

REPORT ON ELECTRIC MOBILITY AND VET EDUCATION IN EUROPE

ERASMUS + KA220-VET - COOPERATION
PARTNERSHIPS IN VOCATIONAL EDUCATION
AND TRAINING



ElectriCars
VET Hub



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“Europe's Electric mobility Market: A Broad Perspective”

1. Introduction

Electric mobility has experienced a significant transformation over the past decade, mainly caused by the urgent need to combat climate change and reduce the environmental footprint of transport systems. As the European Commission highlighted, in 2016, transport accounted for almost a quarter of Europe's greenhouse gas emissions and remains the main source of air pollution in urban areas (European Commission, 2021). To address this, the European Union has established ambitious goals: reducing greenhouse gas emissions by 80–95% by 2050, halving the use of conventionally-fueled cars in urban areas by 2030, and phasing them out entirely by 2050. These targets also include removing barriers to the electrification of transport, increasing the use of renewable energies, and promoting sustainable urban mobility.

To meet these objectives, the transition to electric mobility requires not only technological innovation but also a workforce equipped with the appropriate skills. In this context, Vocational Education and Training (VET) plays a crucial role in preparing professionals for the new jobs emerging in the electric vehicle (EV) sector. This includes developing both technical knowledge and transversal competences such as safety, sustainability awareness, and problem-solving skills.

The ***ELECTRICARS VET HUB***, promoted by Xarxa FP and co-funded by the European Union, addresses this need by fostering innovation in VET centres across Europe. The project strengthens cooperation between training centres, public institutions, and companies through initiatives such as a European specialization course for teachers, focused on safety in electric mobility, new learning materials, and work-based learning opportunities with companies in the EV sector. Building on the foundations of this project, the aim of this report is to present an overview of the current VET context in the participating countries, and showcase best practices that can guide the future of vocational training in the electric mobility ecosystem.

2. Electric Vehicles: Understanding an Emerging Industry

Transport, in general, accounts for 40% of total energy consumption and generates 27% of all greenhouse gas (GHG) emissions, positioning electric mobility as a key vector for reducing both energy use and GHG emissions in cities. Moreover, electric mobility produces lower noise pollution and fewer airborne particles in urban areas (Peters & García, 2018).



However, the transition from fossil fuel-based mobility to electricity-based systems represents a major challenge due to the scale of the transformations involved: industrial reconversion, diversification of materials to be used, the creation of the necessary infrastructure to make this new model viable, and, as the most important point to consider, the development of the talent required to drive, manage, and innovate

within this new framework of sustainable electric mobility.

These various challenges are being addressed from multiple levels and sectors. Consequently, a number of national and international strategic frameworks have been put in place to guide the shift towards electric mobility, recognizing its broad implications for sustainability and competitiveness. Key examples include the United Nations Sustainable Development Goals (SDGs), the European Union's Sustainable and Smart Mobility Strategy, Spain's 2050 Plan outlining the long-term vision for national transport, the Catalan National Pact for the Energy Transition, and the 2021 MOVES Plans by the Government of Catalonia supporting efficient and low-emission transport models among others.

In this context, the European Union is taking the lead by creating a clear and future-oriented plan. A key part of this plan is the European Green Deal, which aims to make Europe the first continent with no climate impact by the year 2050. This includes the goal of reducing transport-related GHG emissions by 90% by mid-century and progressively eliminating internal combustion engine vehicles from urban mobility systems (European Commission, 2019).

Complementing the Green Deal, the Fit for 55 legislative package reinforces this ambition with concrete targets and instruments. It mandates a 55% reduction in

overall GHG emissions by 2030 (compared to 1990 levels) and introduces specific regulatory measures for the transport sector. These include expanding electric vehicle charging infrastructure, tightening CO₂ emission limits for cars and vans, and incorporating road transport into the EU Emissions Trading System (European Commission, 2021).

On the industrial front, the EU has also launched initiatives such as the European Battery Alliance, which aim to secure a sustainable and competitive battery value chain within Europe. These efforts are crucial for reducing external dependency and consolidating Europe's leadership in strategic sectors of the green transition, including electric mobility (EIT InnoEnergy, 2023).

However, turning these policy visions into reality requires more than technological development and infrastructure investment. A qualified and future-ready workforce is essential to operationalize this transformation.

For this reason, understanding how Vocational Education and Training systems are adapting to the needs of the electric vehicle ecosystem across different European countries becomes a critical step in the transition. To support this effectively, it is essential to examine how VET's systems are evolving across Europe in response to the demands of the electric mobility sector.

3. VET system in Europe.

The benefits of dual vocational education and training have been widely documented in specialized literature and are recognized across all actors involved in the student learning process. For companies, dual VET offers the opportunity to participate actively in the design, monitoring, and evaluation of training content, while helping to shape future professionals who are already familiar with their tools, procedures, culture, and methodologies. This model fosters a shared responsibility in workforce development, highlighting that only close cooperation between the productive sector and hands-on training can lead to a workforce capable of driving innovation and productivity (Fundació BCN Formació Professional, 2022).

For learners, dual VET provides clear advantages, including early contact with the labour market, acquisition of sector-specific competencies, exposure to real working conditions, enhanced motivation and improved employability. At a territorial level, dual VET also stimulates synergies between training centres and companies, leading to collaborations, upskilling opportunities for current workers, job placement services, and innovation-oriented partnerships (Fundació BCN Formació Professional, 2022).

