footprint (ILO, 2012). Statistical agencies across the world usually focus their definition of green jobs on the definition of the environmental goods and services sector. The distinction between jobs and skills is important because the labour market dynamics of “greening” in the economy are, and will be, complex into the future. Skills analysis offers a disaggregated level to examine and unpick these dynamics» (OECD, 2014)

³⁶ () ILO, *World employment and social outlook 2018: Greening with jobs*, 2018.

³⁷ () OECD, *Employment implications of green growth: Linking jobs, growth, and green policies*, OECD Report for the G7 Environment Ministers, 2017.

³⁸ () European Commission, *Green growth, jobs and social impacts fact sheet*, 2020.

³⁹ () IRENA, *Global Renewables Outlook: Energy transformation 2050*, 2020.

Without dwelling in detail on each of them, it is possible to highlight some common features of particular interest for the analysis conducted in this research.

- First of all, it is clear to recognize that, even today, we do not have a single definition of green jobs. However, we can see an evolutionary dynamic: if, at least initially, green jobs were thought of as jobs directly involved in achieving a better and more sustainable use of natural resources and the environment, thus limiting the scope of this category to a few, specific sectors, what has emerged more recently is the holistic dimension of the green transition, which impacts most jobs, either directly or indirectly.
- More specifically, this holistic approach also helps to focus on the particular transformative dynamics that impact, in different ways, different jobs. Taking up the classification of Bowen et al.,⁴⁰ we can observe three different directions of this evolutionary process: Green Increased Demand (Green ID) professions, i.e. professions that already exist and will see their demand increase in the perspective of the green transition; Green Enhanced Skills (Green ES) professions, professions that instead require a substantial update in terms of skills possessed; Green New and Emerging (Green NE), new professional profiles that have arisen in connection with the changes induced by the green transition. Green jobs are therefore not only new professions, but also existing professions that “go green”.
- In this sense, we can only agree with those who point out that “Green jobs vary in ‘greenness’ (the use and importance of green tasks), with very few jobs only consisting of green tasks, suggesting that the term ‘green’ should be considered as a continuum rather than a binary characteristic”.⁴¹

Thinking of green as a continuum therefore helps to overcome an approach according to which the green transition concerns only (new) emerging jobs in sectors with a high environmental impact. Instead, the green transition is a transformative process that concerns all sectors, with different intensity and with different and specific needs in terms of training.

This is why we talk (see Box XX) about greening the economy: and, following the methodological approach emerging from this holistic and transversal approach to the theme of green transition, it is necessary to focus on what green skills are: it is the possession of these that will determine the intensity of the “green” of each new or existing profession involved in the transition.

2. WHAT ARE GREEN SKILLS?

As for green skills, there are many definitions used in the literature and, even on these, there is no general agreement on a single definition. An overview is provided in Box 3.

There are some overlapping terms, such as “Environmental awareness skills” and “sustainability competences”. Since they do not correspond to true green skills, they have not been included in Box 3, although they deserve a dedicated discussion.

Regarding the first term, «Environmental awareness skills refer to the knowledge, abilities, values and attitudes [in the general population] needed to live in, develop and support a society which reduces the impact of human activity on the environment. These generic ‘green’ skills include the capacity to include environmental concerns alongside others (such performance and safety) in taking decisions, including in the choice of processes and technologies» (European Commission 2015)

⁴⁰ () A. Bowen, K. Kuralbayevab, E.L. Tipoec, *Characterising green employment: The impacts of ‘greening’ on work-force composition*, Energy Economics, 72, 2018.

⁴¹ () L. Casano, *Skills and Professions for a “Just Transition”. Some Reflections for Legal Research*, in *E-Journal of International and Comparative Labour Studies*, 3, 2019, pp. 31-46, here p. 36.

BOX 3 GREEN SKILLS DEFINITIONS – A SELECTION

«Green skills are those skills needed to adapt products, services and processes to climate change and the related environmental requirements and regulations» (OECD, 2014)

«The knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society» (CEDEFOP, 2012)

«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)

«Simply put, green skills are the knowledge, abilities, values, and attitudes needed to live in, develop and support a sustainable and resource-efficient society» (United Nations Industrial Development Organization, 2021)

«Technical skills, knowledge, values and attitudes needed in the workforce to develop and support sustainable social, economic and environmental outcomes in business, industry and the community» (Australian National Centre for Vocational Education Research 2013)

It is also necessary to dwell on GreenComp,⁴² a recently approved European Commission project. More in detail, GreenComp is defined as a «Reference framework for sustainability competences. It provides a common ground to learners and guidance to educators, providing a consensual definition of what sustainability as competence entails», which led to the identification of 12 competencies grouped into 4 areas. The competence for sustainability is thus defined in this area: «A sustainability competence empowers learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures» (Bianchi et al., 2022).

To sum up, at least in appearance, the sources analysed and the studies referred to in the previous paragraphs dedicated to green skills do not seem to have produced a satisfactory result in definitional terms: the first evidence is that, no unambiguous definition could be found. In addition, this heterogeneity then generates different approaches and policies based on how green jobs and green skills are thought of in different contexts and countries. Nonetheless, it is possible to discuss some recurring elements and insights emerging from the research, namely from the literature review phase.

• Are green skills transversal or technical skills?

The first term refers to those soft skills aimed at the empowerment of the individual and considered crucial by the European Commission⁴³ for the active participation not only in the labour market but also in contemporary society. These are skills that are acquired independently of the course of study and are mainly social and personal in nature: learning to learn, knowing how to work in a team and collaborate, developing critical thinking. The second, according to the European Commission,⁴⁴ refers to “hard” skills that describe the knowledge, skills and attitudes needed to perform a specific job. For example, knowing how to design a solar panel, knowing and being able to intervene in the maintenance of recycling flows, assembling an electric motor. The first studies dedicated to the theme of green skills focused, in particular, on the identification of technical green skills, as they focused on specific sectors and, within these, specific profiles emerging or to be retrained by including in their curricula specific green skills. More recently, the importance of thinking of these skills not only as technical, but also as transversal, has emerged: green skills are therefore also those skills that correspond to a mindset and a proactive and creative behaviour in the protection and promotion of environmental sustainability, therefore transversal and soft in nature, as not limited to a specific sector or professional profiles.

⁴² () See: https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework_en.

⁴³ () *Council Recommendation of 22 May 2018 on key competences for lifelong learning (2018/C 189/01)*.

⁴⁴ () *Ibidem*.

- **Green skills are difficult to identify because many of them are actually skills already present in the current supply of training systems**, modified in a more or less significant way according to the relative needs emerging from the labour market and from compliance with international regulations. In this sense, if the green skills are now clear that they are both technical and transversal, it is appropriate to think, as already done for green jobs, thinking of the “green” of which the skills are coloured as a continuous, not as a label that distinguishes, strictly, green skills and not green. We speak, in this case, of shades of green:⁴⁵ there are skills that, more than others, will have to become green, as strongly impacted by the transition, other skills that will require fewer substantial changes. Green competencies are both transversal and technical for this very reason: because all knowledge, skills and attitudes can (and must) change, without, however, arriving at a polarization between green and non-green competencies, but at a spectrum of “greenness” where all competencies can be placed, depending on how much they are transformed and impacted by the training needs arising from the transition.
- **The Green General Skills Index** concerns the “Engineering & Technical Skills”.⁴⁶ These are skills that concern the design, planning and implementation of technologies. The second concerns “Science Skills”, knowledge and skills related, in particular, to physics and biology. The third group includes “Operation Management Skills”, more practical and operational skills related to the organization of production processes. The fourth group concerns “Monitoring skills”, competences linked, for example, to quality control and compliance with standards (such as those introduced by the green transition).
- **Green skills, thus identified, are mostly of a technical nature, obtainable through university and, in general, tertiary training.** And that there is the risk of a new polarization: between those who will have access to green skills, and therefore to green jobs in demand, and those who will remain trapped in brown jobs, jobs with a high (negative) environmental impact and often also characterized by low skills, mostly operational in nature - and therefore also at risk of automation, as recently recalled by CEDEFOP.⁴⁷ Although the risk of polarization mentioned here is real, it is, however, possible to affirm that it is precisely a holistic approach to green skills that can overcome - at least in part - the bottleneck effect mentioned. It means, in fact, reasoning on how all jobs can be transformed, highlighting the importance of intermediate technical figures, necessary to enable the transformative processes linked to the introduction of new technologies (and trained through VET paths) and the importance of promoting a transversal approach to the theme of environmental sustainability, going to intercept all study paths. Obviously, this approach must be accompanied by a series of policies to achieve a just transition, as listed in paragraph 5. Nevertheless, it seems possible to affirm that green skills do not only concern high profiles, but that they impact, albeit to varying degrees, the entire occupational structure, generating in particular the need for new intermediate technical figures.
- **Green skills require training carried out in collaboration with employers’ organisations.** The new technologies introduced, the new organizational models, are not already codified, in terms of skills, in standard training courses: they must instead be known, experienced, directly touched by hand in the workplace, as also highlighted by research of MIT dedicated to the relationship between technological innovation and training.⁴⁸

⁴⁵ () UNEP, ILO, IOE, ITUC, *Green Jobs: Towards decent work in a sustainable, low-carbon world*, cit.

⁴⁶ () F. Vona, G. Marin, D. Consoli, D. Popp, *Green Skills*, NBER Working Paper Series, n. 2116, 2015.

⁴⁷ () CEDEFOP, *Digital, greener and more resilient. Insights from Cedefop’s European skills forecast*, 2021.

⁴⁸ () MIT Work of the Future Task Force, *The Work of the Future: Building Better Jobs in an Age of Intelligent Machines*, 2020.

VET and its tools, such as internships and apprenticeships, therefore, acquire a central value and role. Moreover, this alliance is crucial both for the construction of IVET paths (for young people) and for CVET paths (for adults and workers). Lifelong learning, which has become a valuable asset today, is made possible by the construction of these skills alliances, in which the social partners play a crucial role, as also recalled by the European Commission.⁴⁹

• **Green skills and digital skills are interrelated but also interdependent.** In

order to reduce the consumption of buildings, it is necessary to have advanced technologies capable of calculating these aspects through the construction of rendered modules, or even Big Data Analytics techniques are needed to “read” where to intervene in order to make production processes more efficient and, at the same time, reduce waste and therefore environmental impact. Or again, just think of the connections between Virtual Reality (VR) and consumption reduction, for example by limiting travel by providing work and training contexts online. The examples are numerous, and they mean that it is necessary to reason by always keeping together green and digital transition, so as to maximize the benefits of a rethinking of professional profiles - and of the respective training paths - in the light of these connected and interdependent transformations taking place.

3. A PROPOSAL FOR A DEFINITION BASED ON THE PROJECT OUTCOMES

The reasoning carried out so far and the evidence gathered in the preceding paragraphs suggest proposing an original definition of green skills, which has also matured thanks to the work conducted as part of this research, which has allowed us to come into contact with different experiences of collaboration between VET providers and SGI providers. The definitions constructed are contained in Box 4.

These definitions draw on a broad notion of ‘green transition’, not related exclusively to the sectors directly impacted by energy transformation, but to society as a whole. Green skills are all those skills, both technical and transversal, that are useful to promote, manage and implement this transition.

In considering the distinction between technical and transversal skills, the former are those to promote the green transition from a technical and technological point of view, thanks to advanced scientific knowledge. They have a marked sectoral connotation, as they are closely linked to production sectors and their evolutions, so they can be provided, developed and trained in this context.

BOX 4 – GREEN SKILLS DEFINITIONS – A PROPOSAL

Green Skills	Any skill - both technical and transversal - that enables the (technological, economic, productive, social, cultural) processes related to the green transition, either directly or indirectly. Green skills can either be an update on the professional background of already existing occupations or form part of entirely new knowledge sets, characterising new professional profiles.
Green Technical Skills	Skills that promote, from a technical and technological perspective, the green transition through the provision of scientific knowledge and abilities.
Green Transversal Skills	Competencies, knowledge, and skills that form a mindset and a set of attitudes oriented toward promoting green transition.

⁴⁹ () European Commission, *European skills agenda for sustainable competitiveness, social fairness and resilience*, 2020.

Transversal skills are complementary to the first ones, i.e. personal skills useful to develop a new mindset, a new attitude towards reality. Examples include identifying the most sustainable solutions in each project, or taking actions to improve the environmental impact of one's actions in the private and professional spheres. Transversal green skills have a cross-sectoral dimension: their acquisition and updating is strategic during one's career, even within different professional specializations.

4. IDENTIFICATION OF THE MAIN (GREEN) SKILLS AND LABOUR IMBALANCES WITHIN THE TARGETED MEMBER STATES/SECTORS

Starting from the assumption that the green transition will have a substantial impact in terms of changes in skills and occupational needs on the sectors under investigation, the aim of this section is to provide a quantitative overview of the dynamics of employment and skills in target countries in order to verify the presence of any phenomena of skills gap and shortages also from a forecast perspective.

In general terms, and considering the purposes of the present Chapter, it was also considered appropriate to open this paragraph with CEDEFOP's most recent quantitative insights from a European Green Deal (EGD) skills forecast scenario.⁵⁰

Water supply and waste management appear to benefit most from the EGD. While employment in this sector trends slightly downward in the baseline forecast, the EGD scenario forecasts an employment increase of over 60% between 2020 and 2030. Beyond avoiding the job losses forecast in the baseline, implementing the EGD is expected to create around 941 000 additional jobs.

This can be attributed to increasing employment in the design of waste management and sustainable water (re)use facilities and their operation. The main aims set out in the Circular economy action plan⁵¹ – harmonising the separate waste collection systems across the EU, minimising the presence of harmful substances in waste water, and re-use and recycle policies affecting the sector – drive these trends.

In the EGD scenario, the sectors that are expected to see the largest employment gains are utilities (through increased recycling activities), electricity supply (through increased demand for renewable energy), manufacturing of appliances/electrical equipment (e.g. for the renewable electricity generation sector, or more-energy efficient appliances), construction, and the sectors that link to these via supply chains. Besides the expected direct impact, the interconnectedness of economic activities through supply chains also creates expectations for the indirect impact of the green transition on employment in other sectors. Changes in the profile of energy production will, for example, create jobs (and new occupations) in firms supplying new technologies. In Europe, about 286 000 energy sector workers (at all skill levels) may need to transition to a job in a greener sector, to a job in a sector where EGD implementation has a positive impact on labour demand. Employment in the electricity sector is forecast to increase by 197 000 jobs by the end of the decade, almost four times what was forecast in CEDEFOP's baseline scenario.

Comparing forecast change in employment levels in the baseline with the change emerging from the EGD scenario shows that EGD-driven employment trends are likely to benefit a broad range of medium-skill occupations. In relative terms, the highest impact is expected for refuse workers, building and related trades workers, electrical and electronic trades workers and drivers, one of the main occupations within the transport sector.

⁵⁰ () CEDEFOP (2021), *The green employment and skills transformation: insights from a European Green Deal skills forecast scenario*.

⁵¹ () European Commission (2020), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A new circular economy action plan for a cleaner and more competitive Europe*, 11.3.2020, COM(2020) 98 final.

Looking at the issue of attractiveness (especially towards young people) and future sustainability considering the element of demographic change with the aim of integrating the detailed country-by-country information provided in the table below, it was deemed appropriate to also provide an overview (at European level) of the 2020 sectoral employment composition by age group of the three main sectors under analysis:⁵² in all target sectors the age group 15-24 has the lowest values equal to 4,3% (water and waste treatment), 5,2% (energy supply services) and 6% (transport and storage) while the 25-49 age group is on the lead.⁵³

With reference to the sources used to implement the following paragraphs of the research, the following datasets were taken into consideration:

- **Skills intelligence:** CEDEFOP interactive portal devoted to evidence on current and future skills and labour market trend (2020-2030)⁵⁴
- **Skills for Jobs:** OECD Database providing country-level (and subnational) information on the alignment between the demand and supply of a wide range of dimensions, including cognitive, social and physical skills disaggregated into more than 150 job-specific Knowledge areas, Skills and Abilities.⁵⁵

Most of this information was also used in the preparation phase of the round of in-depth interviews carried out during the Project implementation and provided in advance to the interviewees.

Table 1 illustrates the most significant data at sectoral and national level obtained from the aforementioned datasets. First-hand information gathered through the online questionnaire and interviews is discussed in the relevant sections.

Table 1: Country fiches on employment key facts in Belgium, France, Germany, Netherlands, Portugal, Spain (water, energy, transport sectors).

Note for the reader: the statistics in Table 1 are intended to enhance quantitative information on the labour market in the countries and sectors of reference. However, it is appropriate to point out that these data provide reliable information with reference to the water, energy and transport sectors as they are classified by the NACE code. Therefore, they are not meant to include the broader and more varied sectoral dynamics considered by the Project and its Partners.

⁵² () Source: Eurostat, dataset: European Union Labour Force Survey (EU LFS), indicator: Employed population.

⁵³ () 55,5% (water and waste treatment), 58,1% (energy supply services) and 58,4% (transport and storage).

⁵⁴ () See: <https://www.CEDEFOP.europa.eu/en/tools/skills-intelligence/sectors?country=§or=01.04#1>.

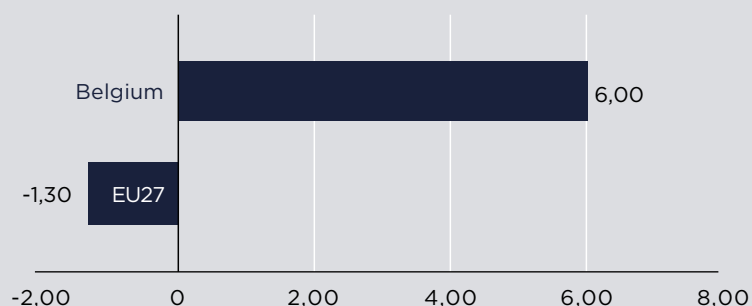
⁵⁵ () See: <https://www.oecdskillsforjobsdatabase.org/press.php>. The dataset used when preparing this Report is from 2018. For the sake of completeness, it should be noted that a new dataset was released at the end of September 2022, which can be found at the following link: <https://stats.oecd.org/Index.aspx?DataSetCode=S4J2022#>.

COUNTRY FICHE 1

BELGIUM

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS⁵⁶

Future employment growth (in %) in Water and waste treatment sector in Belgium compared to EU27 in 2020-2030



Future employment growth (in %) in Water and waste treatment sector in Belgium compared to EU27 in 2020-2030: comparing performances under this indicator over the period 2020-2030, Belgium is on the lead with 6 while EU27 follows with -1.3 ().

Top three Occupations employed in Water and waste treatment sector in Belgium in 2020⁵⁷

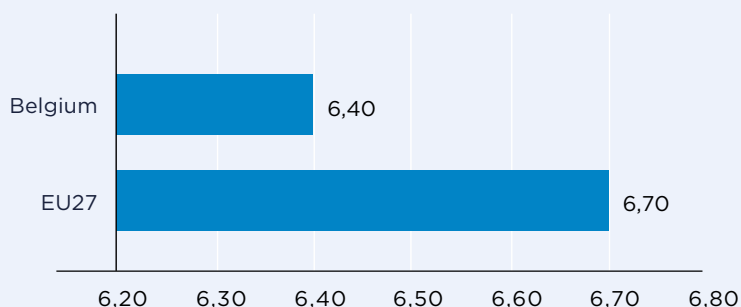
Other elementary workers

Science and engineering technicians

Drivers and vehicle operators

ENERGY SUPPLY SERVICES⁵⁸ - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Energy supply services sector in Belgium compared to EU27 in 2020-2030



Future employment growth (in %) in Energy supply services sector in Belgium compared to EU27 in 2020-2030: comparing Future employment growth over the period 2020-2030, EU27 is on the lead with 6.7 while Belgium follows with 6.4.

Top three Occupations employed in Energy supply services sector in Belgium in 2020

Science and engineering technicians

Researchers

Engineers

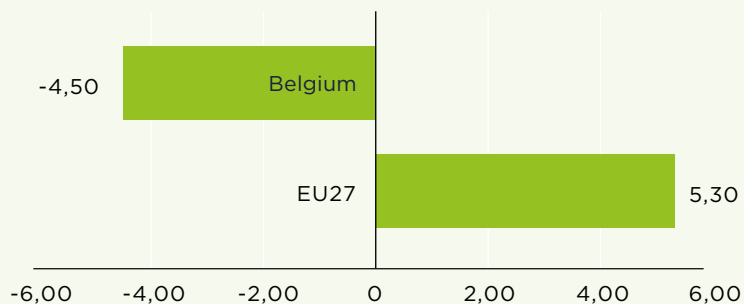
⁵⁶ () As for NACE rev.2 classification, activities in the water and waste treatment sector include: the collection, treatment and distribution of water for domestic and industrial needs; activities relating to the management of waste, such as the collection, treatment and disposal of various forms of waste, including that from households; and the provision of remediation services, i.e. the clean-up of contaminated buildings and sites, soil, surface or ground water.

⁵⁷ () Source: Eurostat, dataset: European Union Labour Force Survey (EU LFS), indicator: Employed population by Occupation and Sector.

⁵⁸ As for NACE rev.2 classification, activities in the energy supply services sector includes activities that provide electric power, natural gas, steam, hot water and the like through a permanent infrastructure (network) of lines, mains and pipes. This includes the distribution of electricity, gas, steam, hot water and the like to industry and residential buildings. It includes the operation of electric and gas utilities, which generate, control and distribute electric power or gas. Also included is the provision of steam and air-conditioning supply.

TRANSPORT⁵⁹ - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in Belgium compared to EU27 in 2020-2030



Future employment growth (in %) in Transport & storage sector in Belgium compared to EU27 in 2020-2030: comparing Future employment growth over the period 2020-2030, EU27 is on the lead with 5.3 while Belgium follows with -4.5.

Top three Occupations employed in Transport & storage sector in Belgium in 2020



SKILLS FOR JOBS (2018 DATA)⁶⁰

In Belgium, the Agriculture, Forestry and Fishing sector is the one that struggles the most to find adequate talent. While **Electricity and Energy Supply, Waste Management and Transportation and Storage sectors are among the ones facing the largest occupational surpluses** together with the Mining and Quarrying, Wholesale, Retail, Trade and Motor Repair and Construction ones.

