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**Methodological Guidelines for Green Skills Integration
in VET Curricula**





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Methodological Guidelines for green skills integration in VET curricula

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Introduction

The “Greening VET curricula for electricians” project (**ENTIRE**) is an 18-month initiative implemented in the period February 2022 to July 2023. The project is financed under the Cooperation partnerships in vocational education and training Action of the Erasmus+ Programme. It combines the efforts of four VET partner organisations from Bulgaria, Austria and Lithuania.

VET is considered a fundamental pillar for the prevention of and adaptation to the consequences of climate change. VET is also regarded as an enabler of just transitions to green economies and a core component to achieving EU’s climate targets as outlined within the European Green Deal. In order to realise the green economy, VET systems are expected to develop a workforce that has the ability and skills needed to support the running of this economic system.

One way to achieve these is by integrating green skills into existing curriculum. The incorporation of green skills into VET programmes is needed in order to develop employees with sustainability habits off and on the job. For this purpose, the starting point of the ENTIRE project is the elaboration of the current **Methodological Guidelines for green skills integration in VET curricula**.

The Guidelines will offer a coherent green skills mapping and integration methodological procedure to enhance the collaboration between VET providers in anticipating and matching relevant green skills. The procedure will outline an expert-driven process of identifying, analysing, synthesising and presenting quantitative and/or qualitative skills and labour market information related to green skills development.

The present mapping procedure will serve as an instrument to facilitate the process of identifying and respectively updating VET curricula for any vocation not only when national regulations require curricula amendment but also when the necessity arises and is voiced by employers, respecting the dynamics with which the labour market is shaped.



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The **target groups** of the Guidelines are VET providers and the employment sector participating in training content amendment at grass root level. Local/regional cooperation has been identified as our intervention point as it allows for flexibility in terms of organising and delivering the process of green skills formulation and incorporation into training curricula without the necessity of engaging in complex national procedures led by the authorities.

By implementing the green skills anticipation and incorporation procedures defined in the Methodological Guidelines, VET providers are expected to:

- Increase their awareness about the importance of green skills;
- Enhance the capacity of VET schools/VET centres and their partner companies in anticipating and matching green skills;
- Improve the competencies of VET schools and their partner companies in updating VET programmes and adapting VET provision;
- Improve VET schools and partner companies' knowledge about sustainability trends.

Equipping VET learners with the right green skills and enabling them to contribute to energy efficiency in the long term is the ultimate goal of the ENTIRE project. For this purpose, the ENTIRE project will provide VET teachers with a tailor-made training programme **for electrical engineering field on topics linked to green economy.**

The Guidelines are structured in five main chapters, which can be outlined as follows:

Chapter 1 - Green Skills in Education and Training

The chapter highlights the growing importance of green skills implementation in education, training as well as employment to achieve more green industrial practices that benefit not only to the economy but also to support social and environmental sustainability. In this chapter the partnership will take an all-round view of horizontal skills trends for the green



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economy as well as international strategies and plans that reflect contemporary climate ambitions.

Chapter 2 Green Skills Development Trends in the Electrician Vocation

The chapter emphasises on green skills that are specific for the electrician technician profession, which is used by a pilot profession by the ENTIRE project. The choice of this particular vocation is based on the fact that it is a Green Increased Demand Occupation and according to the Skills for Green Jobs report (ILO), is one of the occupations mostly vulnerable to green skills changes.

Chapters 3-4 Green Skills Mapping Workshop (Fundamentals and Implementation)

The chapter provides practical descriptions and step-by-step instructions on organising a workshop for identifying green skills needed for the given occupation. The focus is on ensuring that comprehensive information is collected from the industry representatives on the current and emerging trends in skills demand.

Chapter 5 Roadmap

The chapter highlights steps for embedding results from green skills mapping into VET curriculum. It outlines different modalities for this integration for Austria, Bulgaria and Lithuania, which are representing diverse VET systems in Europe.



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Chapter 1 - Green Skills in Education and Training

In order to respond adequately to the issues emerging from the rapid climate change, the EU has adopted numerous strategies, policy initiatives and pieces of legislation. The most prominent one is the European Green Deal, calling for transformation of Europe's economy into a greener one. Education constitutes a key pillar in this strategy as the main vehicle for equipping future generations with the right set of competences to contribute for developing and sustaining the green economy.

In order to encourage education and training providers to contribute more actively to the green transition and to strengthen the sustainability competences of all learners, the EU has endorsed the Green Education initiative. Both European Green Deal and Green Education initiative are further outlined below.

European Green Deal

A package of policy initiatives, which aims to set the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050. It supports the transformation of the EU into a fair and prosperous society with a modern and competitive economy.

The European Green Deal aims to boost the efficient use of resources by moving to a clean, circular economy and stop climate change, revert biodiversity loss and cut pollution. It outlines investments needed and financing tools available and explains how to ensure a just and inclusive transition. It encompasses several strategic initiatives which translate the ambitions of the European Green Deal into concrete actions and obligations.

Green Education Initiative



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Not only from an economic, but also from a social perspective, greening education and training is expected to strengthen the employability potential of learners. The Green Education initiative aims to create opportunities for learners to acquire knowledge, skills and attitudes to live more sustainably and support the green transition. Two main initiatives support the delivery of Green Education:

Education for Climate Coalition

This initiative aims to support a fair, green and digital societal transition in Europe by mobilizing the education and training community. The priorities of Education for Climate Coalition are the following:

- green skills development
- teacher training
- promoting behaviour change
- linking education and science
- collective awareness raising.