Additionally, from a social perspective, dual VET contributes significantly to reducing early school leaving and youth unemployment that remain particularly

acute in countries like Spain, compared to the EU average.

The success of dual VET implementation relies on a strong and structured relationship between public authorities, social partners, and training centres. This cooperation enables the alignment of vocational curricula with evolving labour market needs through mechanisms for curricular feedback, policy adaptation, and co-governance. While the core principles of dual VET are common, each country adapts the model according to its institutional structure, business landscape, and tradition of stakeholder collaboration (Fundació BCN Formació Professional, 2022). The following sections provide an overview of the current state of VET in the countries participating in the ElectriCars VET Hub project. Through this comparative perspective, we aim to identify common challenges, emerging best practices, and innovative approaches that are shaping the future of training in electric mobility.



3.1 Finland's VET system.

3.1.1 Overview.

Finland's vocational education and training system is considered one of the most flexible and competence-based in Europe. It is designed to serve both young people and adults, offering opportunities to acquire update or complete qualifications according to individual needs. The system promotes lifelong learning, supports access to employment, and facilitates progression to further education. VET is regulated nationally by the Ministry of Education and Culture, but its implementation is largely managed at the local level. Training providers (which may include municipalities, municipal federations, private institutions or public companies) have a high degree of autonomy to organize the delivery of education (Finnish National Agency for Education, 2023).

A major reform in 2018, through the Vocational Education Act (531/2017), unified the system into three main qualification types: basic, further, and specialist.

- ✓ **The basic Vocational qualifications**, called *perustutkinto* in Finnish, are addressed to young people who have completed basic education. However, they are also accessible to adults wishing to gain a first vocational qualification or retrain in a new field. They are classified at EQF (European

Qualifications Framework) level 4 and typically take about three years to complete.

- ✓ **The Further Vocational Qualifications**, called *Ammattitutkinto* in Finnish, are designed for individuals who already have some work experience or prior training in the field. They are intended for those who want to deepen their vocational competence or formally certify their existing skills. These qualifications also correspond to EQF level 4 but are more targeted and specialised than the basic ones. They are commonly pursued by adults already in working life and often completed through flexible, work-based learning arrangements.

- ✓ **The Specialist Vocational Qualifications**, known as *erikoisammattitutkinto* in Finnish, are meant for professionals with substantial work experience who are looking to develop advanced or supervisory-level skills. These qualifications focus on expert competences and are typically required for managerial, coordinating, or high-responsibility roles. They are classified at EQF level 5 and often involve demonstrating competence in complex or specialised tasks through practical assessments carried out in the workplace.

The reform strengthened the focus on competence-based learning and flexible study paths (Ministry of Education and Culture, 2023).

3.1.2 Structure and Access

As illustrated in the Image below (see Annex 1), one of the most common ways to enter VET is immediately after finishing basic education. Approximately 40% of learners follow this route, enrolling in initial vocational education and training (IVET) programmes, which are provided either in vocational institutions or through apprenticeships (Cedefop, 2020). Currently, in Finland there are:

- ❖ 42 initial vocational qualifications (EQF level 4)
- ❖ 64 further qualifications (also EQF level 4)
- ❖ and 54 specialist qualifications (EQF level 5).

Admission to IVET is based on the basic education certificate, whereas access to continuing vocational education and training (CVET), which includes further and specialist qualifications is granted case-by-case, often considering prior work experience.

IVET is particularly suitable for adults who lack formal qualifications or wish to change profession, while CVET is aimed mainly at adults with professional experience. Adults enrolled in these programmes may benefit

from study leave, and those taking leave for at least two months may qualify for the adult education allowance for up to 15 months, depending on their employment history. This allowance is comparable in value to the earnings-related unemployment benefit (Cedefop, 2020).

An initial vocational qualification typically includes both vocational units (compulsory and optional) and common units (such as communication, mathematics, science, civic knowledge and working life skills). The nominal duration is three years, though this varies depending on the individual's Personal Competence Development Plan.

The Finnish legislation does not define a fixed minimum or maximum duration for being at the company. Instead, it is tailored to the individual's plan and can be implemented through either a training agreement (non-salaried, no employment relationship) or an apprenticeship agreement (a fixed-term employment contract that includes a salary). Importantly, students may transition from a training agreement to an apprenticeship when the conditions for employment are met, providing flexibility in how the work-based learning is structured across a programme (Finnish National Agency for Education, 2023).

All VET programmes ensure eligibility for higher education, and qualifications are built upon national qualification requirements, which provide the framework for assessing student competences and outcomes. These

requirements are developed by the Finnish National Agency for Education in tripartite cooperation with representatives of employers, employees, education providers, teachers, and learners. Working-life sectorial committees composed of enterprise representatives also contribute to the development of qualifications, the planning of workplace learning and assessments, and the organisation of competence demonstrations, thus ensuring a close connection between the education system and the labour market (Finnish National Agency for Education, 2023; Cedefop, 2020).

3.1.3 Dual Vocational Education.

Finland's vocational education and training system provides two main options for work-based learning: the training agreement (*koulutussopimus*) and the apprenticeship contract (*oppisopimus*), both of which are integrated into the national competence-based VET model.