⁵⁹ As for NACE rev.2 classification, activities in this sector encompass passenger or freight transport by rail, pipeline, road, water or air, and associated activities such as terminal and parking facilities, cargo handling, storage etc. Also included is the renting of transport equipment with driver or operator, and postal and courier activities.

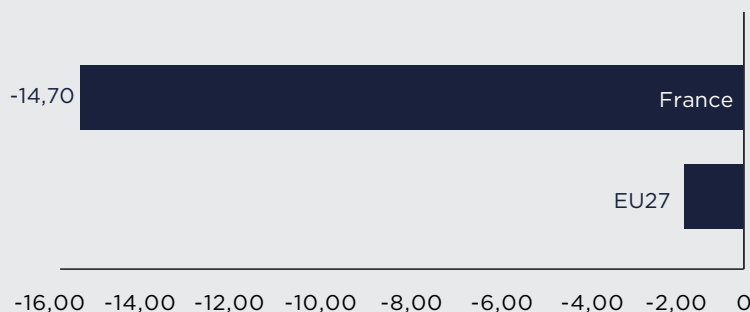
⁶⁰ () Sector shortages occur when firms struggle to find appropriate talent. Surplus arises when the supply of workers in that sector exceeds demand.

COUNTRY FICHE 2

FRANCE

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in France compared to EU27 in 2020-2030



Comparing Future employment growth over the period 2020-2030, EU27 is on the lead with -1.3 while France follows with -14.7.

Top three Occupations employed in Water sector in France in 2020

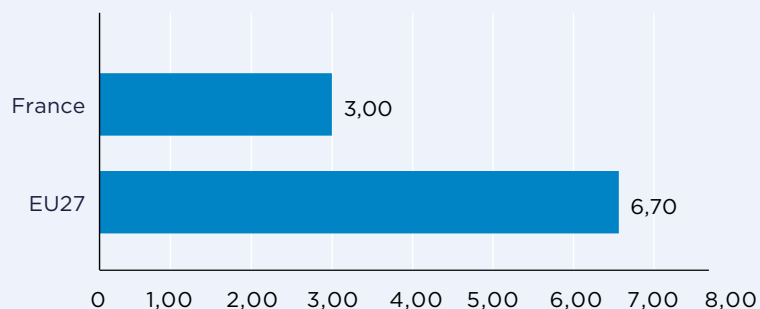
Drivers and vehicle operators

Other elementary workers

Science and engineering technicians

ENERGY SUPPLY SERVICES - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Energy supply services sector in France compared to EU27 in 2020-2030



Future employment growth (in %) in Energy supply services sector: EU27 is on the lead with 6.7 while France follows with 3.

Note for the reader: the statistics in table above are intended to enhance quantitative information on the labour market in the countries and sectors of reference. However, it is appropriate to point out that these data provide reliable information with reference to the energy sector as it is classified by the NACE code. Therefore, they are not meant to include the broader and more varied sectoral dynamics of France which would result in a bigger employment growth for the energy sector.

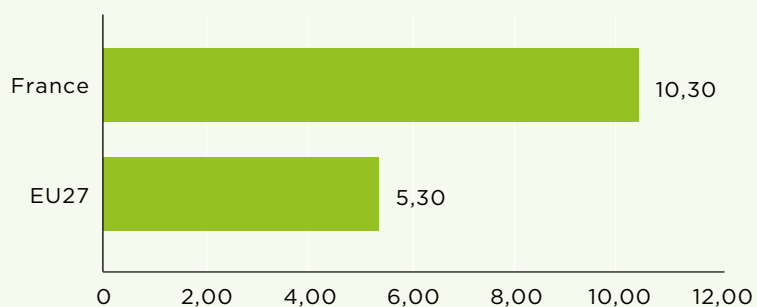
Top two Occupations employed in Energy sector in France in 2020

Science technicians

Engineering technicians

TRANSPORT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Transport sector in France compared to EU27 in 2020-2030



Future employment growth (in %) in Transport & storage sector in France compared to EU27 in 2020-2030: Comparing Future employment growth over the period 2020-2030, France is on the lead with 10.3 while EU27 follows with 5.3.

Top three Occupations employed in Transport sector in France in 2020

▼
Drivers and vehicle operators

▼
Accounting clerks

▼
Office associate professionals

SKILLS FOR JOBS (2018 DATA)

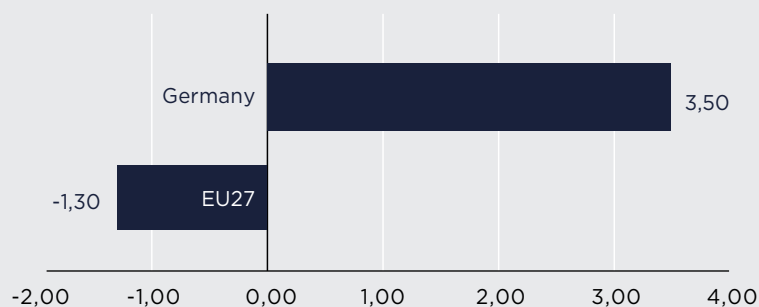
In France, the Education sector experiences the most acute occupational shortages. Some occupational surpluses are instead observed in the Information and Communication sector, as well as in the Transportation and Storage sector and, to a lesser extent, in the Electricity and Energy Supply and Waste Management sectors.

COUNTRY FICHE 3

GERMANY

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in Germany compared to EU27 in 2020-2030



Future employment growth (in %) in Water and waste treatment sector in Germany: Comparing Future employment growth over the period 2020-2030, Germany is on the lead with 3.5 while EU27 follows with -1.3.

Top three Occupations employed in Water sector in Germany in 2020

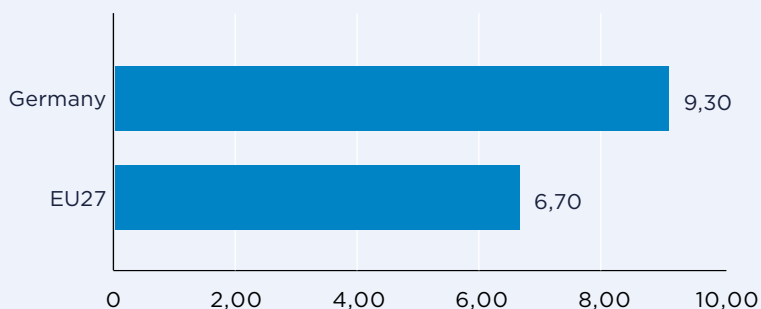
Other elementary workers

Drivers and vehicle operators

Science and engineering technicians

ENERGY SUPPLY SERVICES - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Energy supply services sector in Germany compared to EU27 in 2020-2030



Future employment growth (in %) in Energy supply services sector: comparing Future employment growth over the period 2020-2030, Germany is on the lead with 9.3 while EU27 follows with 6.7.

Top three Occupations employed in Water sector in Germany in 2020

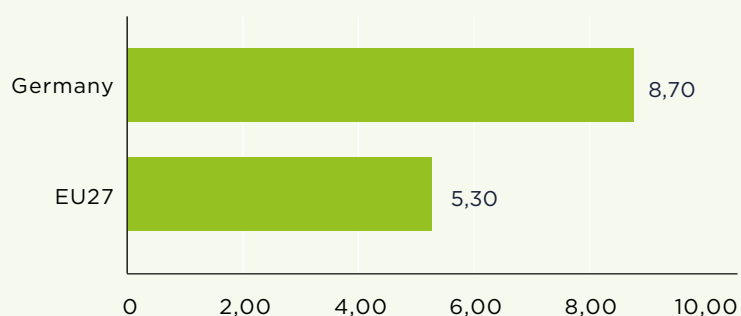
Office clerks

Science and engineering technicians

Electro-engineering workers

TRANSPORT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Transport sector in Germany compared to EU27 in 2020-2030



Future employment growth (in %) in Transport & storage sector in France compared to EU27 in 2020-2030: Comparing Future employment growth over the period 2020-2030, Germany is on the lead with 8.7 while EU27 follows with 5.3.

Top three Occupations employed in Transport sector in Germany in 2020

▼
Drivers and vehicle operators

▼
Accounting clerks

▼
Other support clerks

SKILLS FOR JOBS (2018 DATA)

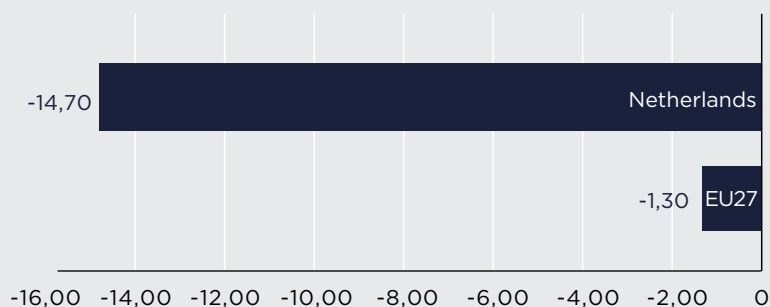
Financial and Insurance activities and Public Administration and Social Security are the sectors with the strongest relative occupational shortages in Germany. The sector with the largest surplus is Agriculture, Forestry and Fishing. Transportation and Storage (more significantly among the target sectors) and Electricity and Energy Supply and Waste Management (to a lesser extent) sectors experience surpluses as well.

COUNTRY FICHE 4

NETHERLANDS

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in Netherlands compared to EU27 in 2020-2030



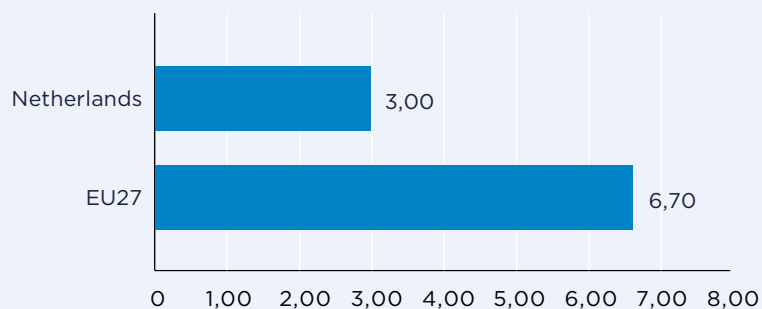
Future employment growth (in %) in Water and waste treatment sector in the Netherlands: Comparing Future employment growth over the period 2020-2030, Netherlands is on the lead with 13.5 while EU27 follows with -1.3.

Top three Occupations employed in Water sector in Netherlands in 2020

Office professionals Other elementary workers Science and engineering technicians

ENERGY SUPPLY SERVICES - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Energy supply services sector in Netherlands compared to EU27 in 2020-2030

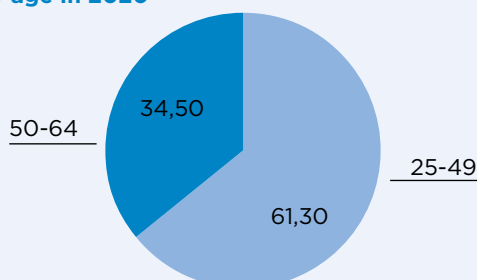


Future employment growth (in %) in Energy supply services sector: Comparing Future employment growth over the period 2020-2030, Netherlands is on the lead with 7.7 while EU27 follows with 6.7.

Top three Occupations employed in Energy sector in Netherlands in 2020

Science and engineering technicians ICT professionals Electro-engineering workers

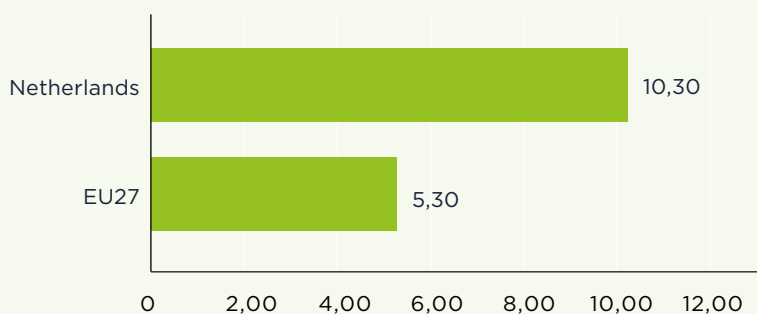
Employment in Energy supply services sector in Netherlands by age in 2020



Future employment growth (in %) in Transport & storage sector in Netherlands compared to EU27 in 2020-2030: comparing future employment growth over the period 2020-2030, EU27 is on the lead with 5.3 while Netherlands follows with -5.4.

TRANSPORT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Transport sector in Netherlands compared to EU27 in 2020-2030



Top three Occupations employed in Transport sector in Netherlands in 2020

▼
Drivers and vehicle operators

▼
Accounting clerks

▼
Other support clerks

SKILLS FOR JOBS (2018 DATA)

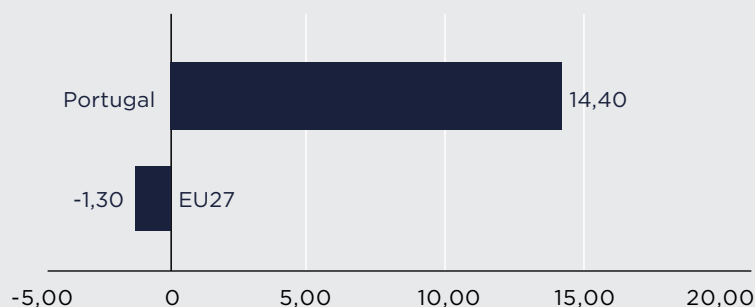
Human Health and Social Worker activities as well as the Education sectors are facing the most acute occupational shortages in the Netherlands. The sectors with the largest surpluses are Transportation and Storage and Wholesale, Retail, Trade and Motor Repair followed by Electricity and Energy Supply and Waste Management.

COUNTRY FICHE 5

PORTUGAL

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in Portugal compared to EU27 in 2020-2030



Future employment growth (in %) in Water and waste treatment sector in the Portugal: comparing Future employment growth over the period 2020-2030, Portugal is on the lead with 14.4 while EU27 follows with -1.3.

Top three Occupations employed in Water sector in Portugal in 2020

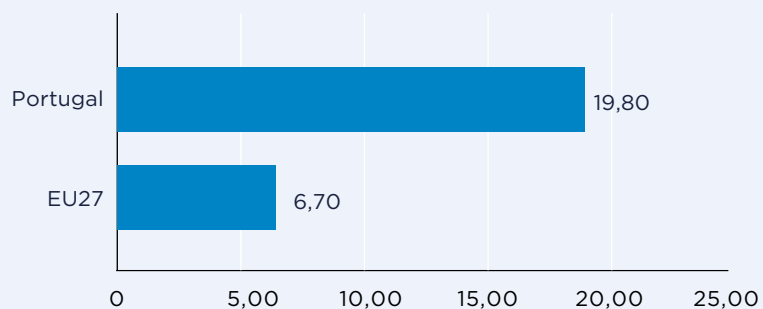
▼
Drivers and vehicle operators

▼
Science and engineering technicians

▼
Other elementary workers

ENERGY SUPPLY SERVICES - EMPLOYMENT KEY FACTS

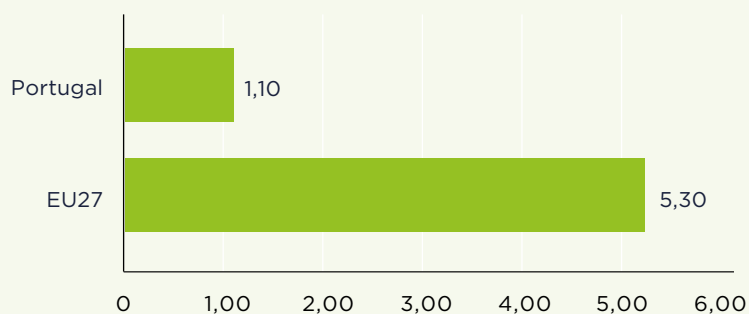
Future employment growth (in %) in Energy supply services sector in Portugal compared to EU27 in 2020-2030



Future employment growth (in %) in Energy supply services sector: comparing Future employment growth over the period 2020-2030, Portugal is on the lead with 19.8 while EU27 follows with 6.7.

TRANSPORT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Transport sector in Portugal compared to EU27 in 2020-2030



Future employment growth (in %) in Transport & storage sector in Portugal compared to EU27 in 2020-2030: comparing future employment growth over the period 2020-2030, EU27 is on the lead with 5.3 while Portugal follows with 1.1.

Top three Occupations employed in Transport sector in Portugal in 2020

▼
Drivers and vehicle operators

▼
Accounting clerks

▼
Office associate professionals

SKILLS FOR JOBS (2018 DATA)

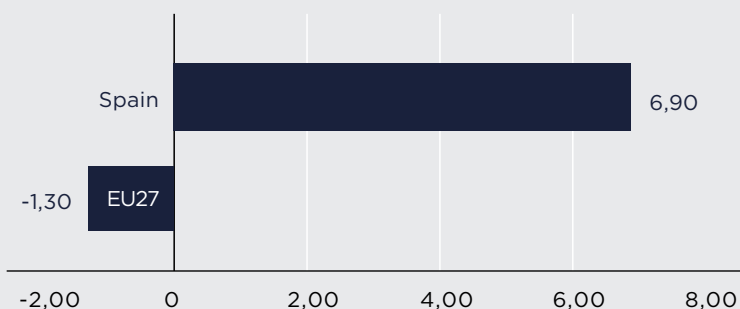
The Education sector as well as the Information and Communication sector are those facing the most intense occupational shortages in Portugal. The sectors with the largest surpluses are Construction and Accommodation and Food Service Activities. Transportation and Storage and Electricity and Energy Supply; Waste Management are the last two sectors in terms of consistency of surplus phenomena

COUNTRY FICHE 6

SPAIN

WATER AND WASTE TREATMENT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Water and waste treatment sector in Spain compared to EU27 in 2020-2030



Future employment growth (in %) in Water and waste treatment sector in Spain: comparing Future employment growth over the period 2020-2030, Spain is on the lead with 6.9 while EU27 follows with -1.3.

Top three Occupations employed in Water sector in Spain in 2020

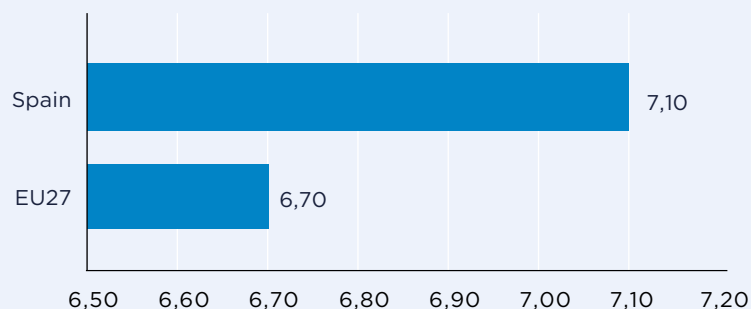
Other elementary workers

Drivers and vehicle operators

Science and engineering technicians

ENERGY SUPPLY SERVICES - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Energy supply services sector in Spain compared to EU27 in 2020-2030



Future employment growth (in %) in Energy supply services sector: comparing Future employment growth over the period 2020-2030, Spain is on the lead with 7.1 while EU27 follows with 6.7.

Top three Occupations employed in Energy sector in Spain in 2020

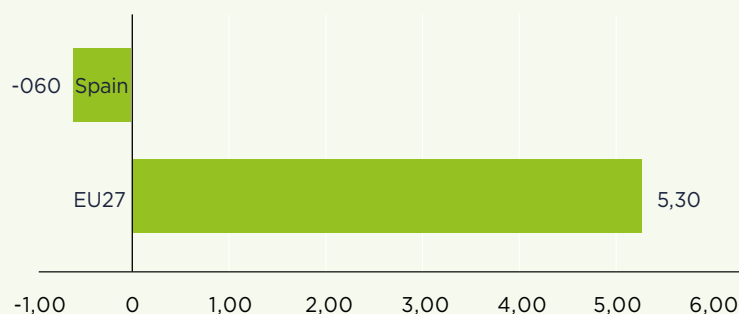
Researchers and engineers

Science and engineering technicians

Electro-engineering workers

TRANSPORT - EMPLOYMENT KEY FACTS

Future employment growth (in %) in Transport sector in Spain compared to EU27 in 2020-2030



Future employment growth (in %) in Transport & storage sector in Spain compared to EU27 in 2020-2030: comparing future employment growth over the period 2020-2030, EU27 is on the lead with 5.3 while Spain follows with -0.6.

Top three Occupations employed in Energy sector in Spain in 2020

Drivers and vehicle operators

Technical labourers

Accounting clerks

SKILLS FOR JOBS (2018 DATA)

The Real Estate and the Education sectors are facing the most intense occupational shortages in Spain. Transportation and Storage sectors experience as well occupational shortages, even if in a less intense way. The sectors with the largest surpluses are Accommodation and Food Service, Agriculture, Forestry and Fishing and Administrative and Support Service sector. Electricity and Energy Supply and Waste Management are the sectors in the last position in the ranking of those in which employment surplus phenomena occur.

5. CONCLUDING REMARKS

These analyses unanimously highlight the importance of training and VET for the realization of a “just” green transition. Hence the importance of identifying policies to support the construction and diffusion of green skills. Some of these are listed below and can be further explored in the cases identified and developed in the countries and sectors involved in this research. According to the main international research centres, it is necessary to:

- **Build synergies and coordinate integration between industrial and training policies** (OECD, 2014, CEDEFOP, OECD, 2015). In most cases, the absence of coordination between policies dedicated to supporting sectors affected by the ecological transition and adequate training policies, which are absent or managed separately, is highlighted. Instead, there is a need for integration, from the national level and especially at the local level, as well as within the policies implemented by the social partners.⁶¹
- **Develop skills intelligence and implement tools for anticipating needs** (Auktor, 2020, CEDEFOP, 2021). This is a very emphasized and central theme in most of the reports. In particular, it is emphasized that skills intelligence cannot be reduced to the mere anticipation of short-term needs, but must be coordinated with industrial and training policies in order to provide transparent information for planning effective transition programs.
- **Develop a sectoral and local approach** (CEDEFOP, 2019). While it is necessary to move away from the perspective of thinking of green transition as impacting only certain sectors (e.g., those with higher environmental impact intensity), it would be equally incorrect to imagine homogeneous policies that are not attentive to different specificities. More specifically, it seems necessary to plan initiatives linked, for example, to training and retraining of workers by understanding the specific sectoral and territorial needs, together, in order to maximize the effectiveness of the measures.
- **Also consider the impacts on local communities** (ILO, 2018). A factory that closes, or that sees the workforce employed significantly reduced, does not only generate problems for those directly involved, but also - indirectly - for local communities in terms, for example, of complementary activities (production chains), personal service activities, social services and welfare. Hence, the importance, once again, of an approach that is not limited to isolating the direct problem from the social and economic context in which it emerges, but to develop policies capable of taking these variables into account as well.
- **Build networks between innovation centres, businesses, training institutions** (CEDEFOP, 2012, ILO, 2019). This is because learning processes, to be effective, must take place in direct contact with technologies, which can be experienced directly in the workplace. Not only that: research activities must also be “closer” to training processes, for a rapid translation of innovation, from its experimental phase to that of rapid implementation thanks to the availability of workers with enabling skills.