Further information can be found [here](#)

Learning for Environmental Sustainability

Council Recommendation adopted on the 16th of June 2022 to “to stimulate and support policies and programmes about learning for the green transition and sustainable development”. Special attention is paid to the fact that educators need additional targeted support in developing their knowledge and skills to teach about the climate crisis and sustainability.

Further information can be found [here](#)

Green transitions do create opportunities for new jobs but *require an approach that allows education and training to anticipate and respond to changing skills needed for green jobs*. In this sense, VET needs to create preconditions to prepare learners who are capable of acting creatively, efficiently and are a driving force for sustainability in the workplace and society in general.



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Green skills vary largely between different economic sectors and occupations. By definition generic green skills are interdisciplinary and include general knowledge, skills, attitudes and values and they are necessary for contributing to sustainable social, economic and environmental development in any job. Examples include skills in pollution mitigation and waste prevention, environmental remediation, sustainable procurement, energy generation and management, etc.

According to the “Skills for green jobs country reports” (ILO, 2018), generic green skills required across any vocation are the following:

Environmental awareness and respect	<i>to demonstrate willingness to learn about sustainable development (Sustainable Development Goals)</i>
Adaptability and transferability skills	<i>to learn and apply the new technologies and processes required to green their jobs</i>
Teamwork skills	<i>to work collectively on tackling their environmental footprint</i>
Resilience	<i>to see through the changes required and be able to thrive in the face of green transition</i>
Communication and negotiation skills	<i>to promote required change to colleagues and customers</i>



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Entrepreneurial skills	<i>to seize the opportunities of low-carbon technologies and environmental mitigation and adaptation</i>
Analytical thinking	<i>to interpret and understand the need for change and the measures required</i>
Innovation skills	<i>to identify opportunities and create new strategies to respond to green challenges</i>
Marketing skills	<i>to promote new products and services</i>
Consulting skills	<i>to advise consumers about green solutions and to spread the use of green technologies</i>



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Chapter 2 - Green Skills Development Trends in the Electrician vocation

Green skills are essential to the transition towards a green economy, with the International Labour Organisation (ILO) estimating 24 million jobs worldwide created by the green economy by 2030. “Green skills are abilities or knowledge a worker can use to prevent, monitor, or clean up pollution, and optimise stewardship and conservation of the natural resources that companies use to produce goods and services” (World Economic Forum, 2021).

Within the context of the electrician vocation, the occupation-specific skills that are aimed directly at greening the economy, are those that lead to producing products and services with less energy and with reduced carbon emissions.

Emerging technologies and green economy are expected to significantly increase the demand for electricians equipped with relevant green skills. Electricians, equipped with the right green skills and with knowledge of future trends in the sector, will become true agents of change for energy efficiency.

According to ILO, the energy sector holds the key to the transition to a low carbon economy. At the same time, electricity and heat production, transport, and buildings, account for almost half of the global GHG emissions (IPCC, 2014).

The emergence of new forms of electrical power also leads to an increase in work for electricians. From wind power to solar, the installation of new systems and the linking of them to grids require employment of qualified electricians.

Trends in Electrician Vocation

Technology is constantly shaping the electrical industry, creating innovative solutions to help rethink how to build infrastructure, design cities, and consume energy. Below are presented some of the most recent trends in the electrician vocation.

1. Storing Energy

Storing energy is believed to help consumers not only reduce wasteful energy consumption, but it can also help the world cut on energy costs. Simply said, this is a method to allow



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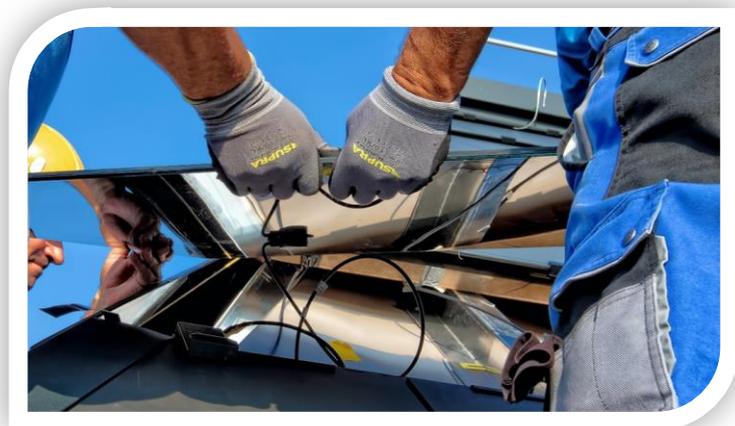
consumers to have more control over their energy. Recent policies drive the development of more and more energy storage technologies, which calls for new skills among electricians to install and maintain energy storage utilities.

2. Growing Energy Demand

By 2050, the energy demand is expected to increase by 57%. This leads to more and more consumers and businesses being concerned about energy efficiency, not just as a way to save money, but also to cut down on carbon emissions. Introducing innovative technologies seems to be the best way to address the concern of a thriving energy demand. From distributed energy resources (DERS) to more accessible renewable energy options, these technologies will be a huge player in how we maximise the efficiency of our energy consumption in the coming decades.

3. Renewable Energy

Renewable energy will be the only energy in the future. Power generation from renewables will replace power generation from fossil fuels, but this will not change the electricity supply across the world. Some renewables will



change as trends change, like biomass in favour of solar, wind and sea generated electricity, which seem to be a cleaner way to advance. Becoming an electrician working with renewable energy will always be electricity centric, but the job will become more involved and skilled.