- Under a **training agreement**, students complete part of their studies at a workplace without a formal employment relationship. They do not receive a salary, and the employer is not financially compensated. This model is highly flexible, allowing learners to acquire specific skills at any point in their programme based on their Personal Competence Development Plan.

- In contrast, **the apprenticeship contract** establishes a formal employment relationship between the student and the company. The learner receives a salary according to collective agreements, and the employer may apply for public funding to support training costs. This model is particularly common for students who already have some workplace experience or who are aiming to deepen their professional skills in a real work environment.

Both models are defined and personalised for each student, a legally required individual learning plan drawn up jointly by the VET provider, the student, and the workplace representative. This plan outlines the learning objectives, the required competences, and the methods and schedule for achieving and assessing them (Finnish National Agency for Education, 2023).

As mentioned before, the duration and intensity of workplace learning are not fixed by law. Instead, they depend on the learner's needs and goals. The practical component may range from part of a single module to an entire unit or even the full qualification.

Access to work-based learning depends on the availability of a company willing to host the learner. Students may find a workplace on their own or with the support of VET institutions, public employment services, chambers of commerce, or trade unions. Once an agreement or contract is signed, the

learner alternates between studying in the workplace and at the VET centre, following the agreed training path.

Work-based learning is widely used across various sectors, especially in technology and industry, health and social care, business and administration, catering and tourism among others. This dual approach strengthens the link between education and the labour market, ensuring that learners acquire up-to-date skills in real working environments (Finnish National Agency for Education, 2023).

3.1.4 Dual vocational education related to Electric Mobility.

Electric mobility is becoming more important in Finland as part of the country's green and digital goals. Although the vocational education offer specifically focused on electric mobility in Finland is still emerging, several programmes have already started to integrate modules related to electric and hybrid vehicle technologies, charging infrastructure, and sustainable transport systems. In addition, there are initiatives and collaborations between VET providers and companies that aim to strengthen skills in this growing sector. The following section presents an overview of the current training opportunities available in Finland related to electric mobility.

Vocational Qualification in the Motor Vehicle Sector

Level: Upper Secondary VET (EQF level 4) Description: Trains technicians in the maintenance, repair, and diagnostics of motor vehicles, including electric and hybrid vehicles. Structure: Competence-based learning including core and vocational units. Features mandatory workplace training (internship). Duration: 3 years (180 competence points) Language: Finnish / Swedish Institutions: REDU (Rovaniemi), Salpaus, Hyria, YA Ostrobothnia, among others Source: https://opintopolku.fi/konfo/en/sivu/vocational-education-and-training-vet	<i>High Voltage Electric Vehicle Training – Shift E-Mobility</i> Level: Specialist Training for automotive professionals Description: Focused on the safe handling and maintenance of high-voltage systems in electric vehicles, combining both theoretical knowledge and hands-on practice. Structure: Modular format with flexibility for online or in-person delivery, tailored to the needs of industry professionals. Duration: Flexible Language: English Institutions: Shift E-Mobility (Private training provider) Certification: SHIFT Academy EV Certificate, valid for one year Source: Shift E-Mobility https://www.shiftemobility.com/services/education
<i>Master's in Electric Transportation Systems – LUT University</i> Level: Higher Education – Master's Degree (EQF level 7) Description: Electric vehicle technologies, power electronics, smart charging systems, and energy storage. Duration: 2 years (120 ECTS) Language: English Location: LUT University, Lahti campus Source: LUT University. (2023). Master's Programme in Electric Transportation Systems. https://www.lut.fi/en/studies/technology/masters-programmes-technology/electric-transportation-systems-maisteriohjelm	<i>GreenVETnet Project – Savo Vocational College</i> Level Erasmus+ Innovation Project Description: An initiative to embed green and digital skills into vocational education and training (VET), with particular emphasis on sectors such as electric transport and sustainable construction. Structure: Collaborative project involving multiple European partners, focusing on curriculum development, toolkits and training resources for green transition. Duration: More than one year Language: English Coordinator: Savo Vocational College (Finland).

<https://www.oph.fi/en/news/2023/greenvet-increases-green-skills-vocational-education-and-training>

3.1.5 Rovaniemi and the Lapland Region: A Regional Approach to Electric Mobility VET.

The Lapland region, with 21 municipalities and approximately 178,500 inhabitants (2019), is a leader in sustainable development and innovation, having been one of the first regions in Finland to implement the Smart Specialisation Strategy. Its focus on the sustainable use and commercialisation of Arctic natural resources has been recognised as a good governance practice by the European Commission (Lapin Liitto, 2023). Lapland is a dynamic industrial hub with major sectors such as forestry, mining, metallurgy, and tourism, and is rapidly adapting to new areas such as electric mobility and green transition technologies.

In relation to electric mobility, Lapland hosts several companies and testing areas that specialize in car testing services, including testing of electric vehicles. These facilities provide an excellent environment for the development of practical, industry-related training.



As for vocational education and training, the Vocational Qualification in the Motor Vehicles Sector is the main programme available in Lapland that is directly connected to sustainable and electric mobility. This qualification is part of the national framework and includes competencies related to the repair, maintenance, and diagnostics of modern vehicles, including electric models. The qualification follows the national standards as outlined in the official eRequirements portal of Finland¹

Work-based learning is an integral part of the qualification. Students complete internships at the end of the programme, allowing them to apply the skills acquired in vocational schools in real-world business settings. These internships are coordinated by VET providers such as the Rovaniemi Municipal Federation of Education, which is responsible for hiring teachers and managing local VET delivery.