⁶¹ () See also “green stimulus”

- **Participatory design and constant updating of curricula** (ILO, 2019). On this aspect, the social partners, but also the territories, have a decisive role. Updating the curricula of training paths thanks to the information gathered from skills intelligence activities is fundamental to promote, in turn, their effectiveness, both for the training of new professional skills, but also for the management of employment transitions based on the retraining of workers.
- **Overcome the distinction between initial and continuing training** (OECD, 2014, ILO 2015). A further element concerns the need to develop training processes that do not stop once secondary or tertiary education has been completed, thus also linking with continuing education.
- **Overcoming the distinction between transversal and technical skills** (Bianchi et al. 2022). An element that is more debated, but nevertheless present, and which refers to the importance of an approach that knows how to go beyond the identification of technical skills alone, but which knows how to think of them as a transversal factor (the continuum already mentioned).
- **Integration with other training policies** (Digital transition, Industry 4.0) (Auktor, 2020). Many green skills are also digital. If we think, for example, of techniques for the analysis of big data that know how to reduce waste and therefore environmental impact in the agricultural sector, then we think of digital skills that, given their specific impact, are also green. Or if we think about the importance of soft skills such as critical thinking and collaboration skills, which are recognized as central to, for example, Industry 4.0, we think about skills that are also central to the green transition. As these transitions are interconnected, it makes sense to also link related training policies to avoid duplication and wasted resources.
- **Overcome the distinction between formal, non-formal, and informal training** (OECD, 2014). Much of green skills training will affect - and does affect - especially in the early years of transition, adult workers. Hence the importance of enhancing the value of training processes carried out on the job or in non-formal contexts, and especially their certification, also in order to build that system of skills intelligence on which we have already focused.

CHAPTER 3. THE COLLABORATION BETWEEN SGI PROVIDERS AND VET PROVIDERS FOR BUILDING GREEN SKILLS

1. INFORMATION AND CHARACTERISTICS REGARDING EMPLOYMENT PROSPECTS AND REQUIRED SKILLS AS FOR INTERVIEWS AND DESK RESEARCH EVIDENCE.

This chapter is devoted to the issue of the collaboration between SGI providers and VET Providers for building green skills. To this end, the main results that emerged from the preliminary questionnaire and from the rounds of interviews conducted at sector level will be illustrated. The criteria adopted for the identification of the good practices under analysis are discussed in detail at the end of the chapter.

The following table summarises the main results that emerged from the qualitative investigation phase -survey⁶² and interviews-. Considering the purposes of the present report, it was also considered appropriate to integrate this data with CEDEFOP's most recent quantitative insights from a European Green Deal skills forecast scenario.⁶³ A sectoral approach is adopted and, where relevant, excerpts of the interviews -shown in italics- report the country of reference and the affiliation of the respondent in terms of belonging to SGI providers or VET organizations panel of respondents.⁶⁴

⁶² () As regards the online survey, in this section only the inputs related to employment and skills projections have been considered.

⁶³ () CEDEFOP (2021), *The green employment and skills transformation: insights from a European Green Deal skills forecast scenario*, cit.

⁶⁴ () An overview of the interviews conducted with a breakdown by country, organisation type and organisation name can be found in Annex 3. In compliance with the rules on the collection and processing of personal data and the need for anonymisation, the names of the respondents are not given. In any case, the opinions expressed by respondents are purely personal and do not reflect the position of the organisations they belong to.

TABLE 2

GREEN TRANSITION: EMPLOYMENT PROSPECTS AND REQUIRED SKILLS - KEY FINDINGS FROM WATER, ENERGY AND TRANSPORT SECTORS.

GREEN TRANSITION: EMPLOYMENT PROSPECTS AND REQUIRED SKILLS
WATER SECTOR
<p>► Examples of green skills/“low carbon” occupations which are difficult to find within water sector:</p> <ul style="list-style-type: none"> • <i>agricultural operator with sustainability knowledge and skills</i> (SGI provider – NL – online survey); • <i>water plant operator</i> (SGI provider – ES – online survey); • <i>managerial professional profiles should be able to holistically handle all the issues concerning the quality of the services and to deal with analytics concerning the efficiency topic</i> (SGI provider – ES – interview); • <i>new green occupational profiles strategic for the SGI providers are about energy efficiency. In any case, the new skills arising are digital skills concerning programming and coding (clear gap regarding digital programming)</i> (SGI provider – ES – interview); • <i>Process engineering in wastewater treatment and Process engineering in groundwater management</i> (SGI provider – DE – online survey) <p><i>“In our opinion, it is more about equipping existing professional profiles with “green” skills through appropriate further training. For example, it is worth training engineers to become sustainability and/or climate protection officers”</i></p> <p>(SGI provider – DE – interview)</p> <p>► Are new entrants to the workforce are suitably qualified in green skills? For the majority of respondents⁶⁵ in the online survey, no, they have the right level of qualification, but they completely lack experience to perform green jobs adequately.</p> <p>► What do SGI providers interviewees think?⁶⁶</p> <ul style="list-style-type: none"> • The main transformations characterising the water sector are: demographic change, climate change and the digital <i>transformation</i> which also has an impact on the environmental footprint of companies and their performances in terms of sustainability. • It has been underlined that even in even in countries where there are currently no phenomena of skills shortages, <i>demographic</i> changes will have an impact on recruiting activities and create difficulties in hiring suitable professionals and retaining employees. • It is possible to assume that (green) skills shortages and mismatches at the sectoral level are caused by a lack of “<i>attractiveness</i>” of the water industry. Communication campaigns led by SGI providers and municipalities and/or local authorities devoted at raising awareness about occupational opportunities and career prospects within the sector could help narrow the skill gaps. In the foreseeable future demographic changes could have an impact on the supply side of suitable personnel to be hired. • The company <i>size</i> variable may affect the feasibility of undertaking collaborations with vocational training institutions. In addition, large companies find it easier to attract talents and train them through dual training paths thanks to a greater availability of dedicated human resources.

⁶⁵ () Question exclusively addressed to SGI providers. 4 out of 6 respondents. Authors’ elaboration on data collected from the survey and interviews.

⁶⁶ () As regards the interview phase, in this section only the inputs related to employment and skills projections have been considered.

► What do VET providers interviewees think?

- There is a need to develop hybrid environments for learning green skills by close collaboration between different institutions (VET providers, HE, University, Research Institutions, Public Bodies)
- Where collaboration is more difficult, there is often a lack of awareness of the importance of green skills training for local economic development and social inclusion, as well as of European strategies, resources and projects on this specific *topic*.
- More than training new profiles, VET providers should focus on building new green skills to manage the transition, adopting (*necessarily*) new learning methods and tools.
- It seems still limited the use of work-based intensive programs, as well as apprenticeship, while a central importance is covered by *workshops* and collaborative spaces, co-managed with companies.
- For many VET providers, the *task* of training new green skills is too expensive if done “alone”. For this reason, the role of intermediary bodies that can facilitate the dialogue between companies and educational institutions, allowing them to focus on each other’s activities, is crucial.

ENERGY SECTOR

► Examples of green skills/“low carbon” occupations which are difficult to find within energy sector:

- **Technicians, Project manager** (SGI provider – FR – online survey)
- **Electrical/Electronics engineering technicians** (SGI provider – DE – interview)
- **Manufacturer of wind turbines** (SGI provider – FR – interview)

“The ecological transition will be digital, and the digital transition will be ecological”

(SGI provider – FR- interview)

New **entrants** to the workforce are reported to be **suitably qualified in green skills**.

► What do SGI providers interviewees think?

- Considering energy sector and its branches -where data and forecasts indicate the most consistent employment growth, they will also face the main shortages in terms of professional profiles and adequate skills for supporting this growth.
- The energy transition needs to take into account all the stakeholders of the electricity value chain. Transition which will require new professional profiles.
- The territorial level perspective, alongside the sectoral analyses, appears to be the most suitable for tracing (also from a provisional point of view) the trajectories of matching between supply and demand for skills and professional profiles. In this sense, the involvement of all the actors of the local labour market, including public authorities, is crucial. This, also with specific reference to the management of the funds available for shared projects.
- Considering both the already current difficulty in finding qualified personnel at the sector level, and the highly international connotation of the workforce, action at European level -involving social partners- is desirable and necessary to facilitate the mobility of workers (in Europe and from foreign countries) and the comparability of standards and professional qualifications with particular reference to blue collar workers.

“The shift in the landscape of energy sector jobs will be between old energy technologies (coal, oil, and gas), where jobs are linked to extraction, versus new energy technologies (solar and wind), where the bulk of the jobs are likely to occur in manufacturing jobs. The fight against climate change needs all the talents, which is a challenge in an industry (i.e. the nuclear one) where women are under-represented.”

(SGI provider – DE – interview)

“The whole energy transition will or might fail due to the lack of professionals”

(SGI provider – DE – interview)

- The biggest challenge facing the energy sector is not so much that of providing new skills (including green skills) to those who enter the labour market for the first time at the end of a study / training course, but of updating skills of workers who have been working in the sector for several years. In this regard, it is important to underline that the green and digital transition must be considered together, and not as two distinct phenomena. The two transitions, digital and energy, provide a good opportunity to rethink our use of digital technology as a driver for innovation and to design services reducing the carbon footprint.
- What is relevant, with respect to the issue of the impact of the green transition on skills needs, is not so much the creation of totally new professional profiles, but rather the integration of the matrix of skills of those already existing with skills and knowledge suitable to support this transition (and the digital one).
- What affects the difficulty of finding qualified personnel is also a discourse of low attractiveness of the sector. In this regard, it is important that not only employers' organisations and workers' representatives engage in communication campaigns aimed at underlining the growth, career and employment prospects generally offered by the sector, but also it is strategic that at a European level institutions and stakeholders undertake to provide clear, easy-to-understand, reliable and up-to-date data on these issues. This, to inform adequately all the audience which could be interested in joining and preparing for entering the sector.

► **What do VET providers interviewees think?**

- A general shortage in enrolments of students in programmes devoted to technical professions can be noticed. Industrial activities -in terms of occupational prospects- are far from being understood by the students and their families. Attractiveness should be enforced via higher salaries and career perspectives (where long-life-learning is a must have).
- The energy sector is already suffering from shortages of workers but also of qualified “technical” trainers.
- The autonomy of VET providers (in updating/modifying/integrating CVs and study programmes), with respect to national programs and standards, could be an element of supply in the ability to adapt the training offer and increase its responsiveness to the challenges posed by the green transition.

“Vocational Education and Training is (therefore) necessary to complement the traditional system and develop a pool of technical skills the energy sector urgently needs”

(SGI provider – FR – interview)

TRANSPORT SECTOR

► Examples of green skills/"low carbon" occupations which are difficult to find within transport sector:

- **transport engineer** (SGI provider – DE – online survey)
- **hardware-software engineer** (SGI provider – PT – interview)
- **hydrogen technician** (VET provider – NL – interview)

"There is no energy transition possible without more digital skills"

(VET provider – NL – interview)

New **entrants** to the workforce are reported to be **suitably qualified in green skills**.

► What do SGI providers interviewees think?

- Considering transport sector and its branches lots of elements must be contemplated for describing and facing the transformation: the increase of energy prices and the consequent increase of labour cost; supply shortages; the green and digital transition.
- The green transition needs to consider all the stakeholders of the value chain: in particular in the passenger transport branch, consumers, operators, Institutional and private contractors are increasingly demanding "greener" vehicles, "greener procedures" and "greener" overall production. Transition which will require new professional profiles.
- Both hard and soft skills are needed in the new value chains: the technical points of the job and specificities of the sub-sector must be a focus of the collaboration of training centres and the companies. The technicality of the sector and each mean of transport require a different level of expertise and training must mirror these new needs.
- The green transition in the transport sector is strictly linked to the digital transition: in the long run, companies have to be prepared to change in this new paradigm in the renewed social realities.
- Companies must invest in hardware and software. Training programmes must be focused on new digital skills to support the new technologies.

"Regarding the environmental issues, it is up to collaboration between stakeholders to develop programmes that address the topic and make existing problems tangible while simultaneously presenting future solutions and proposals for resolution"

(SGI provider – PT – interview)

"The freight forwarding industry is a constantly and rapidly changing sector. For this reason, new skills are always needed"

(SGI provider – PT – interview)

- The increase technological solutions and investment in new technologies is a reality that brings added efficiency to the sector and allows transport companies to be able to monetize resources. However, the increasing new technologies must be translated in training programmes to fill the gap of skills and the growing difficulty to find labour for the sector.
- Digital transition and professional skills go hand in hand and should complement each other.
- Green skills are the knowledge, skills, values and attitudes necessary to live, develop and support a sustainable and resource efficient society.

► What do VET providers interviewees think?

- Due to the green transition, there is more connectivity between different areas of work in public transport companies. This leads to changes in the way of how to communicate the knowledge: it is not just skills domain, but it is about connectivity and collaboration between domains and areas.
- Green skills are a transversal issue in several projects: there is not a focus, a project, a seminar on green skills only, because green skills, sustainability are integrated in the training concept.
- Several stakeholders are involved: learners, workers, in the end are stakeholders because they need to gain a new understanding of how they see their own opportunities in the green transition of the transport sector.
- Green skills should be certified and inserted in workers curricula.
- Facilitator, people who teach in the companies must be trained too in the green transition: digitalisation, automatization and green transition are complex transformations that require a multi-level accompaniment of the subjects.

“There is a tendency that all the responsibility in terms of sustainability is put on each and individual labour. We shouldn’t forget that it is not okay to establish sustainability under every circumstance or at any price”

(VET provider – DE – interview)

“You cannot become more sustainable and have more green skills without more automation and more digital skills”

(VET provider – NL – interview)

2. IDENTIFICATION OF BEST PRACTICES AND CHALLENGES TO THE IMPLEMENTATION OF GREEN-ORIENTED VOCATIONAL EDUCATION AND TRAINING ACROSS PARTICIPANT MEMBER STATES

Best practices in the field of green oriented initiatives across target countries selection criteria and their variety in terms of scope and actors involved responded to two main objectives: on the one hand it was considered appropriate to underline the concrete examples of collaboration between SGI providers and VET organizations regarding the construction of professional profiles (curriculum) and green skills. These practices constitute the majority of the examples outlined. On the other hand, considering not only the role of actors of the European sectoral social dialogue of the project partners (SGI Europe and EFEE), but also the issue of the role of the social partners and collective bargaining regarding the provision of and access to quality training,

projects and initiatives were examined where, at sectoral level, employers’ organisations and workers representatives were directly involved for enabling a better matching between supply and demand of green skills (both in terms of negotiations and with reference to skills forecast studies).

With regard to the sources that formed the basis for the implementation of good practices, a careful analysis was carried out of the first-hand information provided both by the respondents to the online survey preparatory to the start of the research, and of those that emerged during in-depth interviews and sectoral workshops. This information was subsequently integrated with desk research and with supporting documents provided directly by the respondents. The Project Partners, each for their areas of expertise and countries of origin, played a strategic role in the identification of practices. This both in terms of involvement during the workshops, the actors who, with their presentations, illustrated the practices that were then selected for publication, and at the time of identifying the respondents to the interviews.

2.1 BEST PRACTICES – WATER SECTOR

BEST PRACTICE NO. 1

CENTRE FOR INNOVATIVE CRAFTSMANSHIP WATER (CIV WATER) (NL)

COUNTRY: NETHERLANDS

Characteristics of the training offered: The Centre for Innovative craftsmanship Water (CIV Water) is not, strictly speaking, a VET provider, as it is rather characterized as a useful platform for collaboration between educational institutions (e.g., MBO Life Sciences, Friesland College, Nordwin College, Noorderpoort, Wateropleidingen et al: MBO Life Sciences, Friesland College, Nordwin College, Noorderpoort, Wateropleidingen et al), water companies (e.g. Vitens, Waterbedrijf Groningen, Waterleidingmaatschappij Drenthe), SGI providers (Wetterskip Fryslan and Waterschap Noorderzijlvest), R&D centres (CEW, Water Alliance, Wetsus). The first element to focus on is therefore that of the dense network that develops around the Centre, at local and territorial level.

The benefits that such collaborations make possible are numerous. Didactics is characterized by being:

- Hybrid, plural, participatory: many teachers are professionals in the water sector, and the working contexts and, more generally, the practical aspects of the skills trained are widely valued thanks to in-company training and laboratory experiences
- Based on the emergence of personal, transversal skills, with the goal of acquiring a new mindset and a capacity for lifelong learning
- Characterized by the use of highly advanced laboratories where young people learn in direct contact with adult workers also engaged in processes of upskilling and reskilling
- Set on a rethinking of the figure of the teacher, no longer occupied only in lectures but also in coaching activities and facilitation of work and projects carried out directly by students.

The aims that they want to achieve are:

- To train professionals for the water sector equipped with the ability to innovate and be protagonists of the transformational processes that are impacting the sector, one of the most important for the achievement of environmental sustainability standards set at the international level;
- Interweaving the adoption of new technologies with the programming of corresponding training paths. In a sector where innovation is spreading, it is necessary, in order for it to spread as much as possible and not remain the prerogative of a few companies or a few territories, that as many workers as possible are equipped with skills that enable these new technologies. Hence the need for coordination among VET providers, SGI providers, companies and research centres: to pool the needs of the sector, to achieve the necessary critical mass to provide adequate spaces and places for excellent training, to participate in the design of paths that favour the attractiveness of companies in the sector and avoid brain-drain processes at the local level and towards other territories or countries.
- To develop a real training chain to diversify the offer according to the present needs. CIV Water coordinates training courses starting from upper secondary level to the third EQF level up to PhD courses, at the eighth EQF level. This is to be able to offer companies and young people varied paths that, on the one hand, are able to respond, in terms of skills, to the needs of those involved but also, on the other hand, allow a young person who enters a professionalizing path not to interrupt his or her learning path but rather continue to study until he or she obtains higher qualifications.

Reasons and forms of collaboration between SGI providers and VET providers:

- SGI providers and companies have long observed the gradual aging of the workforce engaged in the industry. This process is due to the use of new forms of work organization that have automated some tasks, but above all to the demographic decline and the lack of knowledge of the opportunities offered by the sector for young people. The risk of not finding a qualified workforce and of dispersing precious knowledge has, therefore, moved these subjects to imagine new forms of collaboration with the training systems.
- The relationship between these two worlds is, however, mediated by CIV Water, which therefore represents an intermediary between demand and supply of skills - and above all for the construction of the encounter between these two. The presence of a third party facilitates the collaboration between SGI providers and VET providers, because it allows both to remain focused on their core business and to enjoy the constant work of connection by a body specialized in facilitating these processes of dialogue. The role of CIV Water therefore makes it possible to bring SGI providers and VET providers closer together, acting as an intermediary between two worlds that often speak different languages.
- This intermediate space has also favoured a constant attention to the places of learning, which are not reduced to a simple alternation between the company and the training centre, between practice and theory, but instead favour a constant integration between them, also thanks to the use and provision of advanced laboratories, which allow SGI providers and VET providers to develop further forms of collaboration in training.
- The CIV Water makes available professionals and designers able to propagate innovation also among the subjects that participate in this network, for example thanks to the development of a hybrid learning process, digital, physical and based on innovative didactics, that favours the accessibility of the educational offer and contextually increases its quality.
- This reticular structure and the provision of space and expertise at the forefront have been made possible by the collaboration of some research and innovation centres, which have made it possible to triangulate the study of new technologies with their concrete adoption in production contexts and the design of training courses useful for their dissemination. CIV Water is therefore a real ecosystem that holds together innovation, research, training and work.

Trained Green Skills: within the training offer coordinated and managed by CIV Water, it is not possible to distinguish precisely between green skills and non-green skills. This is for the reasons explained above (see chapter 2): the green transformation has a transversal impact on all the figures involved in the water sector, even if with different degrees and intensity. The specific task of the CIV Water is to train professionals and technicians capable of governing and designing the innovation that is spreading in the water sector.

This inability to identify green skills, among others, is accentuated in the case of IVET courses aimed at young students. Here, the offer is more focused on forming a new mindset, and fostering students' proactivity and critical capacity, and shades of green permeate both technical and transversal training. More distinguishable are the green skills for professionals and adult workers, who can take shorter courses aimed at obtaining specific skills related to the introduction of new technologies or new forms of work organization.

Certainly, in CIV Water's experience, green skills are, first of all, transversal and personal, and starting from these it is then possible to curve the design of technical and hard skills towards sustainability and green transition.