4. Energy Reduction

Just as consumers want to have more control over their energy with access to sustainable, renewable energy options, they are also consciously buying energy-efficient solutions to cut back on energy consumption. And today, there are more solutions than ever, from smart



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thermostats to Energy Star-certified appliances. This green mindset will require electricians to be always knowledgeable of how the latest technology works and possess skills that are necessary to effortlessly maintain this way of living.

5. Disturbed Energy Resources

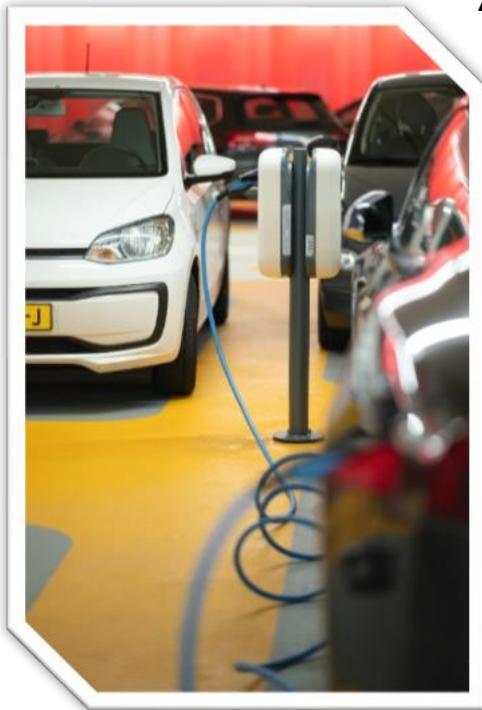
Distributed energy resources are essentially small-scale power generation or storage technologies ranging from 1 kW to 10,000 kW. This covers residential, small commercial, community solar, and even some battery storage technologies. It is a way to decentralise energy production, and it is expected that more utilities will shift toward greener products and services such as solar, home energy management systems, and more.

6. Smart Cities

It is more often that cities apply the “smart” approach where many utilities are connected to perform integrated services, such as smart streetlight systems, backup electricity source, battery storage options, etc. To develop and maintain such systems, it will be of paramount importance to have skilled electricians to actively participate and support the functioning of the whole ecosystem of utilities.



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7. Smart Devices

As devices that can connect to the Internet become more common, electrical connectors will certainly begin encountering them on the job. Electricians who learn how to work with smart devices could open themselves up to new job opportunities.

8. Electric Cars

Regulations in many countries now require all new parking lots to be equipped with electrical outlets to charge electric cars. Only electricians can install these docking stations which asks for new skills that have not been taught in VET schools five years ago.

Another segment of the electrical car will be the need for electricians to be trained in basic auto mechanics – or the auto mechanics to be trained in electrical contracting.

Occupation Specific Green Skills

In line with the above-mentioned trends, a set of knowledge, skills and attitudes that are becoming of key importance and should be integrated in the VET curriculum can be outlined as follows (Osman et al, 2017):

<p>Knowledge and understanding</p>	<ul style="list-style-type: none"> • Different types of energy with focus on renewable energy. • Renewable energy infrastructure, technologies and energy efficiencies. • Highlight the link between energy and climate change, mitigation and adaptive strategies.
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Skills and applications	<ul style="list-style-type: none"> • Energy and environmental management, auditing, design and implementation of sustainable energy transitions. • Promotion of improved energy conservation and uptake of renewables. • Green and renewable energy skills, application of renewable energy technologies.
Values and attitudes	<ul style="list-style-type: none"> • Increased awareness of the need for sustainable energy production. • Ethical awareness pertaining to energy production and consumption. • Environmental consciousness and advocacy for mainstream change.

Future of Electricians

Below are a few examples of the **possible roles an electrician will undertake** in line with the growth of the green economy.

- **Energy-Saving Infrastructure**



The current electricity infrastructure is relying on devices that do not save significant amounts of electricity. Aside from a few energy-saving devices, we use power ad-hoc without thought to conservation. There would be a substantial shift towards both creating

and maintaining devices to save energy in a green economy instead. A slight shift in this



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direction is using energy-saving bulbs and the miniaturization of computing. In the near future, any planned construction will need electricians to design and put in place an energy-saving infrastructure.

- **Solar Panels**

Photovoltaic cells are becoming cheaper and affordable to the mass consumer. Therefore, solar panels are being adopted by more people at all levels of society. These devices will need to be installed in millions of homes. Eventually, a green economy will likely need to build these panels atop any new construction. In a green economy, using the sun's power as an ongoing energy source means these cells will need to be widely installed. This will not only need the installation of the panels themselves. It will also need the installation of battery banks to hold the collected energy for use at other times. Finally, this energy is often passed back to the rest of the community. If this is the case, a licensed electrician will need to handle the maintenance and supervision of this.

- **Wind Turbines**

Wind turbines are largely popular in many parts of the world. Large fields of power-producing wind turbines need ongoing maintenance. The mechanisms in these devices also need regular maintenance. This means that electricians are likely to be on demand for many years ahead.

- **Building Automation**

Several new builds are moving forward with the idea of having an integrated automation system for their air conditioning. A system such as this will save energy by not overheating the building or losing heat when it gets too cold. This system will need wiring, programming, and maintenance. It will also be an ongoing role for a long period of time. It is not only the process of installing this system that will fall to electricians, though. These systems will need designing from the ground up alongside the architects of those buildings. Thus, there are roles at every stage in the building process.