In terms of access and costs, compulsory education in Finland is free, and this includes vocational education. All students

¹ eperusteet.opintopolku.fi.

are required to remain in education until the age of 18, or until they complete an upper secondary qualification, such as the matriculation examination or a vocational qualification (Ministry of Education and Culture, 2023). While students do not receive a salary during their internship period, they benefit from full state coverage of tuition, learning materials, and school meals.

3.2 Estonia's VET system.

3.2.1 Overview.

The Estonian vocational education and training system is strategically aligned with the national goal of ensuring a skilled, resilient and adaptable workforce in the context of digital and green transitions. Estonia has adopted a forward-looking approach to VET reform, guided by the Council Recommendation of 24 November 2020 on VET for sustainable competitiveness, social fairness and resilience, and operationalized through its National Implementation Plan (Estonian Ministry of Education and Research, 2022).

The VET system is governed by the Vocational Educational Institutions Act, which provides the legal framework for the establishment, organisation, quality assurance, and financing of vocational education providers (Estonian Ministry of Education and Research, 2022). Uniform standards are defined in the Standard of Vocational Education, which ensures coherence across curricula, recognition of

prior learning, and alignment with the Estonian Qualifications Framework (EQF levels 2–5), itself referenced to the European Qualifications Framework (Cedefop, 2019; Estonian Ministry of Education and Research, 2022).

In Estonia, vocational education is provided free of charge to learners of all ages, including adults (Estonian Ministry of Education and Research, 2022). Training is offered by vocational education institutions and professional higher education institutions, with a high degree of institutional autonomy in programme design and implementation. The system is flexible and modular, allowing for both full qualifications and micro-credentials (Estonian Ministry of Education and Research, 2022).

Recent reforms have made the system more outcomes-based and competency-driven, promoting lifelong learning and ensuring that qualifications are tailored to evolving labour market needs.

The Education Strategy 2021–2035, aligned with Estonia 2035, underpins the national VET policy. It prioritises learner-centred, inclusive and future-proof education, emphasizing digital and green skills, flexible learning pathways, and collaboration between educational institutions, employers, and research bodies. The strategy is implemented through rolling four-year action plans updated annually (Estonian Ministry of Education and Research, 2022).

Estonia has also made significant progress in developing systems for labour market foresight (e.g. OSKA², the national skills anticipation mechanism), quality assurance (aligned with EQAVET³), and professional qualifications. VET institutions work closely with employers in curriculum design and work-based learning placements, strengthening the connection between education and employment (Estonian Ministry of Education and Research, 2022).

The National Implementation Plan reinforces this vision by setting the following goals:

- ✓ Increasing employment rates of VET graduates (target: $\geq 82\%$).
- ✓ Expanding participation in work-based learning (target: 21% of VET graduates by 2025).
- ✓ Promoting international learning mobility.
- ✓ Enhancing access for vulnerable groups.
- ✓ Supporting modular learning and micro-qualifications.

3.2.2 Structure and access

The Estonian vocational education and training system is structured according to the Estonian Qualifications Framework

(EstQF), which is aligned with the European Qualifications Framework (EQF) (Cedefop, 2020). Vocational qualifications in Estonia are offered at EQF levels 2 to 5, with each level corresponding to specific target groups and training objectives. Access to VET is open to learners of all ages and educational backgrounds, and all programmes are free (Estonian Ministry of Education and Research, 2022). VET programmes in Estonia are categorised into distinct qualification levels, each with specific access requirements and learning outcomes. These are the followings:

- ✓ **The EQF Level 2–3 qualifications⁴** are addressed to individuals without completed basic education, including vulnerable or marginalised learners. These programmes focus heavily on practical skills, with at least 50–70% of training delivered through work-based learning (Estonian Ministry of Education and Research, 2022). They are intended to support labour market integration or serve as a foundation for further studies.
- ✓ **The EQF Level 4 qualifications** represent vocational upper secondary education. These programmes require the completion

² OSKA (Oskuste Koordineerimise ja Analüüsi Süsteem) is Estonia's official mechanism for forecasting labour market needs. It is designed to align education and training provision with the evolving demands of the economy.

³ EQAVET is the European framework for quality assurance in vocational education and training (VET). It helps member states monitor and improve the quality of their VET systems through a shared reference model

⁴ [Explore Estonian Vocational Education](#)

of basic education (9 years of schooling) and provide both vocational skills and general education subjects. Learners who complete these programmes receive a qualification equivalent to general upper secondary education and can access higher education (Cedefop, 2020). These qualifications include at least 35% of work-based learning (internships or in-company practice), and the typical duration is 3–4 years (Estonian Ministry of Education and Research, 2022).

- ✓ **The EQF Level 5 qualifications** are more specialised and targeted at individuals who have completed upper secondary education. These are often completed by adults seeking advanced vocational training, supervisory roles, or lateral movement into new professions. Programmes at this level include more than 50% practical components and focus on acquiring deeper, profession-specific competencies (Education Estonia, 2023).