Innovative features: there are several reasons that make CIV Water's experience an example of collaboration between VET providers and SGI providers (and not only, as we have seen) of excellence at international level:

- CIV Water has formed, along with other partners, the Centres of Vocational Excellence "PoVE", dedicated to water. For a more detailed presentation of the Centres of Vocational Excellence, please refer to the introductory part of this chapter. This organizational and project structure has allowed CIV WATER to acquire European resources to enhance its training and research capacity, strengthening the network of partners that, at local level, form an extraordinary alliance between the world of research, training and work, thus constituting a territorial platform to design, govern and propagate innovation, combining technological and organizational development with highly transformative training processes, dedicated to young people but also to adults. Therefore, this is not only a local experience of fruitful collaboration between VET providers and SGI providers for the construction of green skills, but an evolution of this model towards the creation of a hybrid ecosystem, flexible, participatory, able to generate the critical mass necessary to meet the challenges posed by the green and digital transition.
- An element worth mentioning is also the collaboration with the Katapult Network, a network of public-private collaboration that has helped CIV Water to further intertwine its activities with those of research and experimentation, and to acquire an international perspective useful to understand the needs of the sector and to build long-range collaboration to export and especially import innovative practices of training, organization and research.
- An element that favoured the establishment of CIV Water was the dedicated funding, in the start-up phase, by the Dutch government. The integration between national and international funds (thanks to the participation in the Erasmus+ calls promoted by the European Union) has allowed the centre to have the financial resources to develop its projects in the best way.
- CIV Water invests with conviction in the initial and continuous training of young people and workers, but also of its teachers: having qualified staff always up to date on the technological innovations widespread in the water sector, and able to govern innovative teaching methodologies (laboratories, but also hybrid between presence and distance, between workplace and classroom) is crucial for the construction of green skills.
- The ecosystem built by CIV Water is of particular interest for the purposes of this research, also because it has also favoured training and research experiences that have connected different productive sectors, and not only the water sector. This ability to intercept different needs and to develop dialogue between SGI providers and companies belonging to different economic sectors represents a qualifying element of an experience that is first of all focused on generating innovation, overcoming the traditional distinctions between sectors and going to identify, for example, technologies and related skills that can be used in different contexts, thus further promoting the employability of students and promoting an integral vision of innovation, as a transformative element of contemporary society and not limited, only, to certain areas.

BEST PRACTICE NO.2

PROJECT PARTNER INVOLVED: EMATSA

COUNTRY: SPAIN

Characteristics of the training offered: The Escuela del Agua, founded in 2012, represents an educational and training platform created and promoted by the AGBAR group, one of the main SGI providers in the water sector in Spain. A characteristic element of the training offer is therefore its very origin, designed and coordinated by an SGI provider.

There are three types of courses offered: training courses (and dual training in particular) for young people at upper secondary and tertiary level (for example the title CFGM In Water Networks, Plants and facilities), recognition of professional certifications useful to carry out certain tasks within the water production cycle (for example: the professional accreditation in Operation of Water Treatment Plants), promotion of continuous training courses for workers of other companies operating in the water sector. Other training activities include awareness raising on environmental issues and training of trainers engaged in learning paths aimed at building professionalism in the water sector.

- More specifically, dual training is carried out in collaboration with 11 technical schools in 7 different autonomous communities, and involves 20 companies affiliated with AGBAR. It is also carried out through a training method that envisages a set number of hours to be spent in the company. For example, some two-year courses, such as the Ciclo Formativo Grado Superior en Gestión del Agua, require that the first year be carried out at a selected training institution, and the second year entirely in the company.
- As already mentioned, another service that has been implemented is the certification and accreditation of professionals: Escuela del Agua thus acts as a body capable of recognizing and making transparent the skills possessed by workers, thus qualifying them to perform certain tasks for which a dedicated certification is required. This is a particularly interesting element because it allows an enhancement of non-formal and informal training carried out directly in the workplace, even outside the traditional training paths.
- This possibility is then linked to the offer of continuous training for workers: knowing (and recognizing) their skills, it is then possible to target training to create an offer that adheres to specific company needs and characteristics.
- A final point to underline is the way in which this training is carried out: if the central role of the company as a training and educational institution has already been underlined, a tool that has always been promoted by Escuela del Agua is hybrid training, also carried out at a distance, for the benefit (above all) of professionals and adult workers.

Reasons and forms of collaboration between SGI providers and VET providers:

- One of the main reasons that led AGBAR to promote the Escuela del Agua is the lack of attractiveness of the sector. Few young Spaniards choose vocational training in the water sector. This lack of attractiveness also fuels the skills mismatch that exists in terms of the skills expected and the skills provided by the training courses which, especially if related to the water sector, are few and spread in a heterogeneous manner within the different territories. Hence the importance of an alliance between SGI Providers and VET providers.

- The professional skills most in demand in the water sector also require many skills of a technical and specialized nature, which general courses held at educational institutions do not have the capacity to train. Collaboration between companies and the training system becomes strategic for the construction of training paths capable of training technicians and operators who are immediately operational, because they are trained in the workplace and in direct contact with the technologies used in the sector, which are rapidly evolving and transforming thanks to the cross-pressure generated by the digital transition (and therefore also by automation) and the green transition.
- In the sector of the water is however diffused a patrimony of acquaintances and competences that not always is adequately recognized: AGBAR has therefore wanted to promote also the promotion of the competences possessed by the workers, in this favouring the acknowledgment of the enterprise like central place formative. Attesting and certifying competences is fundamental to enhance continuous training processes of workers and develop lifelong learning paths of quality and recognized by the market.
- Often, moreover, VET providers find themselves in a constant lack of adequate resources, both economic and educational (specialized teachers, for example). The alliance with an SGI provider such as AGBAR has made it possible, through Escuela del Agua, to create a collaborative model capable of fostering the development of the school system as well, which has had and continues to have access to innovative resources in terms of learning spaces, technologies and equipment, teachers and professionals.

In short, that of Escuela del Agua is a model of “diffused academy”: an SGI provider that develops a collaborative and project-based space for the development of the training of its employees and of young people interested in entering the water sector. To do this - and unlike many, traditional, academies - Escuela del Agua does not rely solely on intra-company resources, but has established deep-rooted partnerships in different territories of Spain, collaborating with different training and educational institutions.

Trained Green Skills: Within the training offerings coordinated by Escuela del Agua, there is no clear distinction between green skills and other technical or transversal skills. All training is changing to accommodate the changes induced by the green and digital transition. Again, most of the skills that can be identified as green are digital skills, trained through direct contact with the world of work, and predominantly technical and specialized in nature, especially in the case of adult continuing education.

Escuela del Agua, as mentioned above, also carries out training, education and awareness programs at various schools in the territories in which it operates, dedicated to the water cycle and without having a technical purpose, but to provide young people with knowledge useful for their orientation towards the water sector and specially to provide knowledge useful for building a transversal mindset oriented to the protection of environmental sustainability.

Innovative features: There are several innovative features of Escuela del Agua, also determined by the socio-institutional context in which it takes place.

- In Spain, dual training has not yet established itself with other Member States. The Escuela del Agua therefore represents a positive experience also for its degree of innovativeness for the Spanish context itself, promoting quality training capable of responding to the needs of businesses. The role of the State is, in fact, limited in promoting dual training: an SGI Provider such as AGBAR has therefore moved to solve the growing problems of skills mismatch and skill shortage that the water sector was experiencing. Compared to what happens in other Member States, with AGBAR's Escuela we are witnessing a form of collaboration between SGI providers and VET providers strongly driven by the business side and the companies that are part of the network. The possibility of creating such a widespread school, capable of interacting and establishing connections with different training institutions in multiple territories is due (also) to the critical mass generated by AGBAR's role.
- The training carried out by Escuela del Agua (dual, certified, continuous) is highly personalized to the needs of the sector, of which AGBAR has a clear knowledge given its role in the Spanish market (and beyond). The training is therefore primarily of a technical nature, specialized, flexible and capable of adhering to the needs of the different companies in the network. It is also a training that, having as its main purpose that of responding to the needs of the company, is also capable of enhancing all those knowledge and skills acquired directly in the workplace, promoting the certification and therefore the recognizability on the market of the skills possessed by the workers.
- The dual training model is particularly interesting because it is equal. It is not a question of imagining vocational training as bent to the needs of the company, or the company becoming a simple "laboratory" space in which to put into practice what has been known in theory, in the classroom: rather, the collaboration between the two areas of learning provides for an articulation, also in time, that puts the training institution and the company on the same level. In this sense, we underline those dual courses that provide a full year at a VET provider, and a year in the workplace, at a company in the AGBAR network.
- With the Escuela del Agua AGBAR has equipped itself with a lever to develop upskilling and reskilling processes, strengthening systems for recognizing workers' skills and thus promoting continuing education for all workers, but above all to establish local alliances by providing resources and expertise to communities and training institutions that, alone, would not have had the strength to develop these dual training courses. As mentioned above, Escuela del Agua represents a model of a widespread Academy.

2.2 BEST PRACTICES – ENERGY SECTOR

BEST PRACTICE NO. 3

THE “ÉTUDE PROSPECTIVE EMPLOIS ET COMPÉTENCES DE LA FILIÈRE ÉLECTRIQUE” (FORECAST STUDY JOBS AND SKILLS IN THE ELECTRICAL SECTOR) AND THE “CYBERSELECT” PROJECT IN THE BRITTANY REGION (FR)

COUNTRY: FRANCE – BRITTANY REGION

Peculiarities of the study, main characteristics and criteria underlying the choice of practice:

Anticipating the evolution of employment and skills is it is commonly recognized as a key element for the competitiveness of the various economic sectors and local/regional and national labour markets. In the context of forecasting studies, the one in question deals with the energy and digital transitions in France, also considering the wider occupational European scenario and its developments. In accordance with international reporting and scientific publications on the subject of anticipation and matching of professional skills needs at a territorial and sectoral level, the report under analysis starts from the assumption that “new jobs will be created, others will evolve, mobility and career gateways will have to be organized within the sector and the territories”.⁶⁷

One of the original elements of the study consists in the variety of subjects involved in its realization: carried out under the aegis of the Ministry of Labour, Employment and Integration, the implementation of the Employment and Skills Development Commitment (EDEC)⁶⁸ has brought together, around common issues, the main players in the electricity sector: employers’ organizations and trade unions, company representatives, employment institutions, national and regional public authorities (including Direccte, Chambers of Commerce and Industry).

The second, on the other hand, consists of the territorial approach. In fact, and in accordance with what emerged in the round of interviews carried out for the writing of this report, to obtain reliable and quality information at the sectoral level, the study opted not only for an analysis of the national forecast scenario, but also the local / regional perspective has been duly taken into account. In more detail, the analysis has been carried out in close collaboration with three territories (Provence-Alpes-Côte d’Azur, Brittany, Hauts-de-France) where innovative and collective approaches were carried out. In this regard, the three regions representative of the diversity of the territories, employment, occupations and challenges of the sector were associated with the national study and mobilized the actors of employment, training and those of the electrical sector throughout the project. Indeed, beyond the visibility given on the needs of the sector both from a quantitative and qualitative point of view and the recommendations formulated, the partners intend to continue the work carried out with the various professional branches and the Skills Operators (Opérateurs de Compétences – OPCO)⁶⁹ concerned. Other territories are foreseen to join the process in the near future.

⁶⁷ () Author’s translation. Source: PwC (2020), Etude prospective emplois et compétences de la filière électrique, 2.

⁶⁸ () The employment and skills development commitment (EDEC - engagement de développement de l’emploi et des compétences) is an annual or multi-year agreement concluded between the State and one or more professional branches for the implementation of a negotiated action plan, on the basis of ‘a shared diagnosis of needs analysis which aims to anticipate the consequences of economic, social and demographic changes on jobs and skills and to carry out concerted actions in the territories. The EDEC is a tool of the Ministry of Labour, Employment and Integration supported by the General Delegation for Employment and Vocational Training which aims to anticipate the changes facing the sectors, companies and assets, and to support the forward planning of jobs and skills.

⁶⁹ () In France, on April 1, 2019, eleven skills operators (OPCO), responsible for supporting vocational training, were approved. They have replaced the former joint approved collecting bodies (OPCA). These skills operators are responsible for financing apprenticeships, helping the branches to build professional certifications and supporting SMEs in defining their training needs. For further information, see: <https://travail-emploi.gouv.fr/ministere/acteurs/partenaires/opco>.

Objectives and expected results:

- The study has been designed to serve as a reference in the context of the development of public policies and to provide common benchmarks for all players in the sector, in particular SMEs and micro-enterprises, as well as within the territories.
- The Study, which is part of the implementation of the French Multiannual Energy Program but also within the framework of the recovery plan (France Relance), intends to establish common benchmarks for the various branches concerned, as well as to employment and training institutions.

The crucial role of the EDEC for enabling a sectoral mobilization to anticipate employment and skills challenges and “make the energy transition a success”:

- The EDEC of the electrical sector⁷⁰ is part of the 2015 law “transition énergétique pour la croissance verte”⁷¹ and the Jobs and Skills section of the Programmation Pluriannuelle de l’Energie. Its conclusions are intended to feed the various professional branches concerned as well as the work of the National Council for Industry and its Strategic Sector Committees.
- Under the aegis of the Ministry of Labour, Employment and Integration, the High Commission for Skills (Haut-Commissariat aux Compétences - HCC) and the Ministry of Ecological and Inclusive Transition, the EDEC of the electrical sector is the subject of an unprecedented partnership between players in the sector and the territories.
- According to what it is reported in the study, the EDEC of the electrical sector is part of a threefold approach:

- 1) Collective, based on numerous and varied exchanges with the actors of the sector;
 - 2) Iterative, punctuated by the regular sharing of analysis with all stakeholders and key players in many areas of activity, representative of the diversity of the electrical sector;
 - 3) Complementary, by combining proven quantitative methods and common qualitative analyses.
- The EDEC Filière Electrique brings together all players in the electricity sector and its value chain: the Fédération française des intégrateurs électriciens (FFIE); the GIMELEC (the grouping of companies in the digital electronics sector in France); the FIEEC (representing the electrical, electronic and communication industries); the IGNES (brings together 50 companies of all sizes that manufacture electrical, electronic and security equipment for residential and tertiary buildings); Industries Méditerranée (the unified representation of industry in the South Provence-Alpes-Côte d’Azur region); the French association Think Smartgrids which is made up of 100 members from the business world, the academic world, competitiveness clusters, players in the electricity sector and SMEs; the SERCE (represents companies operating in the energy and digital transition branches); the Union Française de l’Electricité (UFE) is the employers’ association of the electricity sector.

Skills anticipation and matching and the energy transition: this practice has been taken into consideration above all for the precise reference to the theme of the energy transition and its link with the digital one: the study focuses on a robust prospective analysis of the impact of the energy and digital transition on

⁷⁰ () A contract was signed on April 9, 2019 by 8 organizations (FFIE, FIEEC, GIMELEC, IGNES, Industries Méditerranée, SERCE, Think Smartgrids, UFE) and 4 trade union federations (CFDT, CFE-CGC, CFTC, FO).

⁷¹ () Loi n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte.

jobs.⁷² Since the electricity sector is considered at the heart of current and future ecological and socio-economic challenges, in a context of increasing electrification of uses (mobility, buildings, etc.), driven in particular by the Green Deal and the “France Relance” plan, for a successful energy transition in France and Europe, the study highlights that the issue of jobs and skills – which stands at the crossroads of the implementation of the energy transition and in the era of digital transformation- is crucial to support the sector in its transformations and contribute to the ecological transition. In this regard, the practice under analysis is of particular interest since the sector, public authorities, territories and training players mobilized, together and for the first time, to draw up a shared inventory of jobs and provide common responses to changing needs.

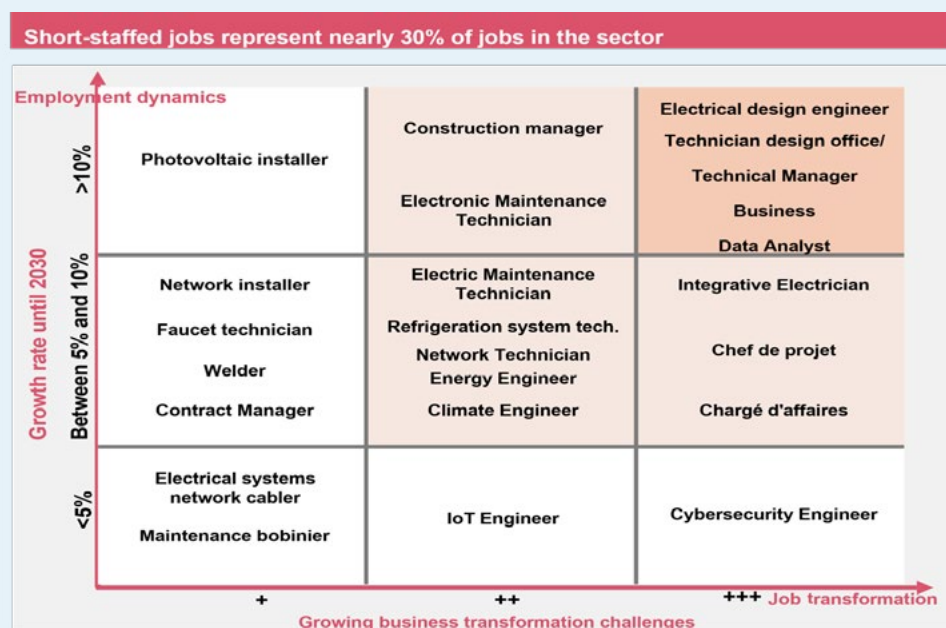
With precise reference to the topics prior to the project in which this report is produced, it should be noted that the study under analysis - as regards the qualitative investigation section - specifies that among the more than 100 occupations analysed, as many as 23 would be “in tension” with respect to the needs of the energy and digital transition. The following three criteria have been retained to determine and analyse these occupations within the sector:

- strong employment growth
- significant difficulty for companies to fill these positions, due to the scarcity of profiles on the labour market, increased competition between sectors or an inadequacy of the training or skills of the available professional profiles
- high degree of transformation of the occupations, in terms of skills and training required.

The figure below provides a detailed overview of the results of the study, also with regard to the identification of the abovementioned professions. The same analysis is available at regional level for territories participating in the study.

FIGURE 2

OCCUPATIONAL PROSPECTS AND TRANSFORMATION OF A SELECTION OF KEY PROFESSIONS (ENERGY SECTOR – 2030 SCENARIO)



Source: PwC (2020), Etude prospective emplois et compétences de la filière électrique, 47.

⁷² () It should be noted that, in view of the study schedule and the still numerous uncertainties about the consequences of Covid-19, the impact of this crisis could not be estimated with a sufficient level of reliability to be taken into account in the projections for the future (2030).

That is, it contributes to the innovation of the study and increases its effectiveness also in terms of communication and usability of the information produced, is that the research is not limited to the identification of strategic and difficult to find occupations to enable the energy transition at a sectoral level, but that for each of them (as identified at national and regional level) key competences (whose identification makes it possible to anticipate the future needs of the sector and to smooth occupational transitions within the sector and from other branches),⁷³ initial and continuous reference training, career gateways and elements of transformation typical of the profession have been listed in detail. Moreover, the factors responsible for the “tension” are also indicated in the “11 fiches métiers” described within the study. The in-depth analysis of the occupations “in tension” is based on a collective and iterative work allowing the initialization of a common reference and shared between all the stakeholders.

Finally, and without the ambition to be exhaustive while analysing the present practice, the study also addresses the issue of training, underlining how the gap between the need for and the supply of training can put at risk the availability of the skills necessary for occupations in tension.

The regional perspective. A focus on the of the CyberSelect project in the Brittany region

It has already been widely discussed how digital skills and their development are strongly connected to the theme of the green transition, or rather, as in some cases, they are a propaedeutic element, for its realization. In this regard, the study underlines that cybersecurity could be considered a strategic matter for all occupation within the electric sector, putting into tension the skills needed to be acquired by sector operators. The continuation of the work of the CyberSelec project aims at making it possible to deliver an action plan responding to the need for skills necessary for cybersecurity in the electrical sector.

• Context

The Cyberselect project, proposed as part of the EDEC for the electrical sector, relies on the Brittany region, a mature region on the cyber dimension, in particular through the development of the Cyber Center of Excellence,⁷⁴ the establishment of the Breton cyber economic sector (cyber valley) and the presence of many players in this field, companies, training and research organizations. In more detail, the work focused on the analysis of the skills necessary for the electrical sector with regard to cybersecurity processes, with the support and expertise of the regional employment ecosystem: EDF Brittany Employment Delegation, Brittany Development Innovation (BDI) and companies in the cyber sector.

⁷³ () According to what is reported directly in the study under analysis, the identification of the sector’s characterizing skills domain is a necessary first step towards the pooling of training, then towards the development of bridges to fill hard-to-fill vacancies and contribute closing job shortages. In terms of research replicability and increasing the sustainability of this project in the future, it is suggested to continuing this work in conjunction with the various branches concerned and the OPCOs.

⁷⁴ () Pôle d’Excellence Cyber, n 2014 by the Ministry of Defense and the Brittany Region, the Pôle d’excellence cyber is an association that brings together national actors in research, training and industry to help develop the French cyber sector and promotes it internationally. The Pôle’s mission is to stimulate the development of: the cyber training offer (initial, continuous, Higher); cyber academic research; the industrial and technological basis of cybersecurity, with specific attention paid to innovative SMEs and micro enterprises. As part of its training focus, the Cyber Center of Excellence contributes significantly to ensuring that the availability of qualified personnel, trained for present and future needs, is not a limiting factor in the development of the cybersecurity sector, whether for the development of products and systems or the provision of services; this concerns companies, research labs and also faculty. The Cyber Centre of Excellence is involved in the identification of all the training, initial and continuous, from BAC+2 to BAC+6 (Mastères spécialisés), provided by the members of the association, in order to produce a catalogue of cyber training. The Pôle is now recognized at national and European level for its expertise in terms of continuing education and training in cybersecurity and cyber-defence. It organizes major European attack/defence challenges, and has become a reference body for the training of engineers recruited in the OIVs (operators of vital importance) or for the benefit of the French forces.

- **Challenges for the sector.**

The energy sector, and more specifically the electrical sector, are prime targets for cyber-attacks. The electrical sector makes massive use of digital technologies for its various processes, the equipment is fitted out with tools connected in large and complex networks and the actors and beneficiaries are numerous. The society as a whole is concerned (individuals, companies and local authorities) by the issues of security of the electrical system, quality of electrical supply and management of personal and sensitive data. Thus, the subject of cybersecurity of infrastructures and processes in the electrical sector has become strategic.

- **Stress Factors (skills and occupations related to cyber security are under stress for several reasons):**

- The width of the potential attacks, but also their permanent evolution, require skills that are at the same time sharp, broad and constantly and rapidly evolving on the subject;
- the field of cyber competences is vast and requires a good knowledge of the electrical sector to understand its specificities (tools, processes, systems, etc.) and to propose appropriate solutions;
- certain issues related to cybersecurity are specific to the electrical sector, but the risks identified are common to all sectors which find themselves in competition for the recruitment of the necessary skills and retention of relevant professional profiles;
- the volume and content of training does not fully meet the growing needs expressed and the retraining of current IT specialists is not oriented towards cyber.