- **Energy Network Management**



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Energy production in the world is slowly becoming more reliant on renewable resources. Because of this, such systems must receive maintenance as electricity use increases. We must create new designs for systems that can optimize the distribution of electricity to households. Another option is that we improve the methods of electricity production instead of the method of transfer. With this done, our society will demand fewer fossil fuels.

- **Electric Cars**

Electric vehicles themselves are often built and maintained by mechanics. However, they provide other opportunities for an electrician interested in a green economy. As the adoption of electric vehicles continues, the infrastructure to maintain them continues to grow. As it does so, it will need to be in place to allow these vehicles to recharge. We will need electricians to install charging points and maintain them later.

- **LED Illumination**

LED lights are being used where normal bulbs existed before. While this is not the most involved process, replacing the whole lighting infrastructure would require many electricians in the near future.



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Chapter 3 - Green Skills Mapping Workshop Fundamentals

Green skills mapping is following the main principle of dual VET, i.e., that **education and training curriculum need to be aligned to the context and business practices within a given industry**. Simply said, this means that it is the world of work that should lead on the design of the education and training programmes, based on industry trends, labour market context and real needs for skills.

Skill mapping allows the creation of a visual representation of all the skills that are needed within a given vocation. Through skill mapping, one has a clear view of the labour force skills, as well as the skill gaps.

Green skills mapping refers to the process of identifying what green skills are on demand by the business within a certain vocation.

Green skills mapping is also a key stage of updating and aligning the education and training curriculum to the industry trends, context and needs. Defining what specific skills are needed within the electrician vocation is a process that will ensure that what students/trainees learn while in VET, corresponds to what their future employers expect and need.

Green skills mapping can be performed in a rather practical, yet effective, manner by bringing together all stakeholders (the business, the education and training providers and VET experts) in a dialogue meeting format (later, referred to as a workshop). All these key stakeholders meet to define the knowledge, skills, attitudes that VET learners have to acquire, in order for them to become more employable and perform in line with the needs of the economy at large.

Workshop Stages

The utilization of VET stakeholders' meetings to map skills for VET curriculum is an approach strongly informed by the situation-based didactics, employed in the development of VET system in Switzerland. Situation-based didactics seeks the answer to two key questions:



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- How can we ensure that the knowledge and skills we acquire respond to the needs of daily life, especially the requirements of daily professional life?
- How can we ensure that our daily experience contributes to the learning process?

The main focus of situation-based didactics is on the concept of situation (Ghisla et al, 2014). Situations are what our lives are made of. Our behaviour, both personally and professionally, materialises in space and time in a series of different situations. Therefore, if we manage to describe in an appropriate way a set of related situations, we will have a starting point on which to build the educational and training processes.

Situations are a means of filling up the learning material with meaning. Effective education and training systems achieve this by using examples from everyday life to illustrate specific content and to link theory with reality.

The process of skills mapping through situations utilises the format of “workshops”. Various techniques are used to collect, analyse and summarise information on the specifics of a given vocation, which allows for identifying the necessary skills to be acquired by VET learners.

To effectively define the necessary green skills within the electrician vocation, the **business** (practitioners from the vocation) and the **training & education sector** (VET teachers), supported by the responsible national authorities, work together in a workshop format.

The workshop is divided into sessions, which are **structured in a specific manner**, ensuring that the process leads to reliable results. The original workshop format might take up to a series of 3–5-day meetings. In the current Methodological guidelines we present an adapted version for the context of the concrete objective related to mapping green skills.

The original workshop process comprises 3 key stages: Development of a SITUATION PROFILE; Development of a QUALIFICATION PROFILE; Update/Revision of the CURRICULUM.



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1. SITUATION PROFILE

During the first stage the workshop is focused on **extracting information about the typical work activities** of a practitioner from the vocation. This should take place as a rather natural process where the practitioner is encouraged to share with their own words what they do on a daily basis.



By sharing their everyday tasks in relation to the specific job they undertake, practitioners provide invaluable information about the very specific actions they perform, which then gives details about what you need to know and be able to do in order to perform such tasks.

During this stage, a detailed list of work activities is drawn, which then leads to clustering these into key situations. Finally, a situation profile of the vocation is elaborated with relevant actions for each situation.

To establish the green skills on demand, it is of key importance that the moderator of the

workshop plans enough time before the workshop begins to explain what green practices and trends are and guide the practitioners to focus mainly on those activities, they perform on a daily basis that are in line with the principles of the green economy.

If an electrician invited to contribute to the workshop works in a fully green-oriented strand of the vocation, e.g., electric cars, they would be invited to share everything they do in their daily practice. However, it might be that an electrician only partially applies green practices,



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in which case the moderator is the one to guide the process of extracting information by either selecting the “valuable” information to feed into the situation profile, or by asking specific guiding questions to help the practitioner to choose what information to share. In both cases, practitioners should not be expected to understand in detail the concept of green economy and know exactly which skills are considered green and which not. The most important feature of this process is to allow the education and training sector to extract as much information as possible from the “world of work”, which would assist the process of formulating the right skills on demand by the labour market and the industry.

During the last phase of this stage, it is important to seek involvement from high-level specialists in the sector, who will **confirm or enrich the situation profile**, based on their more strategic overview on the latest industry trends and technologies. This process entails higher level managers or specialists than those involved in the previous phases to review the situation profile and suggest amendments, if needs be, to fully align the profile to the business needs for skills.

2. QUALIFICATION PROFILE

Once a few sessions of the workshop have been dedicated to extracting information and outlining the profile of the vocation, the process enters a stage where **each situation is broken down into specific activities and actions**.