As illustrated in the diagram below (see Annex 2), the Estonian VET system supports a flexible pathway. Entry into vocational training can occur at various stages of education or career development, depending on the learner's background and objectives. For example, students completing basic education (9th grade) can enter vocational

secondary education (EQF level 4), which combines general and vocational learning and leads to a certificate of vocational secondary education. For those who already hold a secondary qualification, either as young graduates or adult learners, there are options to continue with initial or further VET studies at EQF levels 4 and 5, these programs are usually shorter in duration and more occupation-specific.

Moreover, the system offers different path to progress to higher education, including bachelor's programmes at universities. Finally, vocational programs are also open to adult learners as part of Estonia's formal adult education system, enabling individuals to reskill or upskill at any stage of life through accessible and recognised learning pathways.

3.2.3 Dual Vocational Education.

Estonia does not operate a formal dual vocational education and training system based on salaried employment contracts, as seen in countries like Germany or Austria. However, the Estonian model incorporates key elements of dual training through its strong emphasis on work-based learning, which is a mandatory component across all VET programmes and qualification levels (Estonian Ministry of Education and Research, 2022; Cedefop & Estonian Ministry of Education and Research, 2023). Learners remain formally enrolled in educational institutions and, in general do not enter into an employment relationship.

Nevertheless, in specific cases where the employer wishes to establish a labour contract, the apprentice may simultaneously hold both student and employee status.

The amount of training that happens in real workplaces depends on the level of the programme. In EQF level 2 and 3 programmes, which are usually for people who have not completed basic education or are at risk of exclusion, about 70% of the learning takes place through practical work. In EQF level 4 programmes, which are part of upper secondary vocational education, at least 35% of the training happens in a company. For EQF level 5 programmes, which are shorter and mainly for adults, more than half of the training also takes place at the workplace (Estonian Ministry of Education and Research).

Even if there is no work contract between the student and the company, every apprenticeship or practical training is based on a formal agreement signed by the school, the company and the student. This agreement explains the roles, rights and responsibilities of everyone involved. It also includes details like the length of the training, what students will learn, who will supervise them and how their work will be assessed (Cedefop, 2020). Companies assign mentors to help and guide the students at the workplace. These mentors often help evaluate the student's progress, following the national training standards (Education Estonia, 2023). In some cases, if a work

contract is also signed, companies must pay students at least the national minimum wage, which was EUR 725 per month or EUR 4.31 per hour in 2023 (Cedefop & Estonian Ministry of Education and Research, 2023). The government also helps by providing public funding, which covers training materials, mentor salaries and other costs. Up to 50% of this funding can be given directly to companies to help them supervise the students.

This system is supported by a strong legal and policy framework. The Vocational Educational Institutions Act and the National Implementation Plan of the Council Recommendation on VET recognise work-based learning as a national priority. Thanks to this commitment, in the school year 2020/21, more than 2,300 students, which represents about 9% of all VET learners, took part in workplace-based learning (Estonian Ministry of Education and Research, 2022). The current goal is to increase this number to 21% by 2025.

3.2.4 Dual vocational education related to Electric Mobility.

Estonia is progressively aligning its vocational education and training system with the demands of the green and digital transitions, including the growing sector of electric mobility. While there is no national dual VET programme specifically dedicated to this field, related training content is being integrated into existing vocational qualifications, particularly in automotive

technology, electronics, mechatronics, and transport services (Cedefop & Estonian Ministry of Education and Research, 2023).

Vocational schools such as the Tartu Vocational Education Centre have introduced modules related to electric vehicles (EVs), battery diagnostics, high-voltage systems, and digital servicing technologies. These elements are embedded within standard VET programmes and delivered through a mix of classroom-based instruction and work-based learning either under a training agreement or an apprenticeship contract (Education Estonia, 2023).



This modular and competence-based structure allows students to carry out practical training with companies that are actively transitioning towards sustainable technologies, including electric vehicle repair centres, energy infrastructure firms, and smart mobility service providers. Although participation remains limited at this stage, the workplace component provides students with early exposure to evolving industry standards and hands-on experience in areas such as EV maintenance, charger installation, and energy-efficient

diagnostics (Estonian Ministry of Education and Research, 2022).

National policy frameworks reinforce this direction. The Estonian National Implementation Plan of the Council Recommendation on VET identifies green competences and micro-qualifications as strategic development areas. Specifically, the plan supports flexible learning formats in cooperation with employers, including the creation of short, targeted training modules in emerging sectors like e-mobility (Estonian Ministry of Education and Research, 2022).

Estonia is also involved in European initiatives such as the Centres of Vocational Excellence focused on clean technologies and sustainable transport. These platforms promote collaboration among VET providers, employers, and innovation hubs, with the goal of developing transnational training solutions and improving the quality and relevance of vocational learning in strategic sectors (Cedefop, 2020).

The following table presents an overview of the current opportunities available in Estonia related to electric mobility.

<i>Vocational Training in Motor Vehicle Maintenance and Technology</i>
Level: Upper Secondary and Post-Secondary VET (EQF levels 4 and 5)
Description: training in the maintenance, diagnostics and repair of motor vehicles, with an increasing

focus on electric drivetrains, battery systems, and digital diagnostics.

Structure: Competence-based learning including core and vocational units. Features mandatory workplace training (internship).