- **Goals.** The objectives of the CyberSelect project are: to anticipate changes and support the forward planning of jobs and skills in cyber security for the electrical sector and to participate in cybersecurity processes implemented by manufacturers in the electrical sector aimed at identifying and anticipating risks, protecting the various components of systems, detecting attacks, responding to them in the event of failure and restoring systems while improving the process defence overall.

- **Methodology:** the activities behind the detection, analysis and highlighting of the skills necessary for the cybersecurity process in the electrical sector were carried out between September 2019 and January 2020. The skills framework was built with the help of representatives of Breton cybersecurity companies. The players have, in particular, endeavoured to link the necessary skills and the operations to be carried out, without any consideration of internalizing or outsourcing these skills. The repository thus constructed was subjected to a broader analysis of Breton cybersecurity players.

- **Results:** 5 major skills domains have been identified with specific sub-competences within them (i.e. 15 transversal/behavioural skills like creativity, argumentation etc.; 18 in general areas -English, regulations etc.-; 6 technical and specific skills for the electrical sector (electronics, electrical trade standards, etc.).

Among the reflections and recommendations emerged for acquiring and maintaining the skills and professional profiles necessary for ensuring quality cybersecurity, the following ones -which could be used as examples that can be replicated in other contexts- can be listed:

- internal retraining of IT specialists or technicians with a good knowledge of the process, in order to equip them with the skills they lack;
- sourcing on the job market, by strengthening training capacities to compensate for the insufficient volumes of trainees and strengthen continuing education.

BEST PRACTICE NO. 4

SOCIAL DIALOGUE AND INDUSTRIAL RELATIONS FOR CLOSING THE ENERGY SECTOR SKILL SHORTAGES (FR)

COUNTRY: FRANCE

Branch: electric and gas companies

Criteria underlying the choice of practice: “To what extent can social dialogue and industrial relations bridge the mismatching present in the sector?” Not only this question was addressed to all the interviewees who contributed, each for the reference economic sector, to the development of the research, but also, the same issue was also present in the online survey carried out at the beginning of the research. Therefore, as the results of the qualitative research phase revealed relevant information about the role of the social partners in enabling a better match between demand and supply of skills at sectoral level in the perspective of the energy transition, it was considered appropriate to develop a good practice in this context. Moreover, in France, negotiation is one of the main missions of the professional branches (*branches professionnelles*).⁷⁵ In the area of vocational training, social partners must negotiate a framework agreement at least every four years. Otherwise, they must negotiate every three years on certain topics. In this regard the practice covers the concrete case of a 2020 four-year agreement on training and alternance training (namely apprenticeships) in the electrical and gas industries aiming at encouraging the energy sector to adapt to the energy and digital transitions.

Accord du 1er décembre 2020 relatif à la formation et à l'alternance:⁷⁶ premises, signatories and the energy transition issue.

The agreement on training and alternance training in the IEG branch (Industries Electriques et Gazières), proposed by the UFE (Union Française de l'Electricité) and the Unemig (Union nationale des employeurs des industries gazières), was signed by 3 unions (CGT - Confédération générale du travail-, CFE-CGC - Confédération Française de l'Encadrement- and FO -Force Ouvrière-) while the CFDT- Confédération française démocratique du travail- rejected the text. After the failure of the negotiations in the summer of 2020, the discussions resumed in September of the same year with, in the end, several significant developments. In general terms and considering the innovative scope of the agreement, it is worth mentioning that the agreement makes alternance training a sectoral issue and no longer just a company-level one, setting a target of 5% alternance training employees and establishing a bonus for tutors and apprenticeship trainers (*maîtres d'apprentissage*).

According to the premises of the agreement, “Skills development in the Electricity and Gas Industries (IEG) has always represented a significant investment aimed at meeting the challenges of safety, security and performance of industrial facilities and people. Today, the world of energy is at the heart of societal and technological transformations. The ecological and energy transition is leading to an increasingly profound transformation of the contents of occupations, which shall be supported by the professional branch. The digital transformation of many processes, the digital revolution, including artificial intelligence, makes essential a much faster adaptation of the skills of employees, with professions for some in sharp decline”.⁷⁷

⁷⁵ () A professional branch brings together companies in the same sector of activity and covered by a collective agreement or convention. The contours of a professional branch are defined by the scope of application of the agreement or convention concluded by employers' organisations and representatives trade union organizations. Currently, branches have a national scope. However, some of the stipulations of their conventions and agreements can be defined, adapted or supplemented at the local level.

⁷⁶ () The full text is available at the following link: <https://sgeieg.fr/wp-content/uploads/2021/01/sgeieg-accord-formation-et-alternance-branche-des-ieg-signedoc-1.pdf>.

⁷⁷ () Translation by the Author.

And in this uncertain and evolving context where future occupations' scenario is not totally known the agreement states that the development of skills is strategic:

- to guarantee the right level of employees' skills in response to rapidly changing occupations;
- to support company-level transformations and challenges, namely by considering the digital factor;
- to ensure the employability of workers: major retraining programs should be put in place, taking into account of changes in occupations and tasks.

In France, the governance of the vocational training system has been profoundly transformed (revision of the funding circuits for continuing vocational training and alternance programs, opening up career guidance and consulting prerogatives -*conseil en évolution professionnelle*- to new players included). At the same time, the professional branches now have the prerogative to determine the levels of learning support. This major development makes them relevant actors as for the sources of funding for all work-based training schemes. Thus, the practice under analysis is of peculiar interest since it is the signatory parties themselves who acknowledge that the agreement on vocational training therefore "becomes essential, to incorporate these changes and take into account the Branch's new prerogatives around alternance training".

Vocational training, lifelong learning, and sectoral priorities

The development of the Electricity and Gas Industries (IEG) has always been closely linked to the vocational training and the development of skills and competences. The public service missions, the technical nature of occupations within the sector and the issue of safety and performance of plants, make the IEG Branch one of the very first sectors in terms of investment in vocational training.

In this context and while the law of September 5, 2018⁷⁸ profoundly reformed the role of industrial branches in terms of training and work-study programmes, the signatories of the agreement in analysis undertook to implement constructive social dialogue in order to create the conditions enabling the long-term development of the skills and qualifications of the employees of the branch and the reception of alternance trainees engaged in training that meets the needs of energy companies.

The agreement was aimed to fully implement the new prerogatives given by the law to professional branches in terms of certification and apprenticeship. In more detail, the IEG branch's training policy is based on 6 main priorities:

1. Maintaining, adapting and developing skills with regard to major societal and technological transformations and the needs of the branch's companies.
2. The development of qualifications, in line with the needs of the occupations of the branch.
3. Access to training within micro, small and medium sized enterprises.
4. The development of work-based training and, namely, apprenticeship.
5. The development of the rate of feminization in technical professions.
6. Easy access to training for all employees.

⁷⁸ () Promulgated on September 5th, 2018, the "*Bill for the freedom to choose one's professional future*" aims to radically transform the French continuing vocational training system. Governance, actors' role, financing and schemes are redefined. For an overview of the contents of the law, see Cedefop (2019), <https://www.cedefop.europa.eu/en/news/france-reforming-continuing-vocational-training-2018-bill#:~:text=Promulgated%20on%20September%205th,financing%20and%20schemes%20are%20redefined.>

Finally, the agreement defines five priority audiences to be considered by companies in the branch:

- employees with disabilities;
- women wishing to take training in technical professions;
- employees with 20 years of professional activity or aged at least 45;
- employees with a low level of qualification (*infrabac*);
- employees who have not had training for at least 4 years within their company.

Skills anticipation and matching at company level. Peculiarities of the Electric and Gas Industries.

The signatories of the agreement emphasize the need for companies and their employees to anticipate changes in occupations, jobs, skills and qualifications, linking them with transformations and changes in the general work and sectoral environment in broad sense. Therefore, they invite companies in the branch to commit themselves in the *gestion anticipée des emplois et des compétences*⁷⁹ (GPEC) according to their needs. It should be noted the French labour code (article L2242-13) imposes on companies that employ at least 300 employees to negotiate on the management of jobs and career paths every 3 years with the social partners.

In order to create favourable conditions for initiating, supporting and promoting the implementation of the GPEC approach in companies, the professional branches are also encouraged to have a GPEC.⁸⁰ The sectoral GPEC is built around two main principles:

- 1 enlighten both companies and employees on the evolution trends of the economic, regulatory and technological environment,
2. support them by activating the resources of the branch's tools (i.e. occupations observatory).

The signatories of the agreement undertook to:

- Organize activities steered by the National Joint Commission for Employment and Vocational Training (*Commission paritaire nationale de l'emploi et de la formation professionnelle* - CPNEFP)⁸¹ on anticipatory tools related to the main occupations in the growing or shrinking branches, targeting families cross-cutting and non-competitive professional skills, in order to provide long-term insight into company training needs and their prioritization.
- Identify over the long term the occupations “under stress” or whose activity is already in strong mutation and therefore for which there may be a risk of shortage or obsolescence of skills. This work will make it possible to identify the certifications eligible for the system of promotion or retraining through work-based learning (*promotion ou reconversion par l'alternance* - ProA).

⁷⁹ () Forward-looking management of jobs and skills (GPEC) is an anticipation tool that is part of a global approach to managing jobs and career paths. It is mainly based on forecasts on the technological, economic, commercial and demographic changes.

⁸⁰ () Article of the labour code L2241-12 thus provides for a bargaining at branch level at least once every three years.

⁸¹ () Subject to the powers specific to the Branch Joint Committee (CPB) defined by the branch agreement dealing with social dialogue in the professional branch of IEGs, the CPNEFP is responsible for implementing all provisions relating to training professional of the agreement under analysis as for article 5.1 of the consolidated text. Under the same article CPNEFP role, composition and functioning are described in detail.

Alternance training and the recognition of the tutoring function a new branch challenge

As for article 4.2 of the agreement, alternance training could be defined as a system combining theoretical teaching and practical training in companies. Since it leads to obtain diplomas or a qualification while being associated with real professional experience, work-study programs facilitate access to employment and professional integration. work-based training could be implemented via two specific employment contracts: the apprenticeship contract and the professionalization contract, targeting young people involved in education and training paths and job seekers.

Even if a large part of the agreement corresponds to a “re-writing” of the provisions of the abovementioned law of September 5, 2018, the agreement contains innovative provisions at the sector level as regards the issue of apprenticeships, a training method and a tool which has hitherto been the exclusive responsibility of companies. The signatory parties agree to organize “exchange and information seminars (one per year if necessary), during which several experts from these fields will speak on the associated issues and the processes and working methods to be deployed”.

The agreement considers alternance training as a path to excellence in training, professionalization and the integration of young people and people excluded from employment, thus companies of the branch are aware of the opportunity of hosting students and professionals involved in alternance training. The signatories of the agreement agreed that the alternance training:

- represents a real societal issue because it facilitates young people's access to their first employment and contributes to the professional reintegration of job seekers,
- is a sector of excellence constituting a major lever in the service of policies of recruitment of companies in the branch,
- responds to both economic and strategic challenges insofar as it can allow a transfer of skills under favourable conditions, both for the employee in alternance training with that for the employer.

For these reasons the branch “undertakes to tend at least towards the objective of 5% of alternance trainees”. The current average proportion of work-study trainees in the workforce of companies in the branch not being known, a zero point will be made at the start of the agreement and followed up at the end of each work-base training campaign in CPNEFP, which is also foreseen to share data on the rate of work-study trainees hired at the end of their course.

The signatory parties consider that quality tutoring is essential to guarantee the success of employee training courses within the framework of alternance training. They also consider that the tutoring function carried out by an employee or as part of a tutoring team offers voluntary employees the possibility of diversifying their activity while transmitting their knowledge and know-how to employees that they accompany. In this regard, the purpose of the tutoring function described in the agreement consists in:

- support employees in the development and implementation of their “*projet professionnel*”,
- to welcome, help, inform and guide the employees of the company who take part in training actions within the framework of contracts or periods of professionalization, the apprenticeship contract, an initial training course or continuing vocational training or even external audiences within the framework of the programmes for preparation for employment,
- to liaise with the organization or organizations or training institutions/organisations,
- to contribute to the acquisition of knowledge in a professional situation.

“The taking up of a tutorship will give rise to an assessment of the workload of the person concerned which must be adapted if necessary to enable him/her to carry out all of tasks and thus to promote the quality of the support offered to the employee”, indicates the agreement, which “recommends that companies in the branch value the function of tutor and apprenticeship master during the so-called *entretien professionnel*” (the interview carried out during the recruiting phase).

What is relevant with respect to the subject of qualification and training of tutors, it is worth mentioning that the agreement provides for tutors to be considered as “key players” in work-study paths. “They must all be trained and supported to understand the determinants of their mission, welcome the learner, support the developing their skills and evaluating their achievements”. The tutors and apprentice masters should be chosen by the employers, on the basis of the volunteering, among the employees of the company, who justify a professional experience of at least two years taking into account their job and their level of qualification which must be in line with the objectives selected for the training action. To enable tutors to carry out their duties correctly, companies will ensure that they the implementation of actions preparing for the exercise of the tutoring function and, if necessary, specific training related to this function. In addition, taking up the tutorship will give result in an assessment of the workload of the person concerned, which must be adapted if necessary to enable them to carry out all of their missions and thus to promote the quality of support provided to employees. In addition, tutoring by employees aged 45 and over is particularly encouraged. To this end, the social partners of the branch recommend that companies in the branch to enhance the role of tutor and apprenticeship master during the recruiting interviews.

BEST PRACTICE NO. 5

THE SYNTRA WEST CENTRE (BE)

COUNTRY: BELGIUM

Branch: wind energy

Characteristics of the centre: the Syntra West centre has evolved increasingly enhancing its competences and its services in various sectors. Founded at a provincial level on January 22, 1960, the idea grew for creating a form of education for artisans, traders and the growing small business. All professional organizations have contributed to this first centre, the Training Institute for Small and Medium Enterprises.

In 2015, SBM evolved from “Stichting Bedrijfsmanagement” (“Business Management Foundation”) to “Competence for the company and employees”. The business-oriented training courses of Syntra West’s offering have therefore fully migrated to SBM. SBM is now the specialist in business-oriented training, coaching and consulting and a partner in the development of talents and skills of SMEs, large companies and (international) organizations. In recent years, the “Contemporary Flemish Institute of Wine and Beverages” and a new training centre for companies in the port and logistics sector have been added to the existing training services (in collaboration with the shareholder Portilog).

Today, therefore, the SME Training Institute has grown into an organization with over 2,000 freelance teachers, 200 permanent employees and 55,000 students per year.

Since the beginning, the SME Training Institute has worked with a provincial-level structure, as a non-profit organization with five different campuses, geographically distributed throughout the province: in the large agglomerations of Bruges, Kortrijk, Ostend and Roeselare, and Ypres.

Aims and objectives of the initiative: The Syntra West vocational and educational training centre was established at the end of the 1950s in the Flanders area, in order to economically relaunch an area that is still particularly underdeveloped. The goal was and is the training of entrepreneurs, also in terms of business management, for a full business balance. Employer organizations and trade associations organize courses, seminars and training courses.

Vocational and educational training: Syntra West is a not-for-profit organisation set up in 1960 in the Province of West-Flanders, Belgium which is providing 3,5 million training hours every year for about 55,000 trainees. The centre works with 2,000 part-time trainers and a staff of 250 persons in 6 training campuses. Its target groups are start-ups, company managers, senior staff and employees of small and medium-sized companies. Besides, the centres are making their know-how and structure available towards non-profit organisations and public enterprises.

The offer is made up of short term and long-term training sessions, initiation paths, rush courses, broken down into 4 groups:

- technical training sessions in 200 professions,
- management training,
- IT training and specific language courses by which they are mostly working with native speakers as trainers.

They also developed their own training and didactical material.

In the very specific energy sector, Syntra West offer a technical course on the profession of on & offshore windmill technician. This trajectory is part of the rapidly growing demand for qualified technicians and maintenance technicians for the wind industry. Due to the fast-growing market, the need for skilled maintenance personnel is becoming more and more evident. Not only are more and more onshore wind farms added, but the federal government also has big plans for offshore wind farms. In addition, the program addresses the real needs for skills and abilities within the industry.

This training is sufficient to provide, as an independent technician or as an employee of an SME, the knowledge and skills necessary to develop and follow smaller projects on an independent and cost-effective basis. Additionally, the trajectory offers the ideal start as an enterprising employee who wants to work in the industry at well-known and innovative companies.

The output profiles (Certificate of Maintenance Engineer for SME Employees EMS certified on and offshore windmill technician employee Windmill Techniques Certificate from On and Offshore Entrepreneur) are verified, recognized and certified by VDAB, the Flemish Government Service for Employment and Vocational Training.

Syntra West provides specialised training programmes for starting businesses and plays such a determining role in the success rate of starting businesses.

Reasons and forms of collaboration between SGI providers and VET providers:

- Syntra West also offers many opportunities in various fields of dual learning, a form of education within secondary education. One day a week there are classes on campus, while the remaining four days a week subjects are expected to work for a private company, a government company, or an association. Depending on the level of education, the whole process takes 1, 2 or 3 years.
- At the end of the training the subject will obtain secondary education diploma or certificate of study; professional certificate recognized by the Flemish government; proof of acquired skills.
- Each lesson consists of two parts: general education, where the subject will receive broad general education on cross-sectoral topics; professional training: extra theoretical and practical lessons that correspond to the theoretical training path of the sector. It is also foreseen the support of a coach in the search for an employer, so that the subject entering the dual training processes can be guided in the screening activities, in the conclusion of apprenticeship contracts and can be followed in his own training program. There is also a monthly salary whose amount depends on the age and year of education (on average between 440 and 540 euros per month).

2.3. BEST PRACTICES – TRANSPORT SECTOR

BEST PRACTICE NO. 6

THE ASSOCIATION OF GERMAN TRANSPORT COMPANIES - VDV ACADEMY (DE)

COUNTRY: GERMANY

Characteristics of the center: The VDV Academy has existed since 2001. It is an association registered under the auspices of the Association of German Transport Companies (VDV), supported by transport companies and their educational institutions, as well as by personalities from industry, science and politics, with the aim of ensuring training and higher education in public passenger transport and rail freight transport.

The academy develops educational training courses and products for transportation companies and their employees. It sets standards for work-related continuous education and strives for an orderly system of industry-related professional qualifications. The academy represents the “plus in quality” that helps German companies in the transport sector to secure a competitive advantage in the complex and various transformations of the sector.

The VDV-Akademie uses its service structure, the VDV-Akademie GmbH, to carry out its courses and conferences and to certify the training and higher education facilities. The academy’s know-how is encapsulated in a network in its regional and national competence centres. The courses are developed there and carried out on behalf of the Academy. The outcome of the exam of the course participants is certified by the VDV Academy.

Furthermore, the VDV Academy takes the current topics and issues of the work of the VDV association and associated companies and the transport sector as an opportunity to organize congresses, conferences, workshop seminars and technical discussions in a competent and flexible way. The Academy itself is a platform for information, advice and discussion between the different stakeholders.

On 1 September 2021, the VDV Academy moved to a second location in addition to the headquarters in Cologne. The new House of Logistics Mobility (HOLM) near Frankfurt Airport is an interdisciplinary and networked innovation centre with the aim of developing new opportunities and perspectives for the mobility and logistics of the future. With its InnoVet project funded by the BMBF “UpTrain. Continuous, digital training” the aim is to strengthen cooperation with transport companies, universities and industry.

Aims and objectives of the initiative: The objective of the activity of the VDV-Akademie is the quality assurance of training and higher education in public passenger transport and rail freight transport, in particular through the development of educational products for transport companies and their employees.

Vocational and educational training: The VDV Academy offers the structure, the topics and the support to develop competences and professional skills in the transport sector. Over 70 thematically wide diversified congresses, conferences and seminars are held every year - from mobility management to technology and operation to personnel management, training and further education, in the issues of marketing and the new media with their many areas of application.

The vocational and educational training programmes are offered for many, employers and employees, through the meeting of practice, science and advice.

The VDV Academy and its partners promote the professional development of employees in transport companies through courses with qualified industry degrees. With appropriate qualification measures, the Akademie also prepares employees for IHK advanced training qualifications. The focus is on imparting knowledge and skills so that companies can meet growing challenges and better manage mobility services in passenger transport and logistics management in rail freight transport.

Indeed, the transport companies are characterized by an above-average quality of education: young professionals benefit from this vocational training and drivers in driving schools but also all employees in the company through continuous education. The VDV Academy has developed also a “seal of competence”, a certificate that certifies the qualification and competence of the teachers, who awards driving instructors and trainers. The equipment, the internal processes and the evaluation systems of the educational institutions are also taken into account. The seal, its attribution is a consistency measurement of the operational competence and an on-site assessment, and it sets educational standards for the local transport industry.

Reasons and forms of collaboration between SGI providers and VET providers:

- Talking about the transformation of the sector, whether demographics, work organization, personnel management, service management or qualification, the VDV Academy collaborates in publicly funded projects on these topics are advertised and awarded.
- The VDV Academy also collaborates with various consulting centres and university partners and always in cooperation with several transport companies on research trips in looking for new, innovative and worthwhile ways and solutions for the HR and employment policy challenges in our industries and for supporting companies in their strategic and operational work.

BEST PRACTICE NO. 7

THE SECONDARY VOCATIONAL EDUCATION AND TRAINING (VET) IN THE NETHERLANDS - MBO RAAD (NL)

COUNTRY: NETHERLANDS

Characteristics of the practice: the MBO (abbreviation for secondary Vocational Education and Training (VET) in the Netherlands) sector consists of VET colleges comprising multidisciplinary VET colleges (ROCs in Dutch), agricultural VET colleges (AOCs in Dutch) and specialised vocational colleges. All VET colleges have a strong regional orientation and function.

The direction is mainly given by the MBO Council (MBO Raad) which is the branch organization of secondary vocational education (MBO) and adult education schools offering government funded education. The association represents the (common) interests of the members, it offers services and undertakes joint activities related to this defence.

The MBO Council strengthens the position of the MBO as an essential link in the development of young people and adults, as citizens and as professionals, up to their first graduation and from there they develop over the course of life. The MBO Council stands for high-quality, innovative and inclusive vocational education that contributes to the (economic) prosperity and well-being of the Netherlands as a whole.