During this stage, each situation from the previously defined profile can be illustrated by creating a **short story** that describes a real professional situation in the life of the electrician, which requires them to apply green skills. These stories help learners, as well as key stakeholders to better imagine what it takes to apply green skills and in what practical situations this might become necessary.

The next phase of this stage is to identify the relevant **knowledge, skills and attitudes** that are necessary to perform each and every task (activity or action) within the previously defined situation profile. This is the moment when VET teachers and trainers proactively participate



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in the workshop, as being experts on how to define what a learner should know and be able to do (learning outcomes).

For example, it might be that during the development of a situation profile for the green electrician vocation it turns out that one key aspect from the daily job of an electrician, working for a company producing charging stations for electric cars, is to adapt and maintain charging stations to work effectively no matter the make and the specifics of an electric car. As a result, it becomes obvious that in order to do this, an electrician must have general knowledge and skills in the field of automobile mechanics. These specific knowledge and skills that might not have been typical for and expected from an electrician in the past, are exactly these knowledge and skills that would be defined as **green**, in the context of the greening economy and the transformation of certain vocations and industries.

After defining the green knowledge, skills and attitudes, the workshop participants **analyse** the **importance and necessary time for acquiring each knowledge unit, skill and attitude**. This activity would allow the effective update/revision of the existing curriculum/training programme, as those involved in the development of the education and training framework for the vocation would have justified basis for redistributing the time allocated to vocational topics, introduce new themes, and/or reorganise obsolete subjects in VET schools.

3. CURRICULUM

In a dual VET system, the curriculum refers to the **theoretical basis** of the vocation, usually delivered in educational institutions (VET schools), as well as to the **practical training program** followed during in-company service training (apprenticeship) delivered by the business in cooperation with the education provider.

Nevertheless, no matter whether a dual VET system has been introduced or not, the acquisition of a given vocation always entails some practical aspect, which allows learners to obtain and master practical skills. This could happen within the education institution itself (in training centres or through simulation of real work scenarios), delivered by independent training centres, through internships in companies, etc.



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In all cases, the theoretical and practical aspects should be synchronised to ensure that in the end **what the learner knows and can do is in line with what the industry, the economy and the society** at large need. Therefore, when it comes to green skills, the curriculum (theoretical and practical) has to be aligned to the principles of the green economy.

This is what the last stage of the green skills mapping workshop is addressing. It involves systemising the information gathered during the previous stages and allows for updating the list of subjects and training themes.

The process entails VET teachers allocating the defined knowledge and skills to general, subject-specific and expanded vocational preparation subjects, followed by a revision of the existing school curriculum.

Workshop Leader



The workshop leader is the professional who guides and supports methodologically the whole process of green skill mapping through workshop approach. This role is crucial for the effectiveness and success of the whole process. The main objectives of the workshop leader are:

- to facilitate the overall communication between workshop participants and build relationships of trust;
- to prepare and monitor the implementation of the scenario for each stage;
- to assist with methodological instructions the work during the workshops;
- to document implementation;



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- to monitor the successful attainment of expected results and to summarise what has been achieved.

It is vital for the workshop leader to be an expert who:

- is familiar with the vocational education and training at large;
- knows the legal framework regulating vocational education and training;
- is familiar with the situation-based didactics approach;
- is not a specialist in the electrician vocation (as this might lead to an unintended influence on the actual content of the produced results);
- has information about the latest trends and context in relation to green skills and the green transition;
- has excellent communication skills;
- is capable of providing clear and accurate explanation of processes and rules of operation;
- possesses good analytical skills.

Workshop Participants

In order to have a successful workshop the right participants should be identified and invited to participate. Representatives of the industries, employing electrical technicians are the main participants in the workshops. Teachers in professional theory and practice teaching electrical engineering should also be invited to take part.

Representatives of the industry in the first stage of the workshop should be professionals (electrical technicians) with a work experience of 3 to 5 years in the specific profession. Their occupation and daily responsibilities should be identical or close to the specific curriculum and syllabus for which the workshop is organised. This will guarantee that the process of mapping will cover real work situations from the professional field of the particular speciality and will ensure at a later stage the identification of the necessary knowledge, skills and competences for students studying that particular profession.



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Another important criterion for the representatives of the industry in the first stage of the workshop is that they should represent a diverse set of companies in terms of type, scale and specifics. This approach provides a comprehensive description of all possible work situations that may occur when practising a specific profession. In Chapter 2 different trends and roles of the electrician are highlighted, which might be used as a starting point when selecting which type of companies/professionals to be invited.

In the case of the electrician vocation and having in mind that the key objective of the whole mapping is to define the necessary green skills for this profession, it is recommended that the practitioners invited to share their practical insight into the vocation are employed by advanced companies applying green practices and delivering services that are in line with the latest industry trends. For example, these could be professionals from a company involved in the production of electrical supply stations for electric cars, or such installing solar panels, etc.

The number of practitioners who should be involved in the first stage of the curriculum development may vary but, in any case, should not be less than 6. This indicative number of participants allows for different professional contexts to be represented and at the same time ensures that every participant will have time to provide individual input.

It is recommended that at some point of the workshop, when final results are discussed to invite professionals from the industry who hold managerial positions and possess strategic views for the development of the profession and the future trends. They should be able to analyse external factors and potential needs of the profession in terms of needed skills and knowledge. These professionals can be the managers of the professionals who took part in the first stage of the workshop. Their perspective is an additional guarantee that the outcomes of the skills mapping will be relevant for the industry in the following 5 years.