Duration: 2 to 3.5 years

Language: Estonian

Institutions: Tartu Vocational Education Centre, Ida-Virumaa Vocational Education Centre, Tallinna Lasnamäe Mehaanikakool.

Source:
<https://kutsehariduskeskus.ee/>, [Home - Tartu Vocational College](#)



Tartu has invested in smart mobility, including electric public transport, bike-sharing systems, and digital services. The city operates a growing fleet of electric buses and is expanding its charging infrastructure, making it a real-life testing ground for sustainable transport technologies. These initiatives create opportunities for education providers to develop training programmes connected to electric mobility.

3.2.5 Tartu: A Regional Approach to Electric Mobility VET.

The city of Tartu, located in southern Estonia, is the country's second-largest urban centre and an important hub for education, innovation and green development. With approximately 100,000 inhabitants, Tartu is home to several universities and vocational education institutions, and it plays a central role in Estonia's green transition goals (City of Tartu, 2023). The city is also part of the national Smart Specialisation Strategy, which promotes sustainable and digital development in different regions (Education Estonia, 2023).

In terms of VET, the Tartu Vocational Education Centre (Tartu VOCO) is the leading provider in the region. VOCO offers qualifications in vehicle maintenance and technology at EQF levels 4 and 5, and has recently started to include modules on electric vehicle systems, battery diagnostics, and high-voltage safety. These modules are part of national VET qualifications and follow Estonia's competence-based learning system (Cedefop & Estonian Ministry of Education and Research, 2023). Moreover, Tartu VOCO is also involved in the AutoCoVE 2.0 project, a European initiative that brings together VET schools and companies from several countries to develop learning materials on clean vehicle

technologies. VOCO contributes to the creation of training modules related to electric mobility, aimed at both students and working professionals (Tartu VOCO, 2023).

3.3 Italy's VET system.

3.3.1 Overview.

Italy's vocational education and training system is organised through a dual model that combines national and regional responsibilities and integrates both classroom learning and workplace experience. It provides flexible pathways leading to qualifications recognized under the EQF, supporting the transition of young people and adults into employment or further education (Cedefop & INAPP, 2023).

VET is regulated nationally by the Ministry of Education and Merit and the Ministry of Labour and Social Policies, but regional authorities have full responsibility over initial vocational training through the Istruzione e Formazione Professionale (IeFP) system. This regional track is officially recognised within the second cycle of education, and the qualifications it issues are valid across the entire country thanks to nationally agreed occupational profiles and learning standards (Regione Lombardia, 2023).

Italy offers two main forms of work-based learning within the VET system.

- ✓ The first is **apprenticeship** (*apprendistato*), which is a formal employment contract combining work and study. Apprentices, starting from age 15, receive a salary, contribute to social security, and obtain formal qualifications (EQF 3–4).
- ✓ The second form is *alternanza scuola-lavoro*, a **school-organised internship programme** without an employment contract. While not salaried, it provides practical experience and is widely implemented in upper secondary technical and vocational education (INAPP, 2022).



Recent reforms have focused on improving the quality and attractiveness of VET by expanding the dual system, increasing employer involvement, and modernising curricula to support digital and green skills. One of the main examples of this effort is that the National Recovery and Resilience Plan (PNRR) has allocated €600 million to

strengthen VET and Academies, promote work-based learning, and support innovative partnerships between schools and companies (MEF, 2021). Moreover, the Italian VET strategy also prioritises adult learning, recognition of prior learning, and the development of micro-credentials. With these reforms the system aims to ensure employability, inclusion, and mobility across education and work, by combining formal education with structured work experience.

3.3.2 Structure and access.

In Italy, VET education is available from the age of 14 and is an important part of the upper secondary and post-secondary education system. Programs are aligned with the European Qualifications Framework and are offered at levels 3 to 6. As mention in the previous section, the system is managed jointly: the national government sets the overall rules, but the regions are responsible for organising and delivering most VET courses, especially the initial ones (Cedefop & INAPP, 2023).

As it can be observed in the image below (Annex 3), there are two main ways to enter VET after lower secondary school.

- ✓ One option is the regional pathway, known as *Istruzione e Formazione Professionale (IeFP)*. This starts with a three-year course that leads to a vocational qualification (EQF 3), and learners can continue for a

fourth year to obtain a vocational diploma (EQF 4). These courses are practical in nature and include at least 30% of work-based learning, either through internships or apprenticeships, where students sign a real work contract and get paid.

- ✓ The other option is to attend a technical or vocational school under the national system. These programmes take five years to complete and give students an EQF level 4 diploma, which allows them to go to university. Work-based learning is included here too, but in the form of *alternanza scuola-lavoro*, where students do internships during their studies. These are unpaid and do not involve a work contract.

After upper secondary education, learners can choose to continue in post-secondary VET. In this case:

- ✓ There are *Istruzione e Formazione Tecnica Superiore (IFTS)* programmes, which last one year (EQF 4), and *ITS Academy* programmes, which last two to three years and lead to qualifications at EQF levels 5 or 6. ITS programmes are closely connected to the labour market, and at least 30% of the training happens in companies. In many cases, students can follow these courses through

apprenticeships, combining study and work with a proper employment contract.