Within the MBO Council, similar MBO programs work together and join forces. In this way they influence national developments in MBO education within their sector. This is done through industry groups, also known as BTGs.

There is a total of nine BGTs: trade; ICT and creative industry; mobility, transport and logistics (including maritime); specialized crafts; technology and construction; food and greenery; business services and security; care, well-being and sport; entry courses in the world of work. Each school appoints a representative of the institution for each BGT that contributes to the MBO on behalf of the school.

The various BTGs represent the interests of similar MBO courses to the government and the business community. Within the BGT, the participants share a great deal of knowledge with each other and create projects together to organize education more efficiently. This includes translating developments in the sector into current education, optimizing internship opportunities and sharing knowledge leading to the professionalization of teachers.

For example, schools work together on innovative and future-oriented education that optimally matches higher education and the labour market and we train today's students for tomorrow's professions.

Aims and objectives of the initiative: The objective of the activity of the VDV-Akademie is the quality assurance of training and higher education, between the other sector of activity, in public passenger transport and rail freight transport, in particular through the development of educational products for transport companies and their employees.

Vocational and educational training: With the implementation of the WEB, the act on Vocational Education and Training, the two learning pathways in VET (work-based and school-based) were put in the same qualification framework. The school-based option with full-time education is called the BOL system and the work-based pathway, offering a combination of work and study, is called BBL. Both learning pathways offer programmes on four different levels:

- level 1 entry level
- level 2 basic vocational training
- level 3 full professional training
- level 4 middle-management and specialist training.

obility, transport, logistics and maritime transport is one of the nine industrial groups (“btgs”) of the MBO Council. The MTLM btg is composed of four educational clusters: Mobility, Transport and Logistics, Aviation and Rail and Maritime.

The main tasks of the BTG are carried out annually through the activity plan. The activities carried out in the annual report are taken into account. In these core activities, BTG has defined MTLM in the following emphases and activities:

- Permanent development
- Future-oriented vocational education (educational innovation, trends and developments)
- House in order: learning and inspiring from others (qualification and examination, internship, educational offer, professionalization of teachers)
- Collaboration with companies.

Reasons and forms of collaboration between SGI providers and VET providers:

MBO has a broad public task, the MBO Council (Raad) is the first point of contact for national stakeholders, including the ministries of OC&W, SZW, EZK, employee organizations, other education sector councils and (local) governments and representatives of these (decentralized) governments such as the VNG, the organized business community (VNO-NCW, MKB-NL).

BEST PRACTICE NO. 8:

THE “INSTITUTO PROFISSIONAL DE TRANSPORTES” - IPTRANS (PT)

COUNTRY: PORTUGAL

Characteristics of the practice: IPTrans - Instituto Profissional de Transportes - is a professional school based in Loures that emerged with the aim of qualifying people for the transport sector.

Created in 1993, it has sought to respond, over the years, to the needs of its social and economic environment, offering courses in areas other than transport, with dual certification: academic and professional. IPTrans - Instituto Profissional de Transportes is now located in the municipality of Loures, which is the eighth largest in dimension of the Greater Metropolitan Area of Lisbon and has as bordering municipalities: Lisbon, Vila Franca de Xira, Arruda dos Vinhos, Mafra, Sintra and Odivelas.

For the development of its activity, IPTrans currently has a total of 36 workers of which 19 are trainers/teachers. IPTrans currently has 14 classrooms, a multipurpose room, a resource centre with 40 seats seated and 12 computers, reprographics, computer lab, technical service lab support for children and young people, technical laboratory for transport and logistics, “mindfulness” room, performing studio, auditorium, infirmary, cafeteria and pedagogical and administrative offices.

Aims and objectives of the initiative: The Professional Transport Institute, abbreviated as IPTrans, is a private, non-profit educational establishment owned by the Association for Professional Education in Transport and Logistics, whose objective is the promotion and development of teaching, training and professional certification in transport and logistics.

The School’s mission is to guarantee excellence in the promotion and development of teaching, training and certification, as well as the professional and social inclusion of young people and workers, through learning to know, learning to do, learning to live together and learning to be.

Vocational and educational training: IPTrans is a professional school recognized by the Ministry of Education, with authorization from operation for the provision of professional courses and education and training, in the areas of transport services, commerce (in particular logistics), tourism and leisure, computer science and support for children and young people. These offers are included in the National Qualifications Catalogue, instrument for the strategic management of non-higher-level qualifications that integrates the System National Qualifications. This catalogue is developed in line with the work of implementation of the European Qualifications Framework and the National Qualifications Framework.

Every year the IPTrans assumes an Annual Activity Plan a planning document, for guiding the work to be carried out by the school community throughout the current school year, defining the objectives, identifying the responsibilities for the dynamization, organization and monitoring of activities, as well as indicators and targets for their evaluation.

It presents the activities of different scope, which the schools plan to develop, being a dynamic and flexible document, permeable to the circumstances that arise and reveal themselves relevant as teaching and learning tools for all those involved in the educational process.

Transformations of the current labour markets are taken into account, using strategies that help to continue the implementation of the activities proposed in the annual activity plan, achieving its objectives and meeting those of the documents guiding its practice.

The annual plan of activities consists of all activities that allow, in different contexts, to achieve the objectives mentioned above, with special emphasis on improving the educational success. Its promotion, therefore, involves the creation of this regulatory mechanism that commits internal and external stakeholders to the holistic development of students.

This set of proposals include all sporadic events with educational purpose that is developed in articulation with the community or with the participation of different partners, as well as all the events that take place in a organized over an extended period of time with an educational purpose and curriculum (Course projects or clubs/workshops).

In the 2019-2020 academic year, IPTrans has two professional courses level 4 certification of Transport Technician, Logistics Technician, Traffic Technician Ground Assistance, Travel and Transport Agency Technician, IT Technician of Management and Educational Action Technician.

Reasons and forms of collaboration between SGI providers and VET providers:

- To support the process of continuous improvement, essential to guarantee the quality of teaching and training provided, IPTrans considers it necessary for stakeholders to participate in the analysis and contextualization of the results obtained and in the identification of improvements to be introduced in the management of VET.
- Stakeholders are interested in the success and performance of the School, whether they are directly affected by it or actively concerned with its exercise, identifying themselves in two types: internal and external.
- As internal stakeholders are considered the school management, the pedagogical direction, the course coordinators, educational class advisors, teachers/trainers, workers and students.

Relevant external stakeholders include DGEstE, ANQEP I.P., employment centres and the professional training services of the IEFPP, I.P., the employers/hosts, the parents/guardians, the three members of AEPTL, Municipality of Loures, ANTRAM – National Association of Public Road Transporters of Goods and FECTTRANS – Federation of Transport and Communications Unions and individuals of recognized merit or with competences in the scientific or pedagogical areas.

CHAPTER 4. PROMOTING GREEN TRANSITION. THE ROLE OF VET AND THE SOCIAL PARTNERS

This chapter analyses the actual and potential role of green VET education and the social partners in meeting the sustainability goals set by the European Green Deal. These institutions are linked to one another. VET education has a central role in the construction of green skills, and the social partners can promote their effectiveness, dissemination, accessibility and integration with other European policies, also in order to prevent new risks.

1. THE ROLE OF GREEN-ORIENTED VET IN THE MAKING OF THE EUROPEAN GREEN DEAL

The objectives of the European Green Deal are ambitious, and require investments not limited only to the introduction of new technologies for the reduction of the environmental impact. Technologies, without enabling skills, are not enough.⁸² Without this complementary dimension, socially ungoverned innovation could generate new polarisations and inequalities.⁸³

There is no green transition without skills. So vocational education and training (VET) can play a decisive role. Some of their characteristics can be briefly highlighted in order to understand the reasons for this centrality.

New hybrid figures to disseminate innovation locally. VET enables the construction of 'hybrid' figures, i.e. with advanced and innovative technical skills, and capable of bringing together research and development, and intermediate figures assigned to the management of the new technologies. They are therefore placed between these two levels, providing organisations with technical and transversal skills, gained also thanks to dual training in which they have already been able to experience innovation and acquire solid theoretical and methodological foundations.

One of the fundamental elements of the European Green Deal is the investment in research and innovation, for the development of new technologies useful for tackling climate change and reducing the environmental impact generated by companies. Innovation, once introduced on the market, must then be adopted in the different company contexts:

⁸² () This is outlined in Z. Chen, G. Marin, D. Popp, F. Vona, *Green Stimulus in a Post pandemic Recovery: the Role of Skills for a Resilient Recovery*, in *Environmental and Resource Economics*, 76, 2020, pp. 901-911.

⁸³ () See in A. Padilla-Rivera, S. Russo-Garrido, N. Merveille, *Addressing the Social Aspects of a Circular Economy: A Systematic Literature Review*, in *Sustainability*, 12, 7912, 2020, pp. 1-17.

the speed with which this adaptation process takes place measures so-called “absorption capacity”.⁸⁴ This capacity is determined not only by highly specialized figures but also by ‘hybrid’ intermediate professionals such as those described above trained thanks to the cooperation companies and training systems. VET thus plays a central role for diffusion of innovation. Innovation is no longer based on the use of certain tools, but on the possession of certain skills.⁸⁵ Without this operation, the European Green Deal would not succeed: the low absorption capacity of many companies, especially smaller ones, would make it feasible only in limited contexts, sectors and territories, thus generating new inequalities.

Companies as learning contexts. The main feature of VET is the adoption of work-based teaching, made possible by the cooperation between VET providers and enterprises. Training carried out in real-life contexts is decisive for the development of green skills: direct experience with innovation in the contexts it is transforming are essential components of training that is consistent with the needs expressed by the world of work, and characterised by soft skills such as critical thinking, communication, and the ability to collaborate with others. VET is therefore a fundamental building block for the training of professional figures equipped with all the skills required by the green transition, developed in companies that are engaging in processes of adaptation to this path.

The ability to provide green technical skills and green transversal skills. For the realisation of the European green deal, not only technical skills – i.e. those linked to new technologies and the

demands made by the fastest growing sectors – are needed, but also transversal skills.⁸⁶ Hence the European initiative to design a framework for green competencies (GreenComp),⁸⁷ where the aim is to cope with new developments in the techniques used and to shape a new sustainable approach to all production activities. These two dimensions are interrelated: depending on the specific professional profile to be trained, technical competences will be different, while the transversal competences oriented towards building a sustainable mindset will be common to different training including VET.

As recalled by the European Commission: «*Achieving this requires a lifelong learning approach to learning for environmental sustainability with hands-on, engaging and action-based ways of learning which foster (i) knowledge, understanding and critical thinking (cognitive learning); (ii) practical skills development (applied learning); and (iii) empathy, solidarity and caring for nature (socio-emotional learning). Interdisciplinary approaches are needed to help learners understand the inter-connectedness of economic, social and natural systems*».⁸⁸

Towards a new ‘green’ training paradigm. The transformation of the ways of working requires a new way of thinking and training. What is needed is a holistic approach to this training, which innovates every training pathway starting from sustainability. Every job is changing and will change: the change affects everyone⁸⁹ and has both economic and social impacts. This is a real paradigm shift, which, as such, calls for the construction of a new approach to reality and to the world of work.

⁸⁴ () A definition is provided in a W. Cohen, D. Levinthal, *Absorptive Capacity: A New Perspective on Learning and Innovation*, in *Administrative Science Quarterly*, 1, 1990, pp. 128-152. See also P. Lewis, *Technicians and Innovation: a Literature Review*, The Gatsby Charitable Foundation, 2019, p. 16.

⁸⁵ () See C. Rupietta, J. Meuer, U. Backes-Gellner, *How do apprentices moderate the influence of organizational innovation on the technological innovation process?*, in *Empirical Research in Vocational Education and Training*, 1, 2021, pp. 1-25, C. Rupietta, J. Meuer, I. Porto Gómez, J.M. Zabala-Iturriagagoitia, U. Aguirre Larrakoetxea, *Old Wine in old Bottles: the Neglected Role of Vocational Training Centres in Innovation*, in *Vocations and Learning*, 11, 2018, pp. 205-221, H. B. Lund, A. Karlsen, *The importance of vocational education institutions in manufacturing regions: adding content to a broad definition of regional innovation systems*, in *Industry and Innovation*, 6, 2019, pp. 660-679.

⁸⁶ () See G. Bianchi, *Sustainability competences. A literature review*, European Union, 2020.

⁸⁷ () G. Bianchi, U. Pisiotis, M. Cabrera Giraldez, *GreenComp – The European sustainability competence framework*, Bacigalupo, M., Punie, Y. (eds), Luxembourg, Publications Office of the European Union, 2022.

⁸⁸ () Council Recommendation on learning for environmental sustainability, 2022, Brussels, 14.1.2022 COM (2022), p. 1.

⁸⁹ () See CEDEFOP, *The green employment and skills transformation. Insights from a European Green Deal skills forecast scenario*, 2021.

Educational innovation as a prerequisite for a green-oriented VET.

VET can only play this fundamental role if it innovates its training methodologies, opening up to virtual technologies, 3D simulators,⁹⁰ and developing customized training. In fact, VET is not only addressed to young people but also to adults interested in reskilling and upskilling processes.⁹¹ Modular teaching, which is flexible and customised according to both the skills to be trained and the profiles of the recipients.⁹² Adult training cannot be a repetition of that intended for young people, but requires different methods, times and learning. So, VET represents a crucial asset for companies, as it is able to train both new profiles, endowed with the green skills needed to promote the green transition, but also to develop continuous training processes for individuals to be relocated to other sectors, due to the impact of the policies adopted, or who require updating of their skills. In short, VET becomes a tool to manage and govern the change taking place.

"A successful transition will require large-scale programmes concerning the change in attitude and skills for people of all ages. [...] Education and training providers are well placed to engage not only with their students but also with parents and the wider community to promote sustainability as a core attitude and prepare people of all ages for green jobs. EFEE emphasizes that this transition will therefore require new ways of learning as well as teaching"(EFEE⁹³)

Updating VET curricula to govern the green transition. Another feature that makes VET a strategic tool to meet the objectives set by the European Green Deal is having updated training curricula that flexible and capable of taking into account the new competences emerging from the changes under way.⁹⁴

Compared to academic and general curricula, VET curricula present contents directly indicated by the social partners as corresponding to present and future needs, thanks to the skills intelligence activities carried out by the latter by national and international observatories. This ability to adapt the contents is particularly important for modelling green skills and thus updating training curricula, while enhancing modules dedicated to transversal competences. This adaptation must be a participative one, where the central role is played by the social partners. They consider the indications received at Community level and the needs of enterprises and workers, thus designing these training courses and building those hybrid figures already mentioned.

Strengthening the collaboration between VET and enterprises to innovate: the ecosystems of innovation and training - the "case" of CoVEs.

To achieve these objectives, it is necessary to strengthen the collaboration of VET providers with enterprises. Training also becomes a participative process between training institutions, enterprises, social partners, universities, research centres, local authorities. In other words, VET is evolving: it is no longer a training segment called upon to respond to labour market needs, but an element of a collaborative network where research, innovation, training and work are intertwined. This integration process is particularly necessary for the realisation of the objectives of the European green deal and the green transition: research and development must be accompanied by training processes that provide for the new enabling skills and by connections with companies so as to foster technology transfer processes and upskilling and reskilling activities. Rather than the training-work process, a new ecosystem is created: integration between activities and processes for the joint implementation of different strategies. The creation of local innovation and training ecosystems is exemplified by the European strategy of Centres

⁹⁰ () This point is also emphasized in European Commission, *Interim report of the Commission expert group on quality investment in education and training*, 2022.

⁹¹ () The importance of these two points is outlined in McKinsey Global Institute, *The net-zero transition What it would cost, what it could bring*, 2022.

⁹² () See M.J. Grammare, A. Stenger, *What role does education play in environmental concerns?*, Céreq's Bref, Training & Employment, 155, 2022.

⁹³ () European Federation of Education Employers, *Vision Statement 2020-2024*, 2020.

⁹⁴ () See L.C. Sern, A.F. Zaime, L. Ming Foong, *Green Skills for Green Industry: A Review of Literature*, in Journal of Physics: Conference Series, 1019, 2018, pp. 1-19.

of Vocational Excellence (CoVEs),⁹⁵ funded by the Erasmus+ programme. These centres bring together training, research and business institutions to collaborate in the development of widespread innovation processes, to achieve environmental, economic and social sustainability;⁹⁶ These centres develop international partnerships with other centres in the same production sector. This strategy brings together the local and the international dimension, developing research and innovation hubs capable of collaborating on an international scale, thus fostering joint growth processes.

The structuring of an occupational path and the integration of I-VET, H-VET and 'green' C-VET.

In addition to this ecosystem logic, VET must increasingly develop an occupational path. The needs of enterprises to cope with the green transition are many, as they do not only concern middle and highly-skilled individuals. Likewise, reskilling processes cannot be only upskilling processes: different training solutions must correspond to different needs. In many countries, however, VET ends at the upper secondary level. It is crucial to continue the chain up to the tertiary level, as is the case in those countries that foster innovation propagation processes.⁹⁷ The so-called higher VET is therefore an important segment, in order to allow VET students to continue at tertiary level, raising their skills, and responding to the need for the high technical skills required to promote the green transition.⁹⁸ This chain continues with lifelong learning that must increasingly become an essential component and here too the role of the social partners is decisive in promoting its dissemination and accessibility for all workers.⁹⁹

The necessary integration of industrial and training policies.

Training is often seen as a cost and not as an investment. For the achievement of the goals set by the European green deal, but also by the Sustainable Development Goals (SDGs), and thus for achieving a just transition and promoting environmental, economic and social sustainability, training plays a central role. These policies must therefore harmonise with industrial policies: training policies are policies for competitiveness. The risk of preparing investments, incentives and development plans without considering the design of training paths aimed at building skills that enable green innovation is that of achieving a 'one-sided' transition, i.e. limited to companies and that already had advanced forms of collaboration between companies, social partners and training systems, thus generating new fragmentations.

2. THE ROLE OF SOCIAL PARTNERS IN ACHIEVING EUROPEAN SUSTAINABILITY TARGETS

The collaboration between VET providers and enterprises is one of the determining factors for the realisation of the European green deal. A further element is the social partners: they are central to the construction of an increasingly sustainable society. Social partners and social dialogue are also instrumental in the implementation of sustainable policies at different level of governance.

Without the contribution of the social partners, the objectives of the European Green Deal will not be achieved, and the actions introduced risk worsening inequalities and disparities.

⁹⁵ () See European Training Foundation, *Centres of Vocational Excellence. An engine for vocational education and training development. An international study*, 2020; European Training Foundation, *Centres of Vocational Excellence. Autonomy in forging public-private partnerships in vocational education and skills development. Baseline Study*, 2021.

⁹⁶ () See ILO, *G20 Sustainable Finance Working Group Input Paper. Finance for a Just Transition and the Role of Transition Finance*, 2022, where strong social consensus is seen as a key to transition. See also ILO, *Guidelines for a just transition towards environmentally sustainable economies and societies for all*, cit.

⁹⁷ () This point is stressed in IRENA, *ILO Renewable Energy and Jobs Annual Review 2021*, 2021.

⁹⁸ () The energy sector is a case in point. See M. Černý et al., *Employment effects of the renewable energy transition in the electricity sector. An input-output approach*, ETUI, 2021.

⁹⁹ () See ILO, *Skills Development and Lifelong Learning. Resource Guide for Workers' Organizations*, 2022.

"The role of the social partners in just transition is different depending on the scale and level: - For enterprises, to agree concrete, time-bound and enterprise-wide plans for emissions cuts while creating decent jobs, reskilling and retaining workers, ensuring a social floor for workers who are retrenched and investing in communities. - For sectors, to promote strong climate, labour and just transition targets, policies and supportive lobbying positions and to invest in pre-competitive sectoral collaboration on development, commercialization and dissemination of green technology and know-how - At regional and national levels, to play an active role in the formulation and implementation of strong climate, just transition, labour market and social protection policies, and the public investments in green and decent jobs, training and education, sustainable infrastructure and community renewal to back them up" (Just Transition Centre¹⁰⁰).

In the following section, we will explain the reasons for the centrality of the social partners, starting from what emerges from the literature and the analysis of the main institutional documents.

- **A double-fold transition: adaptability and governability.**

A decisive element for the realisation of the green transition is the policies concerning the specificities of the production sectors, and their relative skill and technological needs. The social partners play this decisive role of implementing the EC indications according to the specifics of the different contexts, which is fundamental for adapting and making these processes governable.

Listening to, knowing and considering the different needs of sectors, areas and people is therefore necessary to promote diversified strategies: there is no single policy that alone enables the achievement of the objectives set at the EC level. It is necessary to work on different fronts and this diversification can only be carried out thanks to the contribution of those who represent the actors involved in the transition, the companies and the workers.¹⁰¹

"The EU Green Deal cannot leave citizens on the side. Parts of the industry of tomorrow will require skills that are today rare or even non-existent, and the training of a significant number of people to be qualified will take time, both for developing skills in new or more traditional economic sectors. Through their closeness to citizens and their links with local authorities, as well as their values of cooperation, solidarity and inclusion, SGI Europe members are committed to building a more united and inclusive EU" (SGI Europe¹⁰²)

The world of work is a key partner in realising the European green deal. The participation of the social partners in the implementation of sustainability policies is therefore a decisive element. Thanks to this cooperation, it is possible to promote strategies for the direct participation of businesses and workers in the realisation of these policies: for example, those that concern VET and call for the strengthening of work-based and workplace-based didactics, or that develop lifelong learning paths.

With specific reference to training policies, it should also be emphasised that the transition affects all workers, but that strategies to train the new green skills must take into account the specificities of the recipients. Adult training deserves dedicated planning, as does VET at the upper secondary level, challenging the social partners to involve companies and workers in the adoption of innovative and diversified teaching and organisational methodologies.

A central instrument in this sense is collective bargaining. The social partners, at a national and territorial level,¹⁰³ can introduce specifications concerning green skills training in sectoral or company agreements, enhancing customised training, thus enabling the construction of those training ecosystems already mentioned. At an international and European level, the social partners can support this bargaining process by harmonising the developments and indicating methods for

¹⁰⁰ () Just Transition Centre, *Just Transition. A Report for the OECD*, 2022, p. 6.