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Chapter 4 - Green Skills Mapping Workshop Implementation

Workshop Preparation

The success of the green skills mapping workshop depends greatly on the sufficient time for preparation, i.e., minimum 2 months. This includes selecting a workshop leader, elaboration of workshop scenario and templates (if needed), communication with potential participants (VET teachers and companies) and practical arrangements related to the workshop venue and resources provision for the various activities during the workshop.

Selecting Workshop Leader

The leadership team of the VET provider, intending to conduct a green skills mapping exercise, starts with selecting a workshop leader to organise, implement and report all stages of a mapping workshop. As mentioned above, it would be recommended to select a workshop leader, who is not coming from the concrete vocation (electrical engineering) to ensure unbiased facilitation and strict following of scenario stages.

Elaborating Scenario

During a series of internal meetings between the VET provider and the selected workshop leader the main parameters of the workshop are agreed upon, which would allow moving forward to developing a step-by-step scenario for implementation and also will serve as a basis of the communication with potential participants.

As mentioned above, the original workshops in the situation didactics model, applied in Switzerland can take quite an extensive period of time, which might not be feasible for every context. Employers are sceptical to send their professionals during working time to long events. Similarly, VET schools cannot easily allocate time for their VET teachers to attend 3-5 days workshops.

Taking into consideration that in each country and organisational context there might be different preferences as to the concrete duration of the workshop, it would be recommended to start the elaboration process, having a 1-day working process in mind. This seems an



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acceptable option for all stakeholders. Furthermore, it should be considered as a first meeting occasion on the chosen topic (in current case, green skills for the electrician vocation). Depending on the outcomes of this first workshop, it might be the case that participants agree to have follow-up meetings to conclude their task.

The choice of duration enables the workshop leader to allocate specific time for each of the main stages of the mapping process highlighted above (Situation Profile; Qualification Profile; Curriculum). It should be noted that here there is also space of flexibility in terms of where more time is allocated. For some VET systems it might make sense for participants in this workshop to finish by developing the list of knowledge, skills and attitudes they see as vital. For some, it might be the list of professional stories that describe each professional situation identified. It is the workshop leader task to decide what makes sense for the concrete context.

Communicating with Potential Participants

On the basis of key parameters of the workshop defined with the leadership team of the VET provider, also including date, time and venue for the event, the workshop leader can propose a draft invitation letter to be sent to potential participants in the workshop (teachers and professionals).

The VET provider leadership team distributes the invitation across potential participants. With regard to VET teachers these can be either staff of the VET provider and/or also staff from other VET schools in the region. The participants from the industry can be from companies that already collaborate with the VET provider as part of the dual education system and/or can be new companies, representing new trends and roles for the profession in focus of the mapping. For example, in the case of electricians, these can be companies from the sector of electric cars productions.

It is recommended along with the official invitation letter to industry representatives to carry out preliminary talks in order to explain the importance of the workshop and the concrete benefits for them in participating. In this communication, it should be completely clear what type of professional should they send to the workshop. Practice shows that the more



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information is provided to companies prior to the workshop, the greater the chance of successful interaction and contribution throughout the process of workshop implementation.

Ideally, the employers can be engaged in all aspects of the workshop, including preparation. It might be a good idea to ask them for their preferred timing and duration of the workshop and in such a way to emphasize the collaborative nature of the whole experience.

Venue Choice, Setting and Resources Provision

The choice of venue for the workshop is key for the overall success. It is recommended to organise the workshop at a neutral place. This will allow participants to detach from their daily working context and enter into a more relaxed and creative mode of action, which is a needed ingredient for effective workshop stages.

Preferably, the venue should be a spacious room for 12-15 participants with natural light and nice air conditioning. Since the minimum duration of the workshop is 1-day, which would presuppose long sitting time, it would be recommended to provide for comfortable chairs.

The opening arrangement of chairs should be a circle. In the background of the circle, it is key to have movable tables, which will be used along the process.

In terms of content and activities specific resources needed, it is advised for the organiser of the workshop to provide for:

- ✓ multimedia projector;
- ✓ flipchart with extra flipchart paper;
- ✓ multicoloured paper cards to write names of activities and situations on them;
- ✓ printed templates (if any), developed with the workshop scenario;
- ✓ paper tape;
- ✓ colour markers;
- ✓ paper.

Participants should be encouraged to bring their own laptop. Otherwise, min. 3 laptops should be provided by the organiser.



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Workshop Scenario

In the current section a sample structure for a workshop scenario is presented to facilitate workshop leaders in their work. The scenario is built for a 1-day event. This scenario serves as an indicative example for workshop leaders and can be adapted accordingly to the concrete context and circumstances. The scenario covers four main sessions: Introduction; Green Actions in the Daily Work Life; Green Situations and Skills; Green Curriculum¹.

Sample Scenario for a 1-day (8 h) Workshop on Green Skills Mapping for the Electrician vocation		
Timing	Session	Topics and activities
09:00-10:30	Introduction	<ul style="list-style-type: none"> - Check-in. Objective: to make participants feel comfortable and get to know each other. This entry point is crucial to set a tone of collaboration between VET teachers and professionals, who often might be sceptical to each other. It is of key importance to allocate enough time and opportunity for all participants to introduce themselves – name, place of work, professional experience, motivation to participate, etc. This can be done through a classic-type presentation or through role plays. - Presenting the topic of green skills. Objective: to introduce participants to the concept of green skills in horizontal and vocation specific context. It can build on the content presented in Chapters 1-2 in current document. - Presenting the methodology of work. Objective: to briefly explain the main phases of the workshop and the expected results. It would be recommended to

¹ This topic usually requires additional work and dialogue between VET teacher and employer to define the most appropriate programme of training for students. In that sense, it would only be touched upon during the workshop as a key follow-up activity.