As it can be observed (see Annex 3), the Italian system allows students to move between different types of education. Someone who finishes a three-year IeFP course can continue to a fourth year, enter an IFTS programme, or even transfer to the national school system. In the same way, a graduate from a technical school can apply for university or go directly into an ITS Academy.

3.3.3 Dual Vocational Education.

In line with European strategies for improving youth employability and reducing early school leaving, the Italian model is built on a combination of classroom-based learning and structured work-based experience (ANPAL Servizi, 2020; Cedefop, 2015). Italy's dual system is regulated at national level, but regions hold exclusive legislative power over vocational education and training, as stated in Constitutional Law 3/2001. This creates a system where implementation varies by region, though it is coordinated through State–Regions agreements (INAPP, 2018).

Dual education in Italy is currently implemented through three main modalities:

- ✓ **Alternance** (*Alternanza Rafforzata*): This pathway integrates school-based learning

with at least 400 hours per year of workplace experience. Learners remain enrolled as students and are not considered employees. The placement is governed by a learning agreement signed by the school, company, and student. The educational institution is responsible for planning, supervision, and evaluation, while companies must appoint a tutor and provide a safe learning environment (ANPAL Servizi, 2020). The goal of this type of agreement is encouraging career guidance and orientation and developing transversal and job-related skills while linking education with the social and economic needs of the territory.

- ✓ **Simulated Training Enterprise (STE)**: Due to the problems for many Italian companies to host students, this program was created to allow students to manage a virtual company in the VET school. It replicates a business environment and allows students to apply entrepreneurial, managerial, and sector-specific skills. Though not part of a legal employment relationship, it encourages learning by doing, teamwork, and problem-solving (Scuola Centrale Formazione, 2018; IAL FVG, 2020). STE is especially useful in contexts where companies cannot

offer in-person placements. While it is less institutionalised than other models, it provides a valuable tool for training providers looking to implement dual education without depending entirely on the local business network.

- ✓ **Dual Apprenticeship** (*Apprendistato Duale*): This modality is a permanent employment contract with a training purpose. The most common for initial VET is the First-Level Apprenticeship, which allows young people aged 15 to 25 to obtain a vocational qualification (EQF 3-4) or a Higher Technical Specialisation Certificate (IFTS, EQF 4). Training is divided between external education (organised by schools or training centres) and in-company training. Students are paid 10% of the contractual wage for internal training hours, and companies benefit from tax incentives (INAPP, 2018; Riboni, 2021). Apprenticeship contracts include detailed information on the roles, duration, qualification to be obtained, and evaluation process. The structure is regulated nationally through D. Lgs. 81/2015, while the training content and duration are defined by each region.

Despite the strong legal framework, the use of apprenticeship remains limited. It

represents only a small share of all type of agreements, while the *alternanze* accounts for about 95% of contracts. According to INAPP (2018), this is due to cultural barriers, low awareness, and the small size of most Italian firms.

3.3.4 Dual vocational education related to Electric Mobility.

Italy is gradually aligning its VET system with the needs of the green transition, particularly in relation to electric mobility. Although there is no national dual VET programme exclusively dedicated to this sector, training related to electric and hybrid vehicles is increasingly being integrated into existing qualifications within automotive maintenance, industrial automation, energy systems, and logistics (Cedefop & INAPP, 2023; INAPP, 2018). This integration is developed in cooperation with local employers and adapted to regional labour market demands (ANPAL Servizi, 2020; Regione Piemonte, 2023).

Currently the offer in e-mobility is the following:

Vocational Training in Automotive Maintenance and Electric Vehicle Technology

Level: Upper secondary and post-secondary VET (EQF levels 3 to 5).

Description: Training in the maintenance, diagnostics, and repair of motor vehicles, with updated modules focusing on electric and hybrid systems, including battery management and high-voltage safety.

Structure: Competence-based learning combining general education, vocational modules, and mandatory workplace training (internships or apprenticeships).

Duration: 3 to 4 years

Language: Italian

Institutions: Lepido Rocco Vocational Training Centre

Source: Lepido Rocco Vocational Training Centre

PES-PAV Certification Course – Safe Operation on Hybrid and Electric Vehicles

Level: Continuing vocational education

Description: This short course provides knowledge of key safety regulations, electrical hazards, first aid procedures, and safe operation protocols for high-voltage vehicle systems.

Structure: Includes theoretical and practical components, with a strong focus on safety and maintenance procedures.

Duration: 16 hours

Language: Italian

Institution: TEXA S.p.A.

Source:
<https://www.texa.it/formazione/corso/qualifica-pes-pav-procedure-per-operare-in-sicurezza-sui-veicoli-ibridi-ed-elettrici-norma-cei-11-27-94/>

3.3.5 Treviso: a regional approach to Electric Mobility VET.

The Province of Treviso, located in the Veneto region, is actively promoting electric mobility through a regional strategy that connects infrastructure development, local entrepreneurship, and vocational training. Although Treviso is not a major industrial hub, it has become a reference point for how small and medium-sized areas can support the transition to sustainable mobility through targeted education and partnerships (Provincia di Treviso, 2023).

Over the past decade, the province has made electric mobility a political priority. The city of Treviso restricts access to the historic centre to low-emission and electric vehicles, and currently hosts around 600 charging stations, both public and private. However, rural and suburban areas still face barriers such as high electricity costs and weak infrastructure. Local solutions focus on combining electric mobility with renewable energy, particularly photovoltaic systems installed on private buildings (Confartigianato Marca Trevigiana, 2023).