¹⁰¹ () See J. Ahlers, *Let's get our hands dirty greening adult learning and education*, European Association for the Education of Adults (EAEA) Background Paper, 2021.

¹⁰² () SGI Europe, *Statement on the EU Green Deal*, 2021, p. 3.

¹⁰³ () See J.M. Cha, *Why Transitioning Workers into a New Clean Energy Economy Should Be at the Centre of Climate Change Policies*, in *Fordham Environmental Law Review*, 29, 2, 2017, pp. 196-220.

anticipating needs, for identifying green skills on a sectoral basis, for sharing good practices as well as for the traditional roles of advocacy and lobbying at a central European level.

Sustainability policies set targets. However, there is still a lack of tools that can be used to achieve them. The social partners play a central role in the identification, design and implementation of these instruments, integrating with the main public policies adopted on the same themes, thus making the European green deal a 'concrete utopia', achievable and governable thanks to intermediate steps and results on the basis of the different sectoral and territorial specificities.

Lastly, the social partners can liaise with the public authorities to encourage the adoption of new green technologies from the bottom up.¹⁰⁴ These technologies are used across different sectors and are often developed after the first, innovative technologies in the most advanced sectors. To facilitate this process of 'broadening' and maximum adoption, it is necessary to know the specificities of the different sectors and to build dedicated training and research and development, a task that requires the leading role of business and workers' representatives.

• A fair transition: accessibility and social inclusion

The impact of the green transition is evident in the growth of some sectors, and the decline of others. The first dynamic will particularly affect the greener sectors, while the second will affect the "brown" sectors. In order for this process not to generate important and dramatic unemployment and impoverishment phenomena, and to allow transitions to better jobs for workers engaged in declining sectors, it is necessary to design active policies¹⁰⁵ through an effective collaboration between public entities and social partners, at national and local level. It is the social partners, which know the different sectors and can interact in such a way as to build pathways that effectively correspond to what

is required and, above all, can involve all the workers concerned.

Some workers more rarely access lifelong learning, reskilling and upskilling: young people, women, low and low-skilled workers, older workers. Not to mention unemployed and unemployable youth and adults. A transition oriented only towards the adoption of new innovative technologies risks enlarging the group of people excluded from the labour market because they lack accessible training opportunities. The social partners also have an important role in promoting, accessibility to retraining processes and, in general, to training, as a decisive asset for employability but also for the green transition itself, which must rest on highly qualified workers.

The emphasis on skills and training referred to here also requires careful anticipation of needs, carried out at an international level to identify green transformational trends impacting the sector. Policies, if not adequately informed by these elements, risk promoting innovation instead of anticipating and governing it. The social partners can use the tools they already have, and collaborate with international institutions, such as CEDEFOP, and national institutions to develop these processes of anticipating and monitoring green skills.

The social partners can play important roles in combating social and economic inequalities. Innovation requires new green skills which can generate an increase in the so-called "skill premium", i.e. the difference between the wages of workers with green skills and those without.¹⁰⁶ To counteract this polarisation, the social partners can use collective bargaining and active collaboration with public policies aimed at widening access to green training, especially VET.

Diversified training by sectors, by areas, and by different social groups also requires the adoption of different approaches, which go beyond the mere transmission of skills but require a transversal

¹⁰⁴ () See M.A. Dutz, S. Sharma, *Green Growth, Technology and Innovation*, The world bank, Policy Research Working Paper, n. 5932, 2012.

¹⁰⁵ () See A. Bowen, *'Green' Growth, 'Green' Jobs and Labour Markets*, The world bank, Policy Research Working Paper, n. 5990, 2012.

¹⁰⁶ () K. Macdonald, H. Patrinos, *Education Quality, Green Technology, and the Economic Impact of Carbon Pricing*, The world bank, Policy Research Working Paper, n. 9808, 2021.

approach to the activation of those involved. For this reason, given that many VET trainers come from the world of work, the social partners have an important role to play in designing training and support pathways for the trainers themselves, equipping them with up-to-date green skills to be transferred, but also with transversal skills to address the different emerging needs.¹⁰⁷

• A widespread transition: participation and collaboration

For the realisation of policies to promote sustainability, it is necessary to develop a new paradigm in which training, research and work are conceived as constantly interrelated. This also means fostering the participation of the social partners in the design of training and industrial policies.¹⁰⁸

This participation can be realised through constant monitoring and updating of training curricula, especially VET curricula, into which the green skills emerging from the anticipatory analyses conducted, on a sectoral basis, should be introduced. Having up-to-date training curricula increases the effectiveness of these pathways,¹⁰⁹ both in terms of the employability of those who attend them, and in terms of matching the needs of companies to introduce technological and organisational innovations, and thus improve productivity. This process of constant updating based on broad social consultation is at the root of the success of countries that develop what are known as collective skills training systems, including the countries implementing the dual system - such as Germany or Switzerland.¹¹⁰

Training projects involving the social partners are also highlighted in the literature as being more effective, since they provide not only the skills required by the company, but also broader skills, thus enhancing training by broadening its contents. This participation is then necessary for upskilling and reskilling.

This logic the necessary methodological prerequisite for the construction of collaborative networks, on a local scale, between companies, training institutions, research centres, local authorities and, indeed, social partners, for the development of innovation and training ecosystems based on public-private collaboration, useful for the realisation of the objectives of the European green deal.

• A global transition: the integration of local and international dimensions

Green transition is a global process, so relevant policies must be coordinated internationally and follow a unified framework, as is the case with the European green deal. But top-down approaches must be accompanied by bottom-up approaches, thanks to the leading role of local entities. The integration of these two dimensions rests on the social partners, their ability to promote policy integration to harmonise the local and international dimensions.

¹⁰⁷ M. D. Hartmann, *Green Skills in Vocational Teacher Education*() See C. Phương Diệp, M. D. Hartmann, *Green Skills in Vocational Teacher Education – a model of pedagogical competence for a world of sustainable development*, in *TVET@Asia*, 6, 2016, pp. 1-19.

¹⁰⁸ () See C. R. Carrión-Crespo, *Green jobs, social dialogue and participatory governance for sustainable water policy reforms*, in *WIT Transactions on Ecology and The Environment*, vol. 153, 2011, pp. 47-57.

¹⁰⁹ () In terms of union participation, see A.L. Booth, M. Chatterji, *Unions and efficient training*, in *The Economic Journal*, 108, 1998, pp. 328-343, R.D. Lansbury, *Trade Unions, Vocational Education and Workplace Training: International Trends*, in *E-Journal of International and Comparative Labour Studies*, 2, 2015.

¹¹⁰ () See P. Emmenegger, L. Seitzl, *Social partner involvement in collective skill formation governance. A comparison of Austria, Denmark, Germany, the Netherlands and Switzerland*, in *Transfer: European Review of Labour and Research*, 1, 2020, pp. 27-42, M.R. Busemeyer, C. Trampusch, *The Comparative Political Economy of Collective Skill Formation*, in M.R. Busemeyer, C. Trampusch (ed.), *The Political Economy of Collective Skill Formation*, Oxford University Press, 2012, pp. 3-38, and K. Thelen, *How institutions evolve. The political economy of skills in Germany, Britain, The United States, and Japan*, Cambridge University Press, 2004.

The global nature of the transition under way also challenges education systems to internationalise their courses:¹¹¹ by favouring the recognition of qualifications as called for by the EC, the mobility of students and professors (also thanks to the Erasmus+ programme), and the development of joint degrees and joint programmes.¹¹² This internationalisation is useful for the exchange of best practices, the promotion of professional mobility, but also for the transversal professional profiles that are immediately recognized. Fruitful cooperation between social partners at international and at national level can be decisive.

The international dimension of the social partners is also useful for coordinating the work to achieve the targets not only set in the climate sphere, but also in training: those indicated by the New Skills Agenda, by the Council Recommendation of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience, and by the Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030). These are ambitious targets, so the role of the social partners and the effective coordination between national and international dimensions are decisive factors.

• A transition for all: the decisive role of social dialogue

The various dimensions of sustainability are interlinked: it is necessary to develop 'competitive sustainability',¹¹³ to promote widespread training which is often seen by individual companies as a cost and not as a strategic investment. But without green, technical and transversal skills, the EC objectives will not be achieved.

The European social partners, through social dialogue, can then promote both the adoption of policies that are effectively consistent with the various emerging needs, but also a cultural change that is the necessary prerequisite for any paradigm shift such as the one underway. Governments should also have a role in supporting and encouraging such processes, focusing especially on those areas where social dialogue is still not widespread.

«Social dialogue has an important role to play in driving energy efficiency, creating a consensus for climate change related policies that are often unavoidable but can create opposition, including at work. More generally, a shared analysis by social partners of environmental protection, resource efficiency and energy efficiency opportunities, as well as of employment, quality of the workplace and training opportunities and consequences, can contribute greatly to a well-managed socially just transition» (ETUC¹¹⁴)

Social dialogue is necessary for the management of the EU resources made available for the management of recovery from the Covid-19 pandemic. The plans presented by the various European countries are ambitious, but they need 'bottom-up' participation and 'top-down' coordination to achieve their goals.¹¹⁵ Also in a recent manifesto,¹¹⁶ it has been highlighted how the current historical moment requires the adoption of policies that do not focus on austerity but rather on tackling the transition underway, through the adoption of a new paradigm useful for the 'social governance of innovation', i.e. the development of innovative projects based on the integration between policies, levels of governance, and on the participation of the social partners in these processes of adaptation and transformation. The role of the European social partners in the realisation of the Green Deal was recently confirmed in their Work Programme 2022-2024, which states that:

¹¹¹ () M. Di Salvo, *Talent partnerships and future skills needs*, EuroMeSCo policy paper, 2022.

¹¹² () See Council Recommendation of 26 November 2018 on promoting automatic mutual recognition of higher education and upper secondary education and training qualifications and the outcomes of learning periods abroad (2018/C 444/01), and, more recently, Council Recommendation of 5 April 2022 on building bridges for effective European higher education cooperation (2022/C 160/01).

¹¹³ () See S. Sabato, B. Fronteddu *A socially just transition through the European Green Deal?*, ETUI Working Paper, 8, 2020.

¹¹⁴ () ETUC, *European Social Partners dialogue on Climate change 13 May 2011 ETUC discussion document*, 2011, p. 17.

¹¹⁵ () See T. Zachariadis, *On the Sustainability Performance of the European Union's Economic Recovery Strategy - A Case Study with Lessons for Policymakers*, 2021, pre-print.

¹¹⁶ () European Environmental Bureau, *Manifesto for a green, just and democratic European economy*, 2022.

"Green transition, decarbonisation and circular economy along with digitalisation contributes to changing jobs, tasks, and to creating new occupations while others disappear. These transitions are interlinked and mutually reinforcing. Digitalisation can contribute to more environmentally friendly production processes, service provision and lifestyles, while greening of the economy requires more advanced technologies and digital solutions to accompany structural changes.

The speed and scale of this transformation in the labour market requires the early and effective involvement of the social partners in order to raise awareness and to identify solutions that can be tailored to sectors specificities and implemented at the local level. Social partners should play an active role to ensure that a just transition, underpinned by appropriate public funding and investments, creates quality jobs and supports enterprises and workers adapting to change, including new skills needs, upskilling, redesign of jobs, organising job-to-job transitions and work organisation improvements" (ETUC, BusinessEurope, SGI Europe, SMEunited¹¹⁷).

¹¹⁷ () ETUC, BusinessEurope, SGI Europe, SMEunited, *European social dialogue work programme 2022-2024*, 2022, p. 5.

CONCLUSIONS

What is the impact of the green transition on employment and production? What skills are needed to enable this transition? Where and how can they be developed? What are the reasons and prospects for the collaboration between SGI providers and VET providers in enabling a better match between demand and supply in terms of green skills? And what is the role of social partners and social dialogue?

These are the questions that prompted this report. This chapter is dedicated to the findings of the analysis concerning the sectoral needs – i.e. the providers of services of general interest operating in the water, energy and transport sector – in some countries (Belgium, France, Germany, the Netherlands, Spain and Portugal). This research also investigated the possible cooperation between vocational training (VET) institutions and companies operating in the sectors of general interest (SGI).

In general terms, the policies adopted at European level are not only intended to achieve climate and environmental sustainability. In the words of the EC President, Ursula von der Leyen, the Green Deal (just to mention the to mention one of most well-known set of political initiatives in this field) represents “our new growth strategy”. This growth strategy requires a careful analysis of the employment impacts that these policies will have on different economic sectors. In this sense, the green transition is a global and transversal process: it has impacts on all industries, though in different ways. In this regard, as far as the target sectors are concerned, and according to the most recent findings, the impact of the Green Deal will be different in terms of employment growth. For instance, the water, energy and transport sectors already face different challenges in relation to the Green Deal targets.

Specifically, the water sector has reported a decrease in the levels of biodiversity, an increase in pollution and the emergence of new forms of natural resource management. The energy one calls for the need for investment in research and development to support the transition to the use of sustainable, clean and renewable sources, as well as of innovative and enabling technologies for environmental sustainability processes also in the other sectors. Finally, the transport industry aims at a reduction of emissions equal to 90% by 2050 and the use of alternative fuels.

Yet these analyses do not take into consideration other factors – for example, how EC policies can be the starting point of industrial and employment strategies at national level – and the specificities of Member States. These analyses risk being too theoretical and far from effective. Furthermore, it is necessary to achieve the objectives of the Green Deal, a strategy of economic growth and social inclusion (as well as environmental sustainability policies) through training for skills development. This importance has been acknowledged in the most recent European policies related to VET, e.g. Council Recommendation of 24 November 2020 on vocational education and training for sustainable competitiveness, social equity and resilience and the New Skills Agenda, which recognize the centrality of vocational training for the green transition aiming at environmental, social and economic sustainability.

Additionally, the goals of the green transition cannot be achieved without investing in workers' skills. The research highlighted how, for some time, analyses have focused mainly on green jobs, i.e., trying to identify the new occupations resulting from the introduction of new technologies to manage the green transition, and the evolution of existing ones. What emerged was that all jobs are impacted by the transition, albeit in different ways. Rather than a separation between green jobs and brown jobs, one should speak of a “green continuum”, to indicate the varying intensity with which all jobs can be green. A holistic approach is therefore needed that also considers green skills affecting all professions to achieve the objectives sought by the green transition.

This analysis with all the actors involved made it possible to identify the need for a paradigm shift. This does not mean updating existing job profiles through certain technical skills, but rethinking education and training (especially vocational training) in order to promote a new approach favouring the adoption of sustainable behaviours, models and strategies.

This is why the project “Green Skills in VET” is important and timely, as it identifies vocational training as the tool for meeting the need for skills and professional profiles of companies, by also adapting workers’ curricula and promoting different types of education and training. Examples of this include I-VET – for young people in upper secondary education – H-VET – i.e. non-academic training in the tertiary sector – and C-VET, which is used to promote the upskilling and reskilling of workers and the unemployed. Based on this research, it is therefore possible to state that VET is central to favour the green transition, to provide certain skills and to promote widespread and inclusive training. In order to exploit the potential of VET and maximise its effectiveness in terms of responsiveness to company’s training needs, it was possible to identify the most suitable approach in terms of dual training, by also involving enterprises. This was done by enabling a smoother green transition with respect to employment and training, highlighting the value of on-the-job situations, and thanks to professionals who are well-prepared for future challenges.

A number of common issues emerged which are faced by SGI providers in the sectors concerned, that is the difficult generational turnover due to an ageing working population, and the struggle to retain younger people. These two processes help to understand how VET providers should work together.

This cooperation is important to help students familiarize with the relevant sectors and to overcome certain prejudices, thus improving their attractiveness, and to develop skills that are in line with the needs of the labour market. Furthermore, VET envisages situations in which experienced workers could act as tutors for their younger peers.

Alongside the collaboration just mentioned, the research highlighted other tools to improve and streamline the relationships between SGI providers and VET providers. Besides the European and national strategies that are wide-ranging and with solid theoretical foundations (e.g. CoVEs), the social partners – i.e. employers’ organisations and workers’ representatives – play a decisive role in this process, through collective bargaining and social dialogue. They can foster the participation of local entities, the integration of top-down and bottom-up approaches, and the synergy between EU and national policies, supporting them with specific activities such as the identification of green skills at sectoral level.

The participative approach that characterises the initiatives conceived and implemented by the social partners – e.g. the Green Skills in VET – is also useful to ward off the new polarisations and fragmentations that could be triggered by the transition, thanks to an inclusive approach promoting diversified and large-scale training. As for the SGI providers, this method makes it possible to involve SMEs, while as far as the VET providers are concerned, the social partners can promote inclusion and diversity in the sector examined.

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ANNEXES

1. INTERNATIONAL SURVEY

(*) Mandatory field

This on-line survey is part of the Project "Green Skill in VET" (VS/2021/0017).

This project has been allocated funding from the European Union.

The survey is structured as follows:

Section #1 – General information about the respondent

Section #2 – Setting the scene

Section #3 – Green Skills in Vocational Education and Training and Services of General Interest

Subsequently, on the basis of your affiliation, there will be two self-standing sets of questions as below:

Section #4 – VET Organisations specific questions

Section #5 – SGI providers specific questions

Section #6 – Have your say

The survey is completely ANONYMOUS. The system used by Fondazione ADAPT records the answers without any personal identification of the respondent. The data collected (included the one referring to the name of the Organisation/Company) will be processed in an aggregated way, in order to prevent one from tracing, even indirectly, the identity of the person who completes the survey.

You'll be able to fill out the survey until the end of July 2021.



Background

SGI Europe and the European Federation of Education Employers (EFEE) are jointly carrying out the European project “Green Skills in VET”, aiming at supporting EU public services and SGIs, as well as vocational education and training (VET) providers to build a skilled workforce for materialising the green transition.

SGI Europe and EFEE are using their respective expertise as SGI providers and education providers for undertaking research into current and future skills and training needs of employers. The focus will be put on 3 key public services and SGIs to be affected by the development of the resource efficient and green economy: water, transport, and energy.

Through the themes covered, the project partners will consider the challenges and priorities set, both in the European Commission’s proposals for a European Green Deal, the European Commission Political Guidelines for 2019-2024 and the Communication on a Strong Social Europe for Just Transitions.

This project aims to create lasting relationship between providers of education and training and of public services and SGIs. Such articulations will be indispensable for an efficient transition to climate neutrality, which will be the very core of EU action for the coming decades. The key angle for this project will therefore be to focus on education and training and the subsequent skills delivery to the labour market.

In 2 years of activity (2021-2023), the project will target six Member States: the Netherlands, Portugal, Belgium, France, Germany, and Spain. SGI Europe and EFEE will work with project partners from their membership for identifying the current and future demands for green skills and jobs, improving VET providers’ capacity to deliver green-oriented training and design common solutions for adapting skills delivery in the context of a framework of collaboration between education and public services’ providers.

External Expert Subcontractor: Fondazione ADAPT (Italy)



Co-funded by the European Commission

SECTION #1 GENERAL INFORMATION ABOUT THE RESPONDENT

1. Please, indicate the name of the Organisation/Company you are working for. (*)
2. Your Organisation/Company operates in: *Please, select one Country from the list below*
[drop down menu with list of Member Countries]
3. Your Organisation/Company is (*) *Please, select the most suitable option considering the core activity of your Organisation/Company. SGI = Services of General Interest; VET: Vocational Education and Training.*
[please, select the most suitable option]
 - A VET Organisation - I-VET (secondary and post-secondary)
 - A VET Organisation - higher VET (tertiary work-based education)
 - A VET Organisation - C-VET
 - An SGI provider (Energy sector) *[go to Q5]*
 - An SGI provider (Transport sector) *[go to Q5]*
 - An SGI provider (Water sector) *[go to Q5]*
 - Other (please specify) _____
1. Please, indicate the industrial sectors for which your Organisation offers the most training (*)
[please, select all suitable options]
 - Energy sector
 - Water sector
 - Transport sector
 - Other (please specify) _____
2. Your Organisation/Company mainly operates (*) *[please, select the most suitable option]*
 - At regional/local level
 - At national level
 - At international level

SECTION #2 SETTING THE SCENE

6. "My Organisation/Company needs to contribute to transforming the European Union into a modern, resource-efficient and competitive economy" (*) *Please, using the following scale, indicate your agreement/disagreement with the sentence. [please, select the most suitable option]*
 - Strongly disagree
 - Disagree
 - Neutral
 - Agree
 - Strongly agree
7. Is your Organisation/Company currently working on adaptation projects that will help to improve your resilience so as to increase climate change effects? (*) *[please, select the most suitable option]*
 - Yes
 - No *[go to Q9]*

8. Please, provide at least one example of a recent initiative in this field involving your Organisation/ Company. You can include web links if relevant. *[brief paragraph] [go to Q10]*

9. Why? Please, select one or more options from the list below. (*) *[please, select all suitable options]*

- ☐ Lack of time
- ☐ Initiatives considered non pivotal
- ☐ Lack of resources (human capital/organisational dimension) Lack of resources (financial)
- ☐ Lack of regional/local/national incentives (financial) Lack of regional/local/national incentives (policies)
- ☐ Other (please, specify) _____

10. Are you aware of any recent national/regional/local policy or initiative in the field of environmental sustainability which has already had/you expect to have an impact on the core activities of your Organisation/Company? (*) *[please, select the most suitable option]*

- ☐ Yes
- ☐ No *[go to Q12]*

11. If Yes, please provide at least one example. You can include web links if relevant. *[brief paragraph]*

12. Generally speaking, to what extent do you think that national/regional/local funds pay attention to the "Green Skills in VET" issue in your sector of activity? Express your opinion using the following scale (*) *[please, select the most suitable option]*

- Insufficient attention
- Average attention
- Adequate attention
- Very significant attention
- I'm not aware of how national/regional/local funds address the "Green Skills in VET" issue

13. Talking about the Green Deal and other European led policies in the field of environmental sustainability and as for your knowledge, please rate their level of impact on the core activities of your Organisation/ Company (*) *[please, select the most suitable option]*

The European Green Deal provides an action plan to boost the efficient use of resources by moving to a clean, circular economy restore biodiversity and cut pollution. The plan outlines investments needed and financing tools available. It explains how to ensure a just and inclusive transition. The EU aims to be climate neutral in 2050. The EC proposed a European Climate Law to turn this political commitment into a legal obligation. The EU will also provide financial support and technical assistance to help those that are most affected by the move towards the green economy. This is called the Just Transition Mechanism. It will help mobilise at least €100 billion over the period 2021-2027 in the most affected regions.