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		emphasise that the workshop is a starting point and it will be followed by e-mail communication or additional meetings to reach all tasks set.
10:30 - 10:45	Break	-
10:45 - 12:30	Green Actions in the Daily Work Life	<ul style="list-style-type: none">- Listing green actions. Objective: to open space for each professional (in the current case, electrician) talk freely about their daily work life and in the process identify those actions that can be named green (in other words contributing to effects pursued by the green economy, e.g. energy efficiency, zero waste). Initially, each participant works autonomously, receiving a blank sheet of paper on which he/she has to list green related actions from the working context of the electrician profession. Since the group is made up of teachers and practitioners, the workshop leader would invite the sharing to be from their direct (professionals) or observing (teachers) position.- Clustering actions into green situations. Objective: to structure all green actions identified and groups them in bigger activities / situations. In the process participants check for repeating actions and try to find connections between the actions (clustering). Here, VET teachers might be encouraged to enter into a more active role and support the ordering of paper cards into meaningful categories, which at end be marked as situations.- Building green profile. Objective: to visualise the list of green situations with their corresponding green actions. For this process, the workshop leader can use a table to position the results from previous activity. As



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		<p>an alternative, electronic table can be used with 1st column representing the titles of the situations and the cells next to each situations, representing actions. The gree profile will serve as a map for the next phase, where participants will formulate a story for each situation.</p>
12:30 - 13:30	Break	-
13:30 - 15:00	Green Situations and Skills (1)	<ul style="list-style-type: none"> - Creating stories about green situations. Objective: to acquaint participants as to the level of details and type of narration expected in one situation story and to organise participants in groups to build stories about situations in the green profile. The workshop leader presents a quick example of a story depicting a work situation. Participants are split in groups in order to cover all situations from the green profile. - Presenting stories. Objective: to reflect on all stories created and move to discussing possible green skills needed.
15:00 - 15:15	Break	-
15:15-16:00	Green Situations and Skills (2)	<ul style="list-style-type: none"> - Mapping skills with stories. Objective: to define what green skills are needed in order to be able to effectively address the situations identified above. The stories created will help participants to make concrete list of skills needed. They can also come back to the actions composing each situation from the green profile. If new actions appear in the process of story buidling these can be added. The guiding question from the workshop leader would be: <i>What skills are needed to effectively</i>



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		<p><i>implement this action and the whole situation?</i></p> <p>Participants can start working in groups and extracting skills for their situations. At the end all skills are listed in an excel file.</p> <ul style="list-style-type: none">- Ranking skills. Objective: to determine the degree of significance of skills identified. Using the excel file workshop leader checks how many times a give skill emerged in the previous process and highlights that this repetitions is an indicator of the importance of this skills. Eventually repetitions are omitted, but the skills are ranked according to this repetition, which will help later on with curriculum design.
16:00 - 17:15	Green Curriculum	<ul style="list-style-type: none">- Open discussion on how identified green skills can be embedded in curriculum. Objective: to mark next steps of integrating green skills into the curriculum of both school education process and work-based learning at a given company. The workshop leader highlights that development of curriculum would require more time and is dependent on normative provision, but still it would add value to outline how results from the workshop can be further used. At this point, it seems logical to provide more space for VET teachers to express their views on curriculum integration.
17:15 - 17:30	Closing	<ul style="list-style-type: none">- Check-out. Objective: to ensure that every participant is safely leaving the workshop in a positive and elevated state of mind. The workshop leader can use short activity to close the workshop and lay the foundations of effective follow-up collaboration between participants. One example of such activity is „Expression of gratitude“, during which each



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		<p>participant is asked to reflect on the whole workshop day and highlight one thing that he/she feels grateful for. It can be about the behaviour of the workshop leader or some other participants. It can be about the outcomes of the workshop.</p>
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It is key for the success of above presented scenario to stick to the principle that the representatives of the electrician profession should lead the process of drawing up green situations and at no time should VET teachers take on the role of practitioners, as this may "distort" the whole approach. Therefore, the workshop leader should apply various communication and presentation techniques to steer the process in the right direction and assist in the successful achievement of the expected outcomes.

When initially "confronted" with terms related to situations, participants often do not understand what is expected from them and how to achieve it. That is why it is necessary for the workshop leader to constantly ensure that the whole group has a common understanding of the basic terms and tasks to be accomplished. All concepts and methods of work should be clearly and accurately explained, as misunderstanding of basic terms or implementation steps may result in compromising the quality of the updated curriculum.

Workshop Follow-up

The follow-up activities, following the workshop are a key conclusive phase to ensure quality of results achieved and their embedding in the VET provision. Several key stages can be outlined.

Follow-up communication among participants

Depending on the outcomes of the workshop the workshop leader can engage participants in follow-up communication through e-mail or small working meeting to finalise results. Furthermore, at this stage the leader is encouraged to consult results with experienced professionals, if they were not able to attend the workshop and collect their feedback on the level of relevance of green skills mapped in relation to current trends and future expectations



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for the development of the profession. In this follow-up communication, the workshop leader requests participants also to provide their feedback on the overall experience.

Desk work

The workshop leader reviews all outputs from the workshop and follow-up communications and conducts clarity check and proof-reading of the key written products. In addition, a review with regard VET terms relevance is also recommended, which will facilitate follow-up integration into the curriculum.

Presentation of results

The workshop leader presents results in front of the VET provider that had assigned conducting of the green skills mapping. During this meeting both parties discuss the plan for embedding outputs into the current curriculum. Furthermore, feedback from participants in the workshop is discussed and recommendations (if needed) for next workshops identified.

Integration into VET curriculum

The end goal of the whole endeavour is to introduce acquisition of green skills map into the training process, taking place both at VET school and the hosting industry.



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Chapter 5 - Roadmap for Embedding Green Skills in VET

The current roadmap is based on national reports on the current state-of-the-art of VET systems, represented in the ENTIRE project partnership. These are Bulgaria, Austria and Lithuania. A synthesis of findings with regard to the possibilities to integrated green skills identified using current guidelines is provided below for each country. At the end of the chapters, there is a list of conclusions on the concrete steps for future integration into the VET curriculum.

All reports contain information on some specifics and basic principles with regards to the national VET systems. While the Bulgarian and Lithuanian reports focus predominantly on iVET, the Austrian report also elaborates on cVET and other forms of vocational training.

Integration Potential in Bulgaria

In Bulgaria, there is the so called “additional vocational training”, which allows for reducing the number of hours spent on theory and provides VET schools with more flexibility on how to organize the education process. Hence, VET schools, irrespective of whether they follow the dual VET system, are allowed to focus on subjects and activities that have been identified as useful by the business. This happens through intensive collaboration between the schools and the local companies. Each company hosting students on practical training sends information to the school in relation to students’ performance. Based on this, the school performs an analysis and the staff members responsible for developing the school curriculum and syllabus for the additional vocational training can make a decision for updating the curriculum.

Integration Potential in Austria

In Austria, there are various formats of vocational training, the focus being on allowing everyone willing to obtain a qualification to be able to do so in the most convenient for oneself manner. This specific leads to the curriculum being available in different forms and sizes, and the content is subject to rather rigid regulations. There is a formal procedure to



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update the learning content and the learning outcomes, involving the Chambers of Commerce, employers, VET providers and umbrella organisations. A quality committee is established at the Federal Advisory Board on Apprenticeship with the main tasks in relation to VET curricula updates. The Provincial Vocational Training Advisory Board is also an important body when it comes to VET curricula, for example, it can decide on the implementation of training trials in the federal province.

VET providers operating within the less formal system have relatively more freedom and flexibility to introduce changes. These VET providers have a number of staff dealing particularly with contacts into the industries and new VET curricula in non-formal education are based on labour market needs and policy recommendations.

Integration Potential in Lithuania

In Lithuania there are the so called “optional modules” within the formal iVET system. Each VET provider can adapt the curriculum to the needs of the labour market and the needs of the students in the recommended topics and subtopics of the planned vocational training curricula, as well as determines which optional modules to offer to their students. It is recommended that the VET provider prepare an offer of at least two optional modules for students. It is important to highlight that the development of a vocational training curricula or its module can be initiated and prepared by a vocational training provider, a citizen of the Republic of Lithuania or another Member State, another natural person exercising the rights of movement in the Member States other organisations without legal personality and their subdivisions. This happens through submitting an application to the Center for the Development of Qualifications and Vocational Training (KPMPC). In addition, the teacher who teaches the module is allowed to make corrections in the curriculum/syllabus affecting no more than 15% of the content.

Conclusions

To introduce green skills within the curricula for the “electrician” vocation, the following options are available in the three countries reviewed.



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Country	Options for embedding in the curricula
Bulgaria	To update/develop together with the local employers new content for the additional vocational training part of the curriculum based on evidenced needs of the business
Austria	To update the training content delivered in the less formal VET system where providers have more flexibility on the curriculum
Lithuania	<p>To include in educational plans the green topics at 15% of a given module without making any formal changes to the electrician's curriculum.</p> <p>To offer and register green module as optional module for the electrician's vocational training curricula (performed by VET providers).</p> <p>To update the electrician's vocational training curricula by submitting a proposal to KPMPC.</p>



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Bibliography

Afrikanov, L., B. Georgieva, Methodology for Applying the Swiss Model of Dual Education in Bulgaria, 2019, <https://dominoproject.bg/>;

European Commission. Education for Climate Coalition, 2022, <https://education-for-climate.ec.europa.eu/en>

European Commission. Learning for the green transition and sustainable development, 2022, <https://education.ec.europa.eu/focus-topics/green-education/learning-for-environmental-sustainability>

Ghisla, G., Boldrini, E., Bausch, L. SiD – Situation - based Didactics, A guide for teachers in vocational training, SFIVET, Lugano, September 2014, https://www.sfuvet.swiss/sites/default/files/situationsdidaktik_en.pdf

Intergovernmental Panel on Climate Change (IPCC). AR5 Synthesis Report: Climate Change 2014, <https://www.ipcc.ch/report/ar5/syr/>

International Labour Organization. Skills for green jobs: 2018 update - European synthesis report, 2018, https://www.ilo.org/skills/projects/WCMS_707582/lang-en/index.htm

Osman A, Ladhani S, Findler E and McKay V, 2017, Curriculum Framework for the Sustainable Development Goals (Commonwealth Secretariat)

World Economic Forum. These are the sectors where green jobs are growing in demand, September 2021, <https://www.weforum.org/agenda/2021/09/sectors-where-green-jobs-are-growing-in-demand/>