- No significant impact
- Low impact
- Limited impact
- Tangible impact *[go to Q15]*
- Very significant impact *[go to Q15]*



14. Generally speaking, which is the level of attention paid by European funds to address the "Green Skills in VET" issue in your sector of activity? (*) *[please, select the most suitable option]*

- Insufficient attention
- Low attention
- Average attention
- Adequate attention
- Very significant attention
- I'm not aware of how EU funds address the "Green Skills in VET" issue

SECTION #3 GREEN SKILLS IN VOCATIONAL EDUCATION AND TRAINING AND SERVICES OF GENERAL INTEREST

For the purposes of the present survey, please consider the following definitions:

Environmental awareness skills refer to the knowledge, abilities, values and attitudes [in the general population] needed to live in, develop and support a society which reduces the impact of human activity on the environment. These generic 'green' skills include the capacity to include environmental concerns alongside others (such as performance and safety) in taking decisions, including in the choice of processes and technologies. [EU commission (Skills panorama) 2015]

Technical skills: specific hard skills are technical and job-specific abilities that are applicable in a small number of companies, occupations and sectors. They describe special attributes for performing an occupation in practice [EU Commission (Progress) 2011]

Green jobs are jobs that contribute to preserving or restoring environmental quality, while also meeting longstanding demands and goals of the labour movement, such as adequate wages, safe working conditions, and workers' rights [Adapted from UNEP (2008) definition]

15. Which is the level of importance of the following features of green skills? * Please, select one rating option for the following items. (*) *[please, select one option/row]*

	Absolutely not important	Low importance	Moderate importance	High importance	Extremely important
Environmental awareness					
Job specific skills concerning new green product/ services/ processes					
Being practically involved in saving energy, protecting ecosystems etc.					
Being responsible for environmental management					



16. Please, feel free to indicate additional aspects of green skills which you consider important. *[brief paragraph]*

17. Has your Organisation/Company ever been involved in skills assessment and/or skills forecast/foresight activities? (*) *[please, select the most suitable option]*

A forecast acts as an early warning mechanism to help to alleviate potential labour market imbalances and support different labour market actors to make informed decisions - Foresight includes a range of forward-looking activities but it is not about prediction or merely about forecasting. It is primarily about sense-making (making sense of emerging trends and drivers), exploring alternative futures, and shaping and enabling a desired future - Skills assessment e.g. competence mapping at company level.

- Yes
- Yes, with a specific focus on green skills
- No
- I don't know

18. "In my country there is a solid and effective collaboration between SGI and VET providers" Please, using the following scale, indicate your agreement/disagreement on the sentence. (*) *[please, select the most suitable option]*

- Strongly disagree
- Disagree
- Neutral *[go to Q20]*
- Agree *[go to Q20]*
- Strongly agree *[go to Q20]*

19. In case you disagreed, why? (*) *[please, select the most suitable option]*

- Lack of time
- Collaborations considered not pivotal
- Lack of resources (human capital/organisational)
- Lack of resources (financial)
- Collaborations made possible only by the willingness of individuals
- Other (please, specify): _____

20. "In my country there is a solid and effective collaboration between SGI and VET providers with specific reference to green skills" (*) Please, using the following scale, indicate your agreement/disagreement on the sentence. *[please, select the most suitable option]*

- Strongly disagree
- Disagree
- Neutral *[go to Q22]*
- Agree *[go to Q22]*
- Strongly agree *[go to Q22]*

21. In case you disagreed, why? (*) *[please, select the most suitable option]* *[go to Q24]*

- Lack of time
- Collaborations considered not pivotal
- Lack of resources (human capital/organisational)
- Lack of resources (financial)
- Collaborations made possible only by the willingness of individuals

- Other (please, specify): _____

22. Which form do these collaborations take? (*) *[please, select all suitable options]*

- co-design of curricula and/or study programmes co-design of tailored sectoral training paths
- dual training (i.e. apprenticeships) internships
- company visits
- participation in institutional events (i.e. sectoral level conferences organised by skills agencies/ministries)
- tri-partite projects and initiatives with employment services (public and private)
- Other (please, specify): _____

23. Could you assess the effectiveness of the above-mentioned collaborations between SGI and VET providers in fostering quality training opportunities to adapt to green skills and labour market needs?

(*) *[please, select the most suitable option]*

Not at all effective 1 2 3 4 5 Extremely effective

24. Generally speaking, and in your opinion, which aspects could be improved for a more fruitful and effective collaboration in fostering quality training opportunities to adapt to green skills and labour market needs? (*) *[please, select all suitable options]*

- get access to updated and reliable information about green skills needs at country and sectoral level (qualitative and future skills scenarios)
- have greater financial resources at disposal
- have specialized personnel for dealing with these issues
- raise awareness via training for our staff about green skills and jobs
- raise awareness via training for our staff about EU led initiatives, action plans and legislation in the field of climate change/environment/just transition
- get access to information concerning best practices in other countries/SGI sectors improve the quality of training offered within apprenticeships
- improve the quantitative development of apprenticeship training

Other (please, specify): _____

25. Are you aware of any limitation (i.e. national regulations concerning public owned companies/municipal enterprises) preventing the development of quality dual-learning VET paths within the energy/transport/water sectors? (*) *[please, select the most suitable option]*

- Yes
- No *[go to Q27]*

26. If Yes, please provide examples (*) *[long paragraph]*

27. Would your Organisation/Company be interested in being involved in ongoing national and monitoring and evaluation of the demand for energy-transport- water sector green skills? (*) *[please, select the most suitable option]*

- Yes
- No

For the purposes of the following questions, please consider the definitions below

Transversal skills: skills that are typically considered as not specifically related to a particular job, task, academic discipline or area of knowledge and that can be used in a wide variety of situations and work settings (for example, organizational skills). [UNESCO IBE 2013, Global]

Technical skills: specific hard skills are technical and job-specific abilities that are applicable in a small number of companies, occupations and sectors. They describe special attributes for performing an occupation in practice [EU Commission (Progress) 2011]

28. With reference to green skills issue and considering your staff: (*) *[please, select the most suitable option]*

- my Organisation/Company needs staff with new green skills (transversal skills) to perform their tasks *[go to Q30]*
- my Organisation/Company needs staff with new green skills (technical skills) to perform their tasks *[go to Q30]*
- my Organisation/Company needs completely new professional profiles

29. Please, provide at least 2 examples of emerging and new green occupations you consider strategic for your Organisation/Company. For examples see: <https://ec.europa.eu/esco/portal/occupation> and type "green" in the "search" field *[brief paragraph]*

The following set of questions is tailored on the basis of your affiliation, this is the reason why we are asking again if...

30. Your Organisation/Company is (*) *[please, select the most suitable option]*

- A VET Organisation *[go to Q31]*
- An SGI provider *[go to Q48]*

VET Organisations specific questions

31. Do you provide training for your staff (teachers and trainers) in green skills? (*) *[please, select the most suitable option]*

- Yes
- No *[go to Q35]*

32. If Yes, (*) *[please, select the most suitable option]*

- we provide direct workplace training
- training is provided by external consultancy firms/companies
- none of these subjects
- Other (please, specify): _____

33. In which green skills do you provide training for your staff? (*) *[please, select all suitable options]*

- environmental awareness
- job specific skills concerning new green product/services/processes
- being practically involved in saving energy, protecting ecosystems etc.
- being responsible for environmental management
- Other (please, specify): _____

34. Does this training concern: (*) *[please, select all suitable options] [go to Q36]*

- the provision of new sets of skills
- the update of employees'/trainers' existing skills bot

35. If No, why not? (*) *[please, select all suitable options]*

- Lack of time
- Training considered not pivotal
- Lack of resources (human and organisational)
- Lack of resources (financial)
- Other (please, specify): _____

36. As for your knowledge, are green skills encompassed in the educational offer delivered by the Organisation? *In this project, we consider green skills to cover the working areas of: - Environmental awareness - Expert knowledge on procedures for energy, water, transport, sustainable development etc. - Being practically involved in saving energy, protecting ecosystems etc. - Being responsible for environmental management etc.* (*) *[please, select the most suitable option]*

- Yes *[go to Q39]*
- No *[go to Q37]*

37. Do you think that green skills could be taught by your institution? (*) *[please, select the most suitable option]*

- Yes *[go to Q39]*
- No *[go to Q41]*

38. Why? Please, select one or more options from the list below: (*) *[please, select the most suitable option] [go to Q42]*

- Lack of time
- Initiatives considered not pivotal
- Lack of resources (human and organisational)
- Lack of resources (financial)
- Other (please, specify): _____

39. Which green skills does your Organisation provide training for? (*) *[please, select all suitable options]*

- environmental awareness
- job specific skills concerning new green product/services/processes
- practical involvement in saving energy, protecting ecosystems etc.
- responsibility for environmental management
- Other (please, specify): _____

40. In more detail and with reference to green skills and the training courses/study programs designed and delivered to students by your Organisation: (*) *[please, select the most suitable option]*

- My Organisation has already started to include specific contents encompassing green skills development (transversal) in the traditional educational offer *[go to Q42]*
- My Organisation has already started to include specific contents encompassing green skills development (technical skills) in the traditional educational offer *[go to Q36]*
- My Organisation has already designed/plans to design completely new study programs devoted to the development of new and emerging professional profiles for green jobs *[go to Q36]*

41. Please, provide at least 2 examples of emerging and new green occupations you consider strategic for your Organisation/Company. For examples see: https://ec.europa.eu/esco/portal/occupation_and_type_green in the "search" field *[brief paragraph]*

42. As for your knowledge, if compared to traditional educational contents, teaching green skills requires:

(*) *[please, select all suitable options]*

- Up-dating and improving the skills of trainers
- more practical and less theoretical oriented teaching methodologies
- more theoretical and less practical oriented teaching methodologies new organisational models
- an increasingly extensive use of technology and digital solutions in the training and learning processes
- different learning environment
- Other (please, specify): _____

43. In your opinion, besides traditional study programmes, does your Organisation have sufficient resources to teach green skills? (*) *[please, select the most suitable option]*

- Yes
- No

44. As for your knowledge, which problem/s does your institution encounter in teaching green skills? (*) *[please, select all suitable options]*

- too few staff have knowledge of green skills
- there is no didactic framework for teaching green skills lack of adequate and specific learning facilities
- low training participants' interest in green skills
- Other (please, specify): _____

45. Do you have opportunities to develop yourself as a green skills VET teacher or trainer? (*) *[please, select the most suitable option]*

- Yes
- No

46. In any case, would you be interested to develop green skills education in the future? (*) *[please, select the most suitable option]*

- Yes
- No

47. Please, tell us how you think green skills vocational education and training could develop in the future
[long paragraph] [go to Q59]

SGL providers specific questions

48. Do you provide training for your staff in green skills? (*) *[please, select the most suitable option]*

- ☐ Yes *[go to Q49]*
- ☐ No *[go to Q51]*

49. In which green skills do you provide training for your staff? (*) *[please, select all suitable options]*

- ☐ environmental awareness job specific skills concerning
- ☐ new green product/services/processes
- ☐ being practically involved in saving energy, protecting ecosystems etc.
- ☐ being responsible for environmental management
- ☐ Other (please, specify): _____

50. Does this training concern: (*) *[please, select the most suitable option] [go to Q52]*

- ☐ the provision of new sets of skills
- ☐ the update of employees'/trainers' existing skills
- ☐ both

51. If No, why not? (*) *[please, select the most suitable option]*

- ☐ Lack of time
- ☐ Training considered not pivotal
- ☐ Lack of resources (human and organisational)
- ☐ Lack of resources (financial)



For the purposes of the following questions, please consider the definitions below

Skill mismatch: situation of imbalance in which the level or type of skills available does not correspond to labour market needs.

- skills mismatch can be a surplus or a lack of knowledge, abilities and competences;
- skill mismatch can be analyzed at different levels (individual, enterprise, sectoral, economy);
- experts distinguish between vertical mismatch (the level of education/skills is higher or lower than required) and horizontal mismatch (the level of education/skills matches job requirements, but the type of education/skills is inappropriate for the current job). [Cedefop, 2014]

Skill gap: situation where an individual does not have the level of skills required to perform his or her job adequately.

- Skill gaps can be analysed at individual level (using a skills audit), at company/sector level, or at regional, national or international levels.
- Skill gaps can be linked to an insufficient level of qualification. They may also refer to situations where the workforce has the right level of qualification but lacks specific types of skills or experience required to perform a task or a job adequately. [Cedefop, 2014]

Skill shortage: situation where skills supply (type of abilities and number of people available on the labour market) is not sufficient to meet labour market demand.

A skill shortage applies to all levels of qualification; it may result from factors such as:

- insufficient education and training supply;
- geographical imbalance in supply;
- developments impacting the structure of the economy;
- lack of attractiveness of specific occupations (difficult working conditions, low remuneration, insufficient social recognition). [Cedefop, 2014]

52. As for your knowledge, do staff in your company need green skills? (*) *[please, select the most suitable option]*

- Yes, in my company green skill gaps phenomena do occur systematically
- No, all the staff is full equipped with relevant green skills
- No, staff do not need to be equipped with green skills since they are not strategic competences

53. As for your knowledge, when recruiting new employees, does your company prefer that they already have green skills? (*) *[please, select the most suitable option]*

- Yes
- No

54. In your experience, do you think new entrants to the workforce are suitably qualified in green skills? (*)

[please, select the most suitable option]

- Yes
- No, they have the right level of qualification but they completely lack green skills
- No, they have the right level of qualification but they completely lack experience to perform green jobs adequately
- No, they have an insufficient level of qualification

55. As for your knowledge, with specific reference to green skills is there any shortage phenomenon ongoing in the sector where your company operates? (*) *[please, select the most suitable option]*

- Yes, because of insufficient education and training supply
- Yes, because of geographical imbalance in supply
- Yes, because of a lack of attractiveness of specific occupations in the industrial sector where my Company operates (difficult working conditions, low remuneration, insufficient social recognition)
- Maybe
- No

56. If Yes, please provide at least one example of green skills/occupation which is difficult to find within your sector *For examples see: <https://ec.europa.eu/esco/portal/occupation> and type "green" in the "search" field* *[brief paragraph]*

57. As for your knowledge, is your company already committed in initiatives for the promotion of green skills at the national or European level? (*) *[please, select the most suitable option]*

- Yes *[go to Q58]*
- No *[go to Q59]*

58. If yes, please provide at least one example. *You can include web links if relevant* *[brief paragraph]*

SECTION #4 HAVE YOUR SAY

59. Please, feel free to add any additional comment relevant for the topics covered by the Project Green Skills in VET *[long paragraph]*



2. INTERVIEWS OUTLINE

SGI Providers Questions

Brief general introduction aimed at asking the interviewees to describe the specific functioning of the target industries in the reference country [special characteristics and regulations of SGI providers].

Which are the main transformations characterizing the target sector (both in general and with reference to the country where your company operates)?

Considering the green skills issue, which new skills have been introduced by the ongoing innovations within the sector (sustainable practices, energy and resource efficiency, new green technologies)? [Guided discussion analyzing emerging green skills within the sector considering their nature -technical/transversal].

In more detail, which are the key green skills needed by the staff in your Company?

Could you identify up to two new “green” occupational profiles which are strategic for your Company and describe their core set of skills?

Within the sector itself, what difference in terms of skills arises between the various branches of the same industry (examples provided at sectoral level). Do you believe that it is possible to intervene with transversal training campaigns or is it more appropriate to have specialized training courses for each subsector?

Has your Company ever been involved in skills assessment and/or skills forecast/foresight activities?

As for your knowledge, with specific reference to green skills is there any shortage phenomenon ongoing in the sector where your Company operates? (If Yes, please provide at least one example of green skills/ occupations which is difficult to find within your sector and specify in which specific areas of the target sector / chain is there a mismatch between the skills of the workers involved and the skills required by the sector) [Guided discussion considering: to what extent is there a mismatch between required skills and skills possessed by those applying for a job (new entrants – focus on the demographic and professional experience factors)]

In your opinion, how can educational institutions prepare students for the needs of the sector? And, considering your country/region and sector, could you assess the role of (T)VET in promoting and developing the right pool of talent and skills, supporting knowledge and awareness on environmental issues? [Guided discussion covering both general observations and practical examples].

Are you aware of any limitation (i.e. national regulations concerning public owned companies/municipal enterprises) preventing the development of quality dual-learning VET paths within the target sectors?

As for your knowledge, in your country/region, are there any examples about collaboration between SGI and VET providers? [Guided discussion about forms and specific features of the above mentioned collaborations; limiting factors and evaluations about collaborations outcomes and effectiveness].

Moving to the training initiatives developed within your Company, which training and reskilling / upskilling courses have already been implemented / are being implemented with respect to the digital and ecological transformation backbones of the sector? [Guided discussion to explain the type of transformation identified, the change in the organization or production model and the related training program/s implemented or the reasons behind the possible absence of implementation of the abovementioned training paths. Focus on training models: i.e. internships/apprenticeships/on-the-job training and on any perceived need to modify / adapt the training methods offered].

Where do the resources allocated for financing the training come from? [Guided discussion aimed to tackle respondents' awareness about new financial instruments and resources delivered by the European Union and identify specific local/national resources devoted to support skills development with specific reference to the green ones].

In more detail, if funded and organized by public bodies and/or European level initiatives and plans, do you believe that the resources allocated for vocational training courses is adequate to the real needs of the sector? What would you change? If it is financed by the Company, do you think that the funds allocated to training courses are sufficient?

To what extent can social dialogue and industrial relations bridge the mismatching present in the sector? [Guided discussion: To what extent /level and in what manner have the social partners intervened / intervene to bridge the gap between the new professional needs of the sector and the gap with the present reality? How did the social partners intervene in the relative modification of organizational systems, qualifications, wages, occupational health and safety systems, working hours?]

Considering the training model dedicated to green skills developed and implemented by your Company, how has it been impacted by the COVID-19 pandemic? (Is the model still sustainable?)

VET Providers Questions

Brief general introduction aimed at asking the interviewees to describe their organisations, areas and level (regional/national) of operation.

What does the green transition mean for education and training systems? And where should we see adaptation and change? What are the mechanisms of adaptation and change? And who are the main stakeholders involved?

As for your knowledge, do staff in your Organisation need green skills? [Guided discussion about the type of skills needed i.e. transversal/technical; training provided directly to organizations' staff; in which green skills do respondents' organisations provide training for their staff]

As for your knowledge, are green skills encompassed in the educational offer delivered by the Organisation and specifically aimed at (current or future) operators in the target sector? [If, no, do you think that green skills could be taught by your institution? In the event of the second negative answer, obstacles and impediments will be investigated, guiding the conversation with examples. If the answer is affirmative, the set of green skills integrated into the training offer will be discussed in detail. In particular, attention will be paid to the specific contents of the training offer and the range of green skills, as well as to the possible need for the establishment of totally new study programs / CVs and the methods of their formalization and design.]

As for your knowledge, if compared to traditional educational contents, what are the distinctive features of the training methodologies dedicated to teaching green skills? [The interviewer will provide examples consistent with those already noted by the questionnaire].

In your opinion, besides traditional study programmes, does your Organisation have sufficient resources (financial/human/organisational) to teach green skills?



[If the respondent is himself / herself a trainer] Do you have opportunities to develop yourself as a green skills VET teacher or trainer?

As for your knowledge, in your country/region, are there any examples about collaboration between SGI and VET providers? [Guided discussion about forms and specific features of the abovementioned collaborations; limiting factors and evaluations about collaborations outcomes and effectiveness].

Could you assess the effectiveness of the above-mentioned collaborations between SGI and VET providers in fostering quality training opportunities to adapt to green skills and labour market needs?

Are you aware of any limitation (i.e. national regulations concerning public owned companies/municipal enterprises) preventing the development of quality dual-learning VET paths within the target sector?

In general terms, could you assess the level of effectiveness and describe which are the main features of skills governance system in your country? [Guided discussion on stakeholders (from the public, private and third sector involved in implementing and using the skills governance system); mechanisms for assuring the quality of training; what can be improved; knowledge of good and best practices etc. actors involved in planning and controlling – to different degrees - the national, regional, and local offer of (vocational) education and training. Notably, (1) who decides the content of training/the content of new curricula and study programmes and (2) through what procedure? mechanisms and fora for identifying (sectoral) skills needs at the entry point into the labour market.

3. OVERVIEW OF INTERVIEWEES

Green Skills in VET – Overview of interviewees and in-depth interviews carried out

RESPONDENT	SECTOR	COUNTRY	AFFILIATION	STATUS	STATUS
Respondent #1	WATER	NL	SGL provider (national level)	Completed - October 2021	Completed
Respondent #2	WATER	ES	SGL provider (local level)	Completed - October 2021	Completed
Respondent #3	WATER	ES	SGL provider (local level)	Completed - October 2021	Completed
Respondent #4 and Respondent #5	WATER	DE	SGL provider (local level)	Completed - October 2021	Completed
Respondent #6	WATER	DE	SGL provider (local level)	Completed	Written answers
Respondent #7	WATER	ES	SGL provider (national level)	Completed - October 2021	
Respondent #8 and Respondent #9	WATER	ES	VET provider	Completed - October 2021	Completed
Respondent #10	WATER	NL	VET provider	Completed - October 2021	Completed
Respondent #11	ENERGY	FR	SGL provider (national level)	Completed - January 2022	Completed
Respondent #12	ENERGY	DE	SGL provider (local level)	Completed - January 2022	Completed
Respondent #13	ENERGY	IRL	VET provider	Completed - January 2022	Completed
Respondent #14	ENERGY	PT	VET provider	Completed - January 2022	Completed
Respondent #15 and Respondent #16	ENERGY	NL	VET provider	Completed - January 2022	Completed
Respondent #17	TRANSPORT	NL	VET Provider	Completed - June 2022	Completed
Respondent #18	TRANSPORT	DE	VET provider	Completed - June 2022	Completed
Respondent #19, Respondent #20 and Respondent #21	TRANSPORT	PT	SGL provider		Written answers
Respondent #22	TRANSPORT	PT	VET provider	Completed - June 2022	Completed



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