The VET system in Treviso is evolving to respond to the growing demand for skills in electric mobility. Although the region does not yet operate a fully structured dual system, it offers numerous internship opportunities, increasingly focused on sustainable transport and vehicle electrification. These placements are often organised through regional training centres and craft-based providers. One example is the PES-PAV certificate, which qualifies technicians to safely work on electric and hybrid vehicles. This certification is obtained through specialised technical courses, developed in partnership with vocational schools like Lepido Rocco and car repair associations, ensuring both regulatory compliance and strong ties to the local labour market (Lepido Rocco & Confartigianato Marca Trevigiana, 2023).

3.4 Romania's VET system.

3.4.1 Overview.

Romania's vocational education and training system is coordinated primarily by the Ministry of Education, which oversees initial vocational training offered at secondary and post-secondary levels. The system as the rest of the countries presented is structured according to the National Qualifications Framework and aligned with the European Qualifications Framework, ensuring comparability of qualifications across Europe (Cedefop; National Centre for TVET Development, 2019).

VET in Romania is mainly school-based, but since 2017 the country has developed a dual system that introduces structured work-based learning in cooperation with companies. This dual track is regulated by Government Decision no. 94/2017 and allows students to acquire practical skills directly in the workplace while continuing their general and vocational education in upper secondary schools (Cedefop; National Centre for TVET Development, 2019). With this reform, the system aims to address both the needs of students and the labour market by offering qualifications in a wide range of sectors, including manufacturing, IT, agriculture, and services. Recent efforts have focused on expanding digitalisation, improving equipment in vocational schools, and increasing student participation in dual programmes. These priorities are supported by EU structural funds and investments included in Romania's Recovery and Resilience Plan, which allocates significant resources to green and digital skills (European Commission, 2023).

3.4.2 Structure and access

VET in Romania is available at secondary and post-secondary levels, and is aligned with the EQF, covering levels 3 to 5. Access is granted after completing lower secondary education (usually at age 14–15), which marks the end of compulsory schooling at EQF level 2.

As it can be observed in the figure below (see Annex: Figure 4), at upper secondary level, students can choose between:

- **School-based vocational programmes** (EQF 3): typically 3-year programmes offered in *școală profesională*, where students receive both general and vocational education, combined with at least 50% work-based learning (WBL). These programmes are a key component of Romania's dual VET system and are available from grade 9 onwards.
- **Technological high schools** (*liceu tehnologic* – EQF 4): 4-year programmes that combine general, technical and vocational education. These may include up to 25% WBL and provide access to the baccalaureate and eventually higher education.
- **Vocational upper secondary programmes** (EQF 4): also 4-year programmes with a general education base and up to 15% WBL, offering formal vocational qualifications and a route to higher education through the baccalaureate exam.

At post-secondary level, the graduates from upper secondary education (usually with a baccalaureate diploma) can access *școală postliceală* (EQF 5), which offers 1 to 3-year VET programmes, often with a strong

practical component. These programmes typically include up to 720 hours of workplace training.

Romania also offers adult learning programmes (EQF 1–4), including upskilling and retraining for the unemployed, the employed, and vulnerable groups. In some cases, adult apprenticeships include more than 70% work-based learning for those aged 16 and above.

3.4.3 Dual vocational education.

Dual vocational education and training in Romania was formally introduced in 2017 as an effort to strengthen the relevance of vocational education and bring it closer to the needs of the labour market. The dual model is regulated by Government Decision no. 94/2017 and is offered within the structure of the 3-year vocational school programmes (*școală profesională*) at EQF level 3 (Cedefop; National Centre for TVET Development, 2019).

In the dual system, training is organised through a partnership between VET schools and companies, with clearly defined roles. The school provides general education and theoretical vocational content, while the company takes responsibility for organising and delivering practical training. Companies also contribute to the design of the training plan and, in some cases, can offer financial incentives such as meals, transport, or scholarships (Cedefop; National Centre for TVET Development, 2019).

WBL accounts for at least 50% of the total programme in the dual pathway and is distributed over the three years of training. According to national legislation, WBL takes place directly at the workplace, under the supervision of company trainers and school tutors, following a jointly agreed training plan (ANOFM, 2022). Students sign a vocational training contract with the company, which does not imply employment but regulates rights and responsibilities during the training period. While participation in dual VET has been growing in recent years, it remains limited to certain regions and sectors. The system faces challenges such as low employer engagement, particularly in rural areas, and limited capacity in SMEs to host and supervise trainees.

The dual model is particularly encouraged in sectors with skills shortages, including manufacturing, automotive, agriculture, and construction. According to Cedefop (2020), Romania sees the dual VET pathway as a strategic tool to reduce youth unemployment, improve the image of vocational education, and foster local partnerships between education and the business sector.

3.4.4 Dual vocational education related to Electric Mobility.

Electric mobility is gaining increasing importance in Romania as the country moves forward with its green transition and alignment with European digital and

environmental objectives. In recent years, the Romanian vocational education and training system has started to adapt to these emerging challenges by introducing new content and methodologies that support the development of technical skills in sustainable transport. Although there is currently no dedicated national VET programme exclusively focused on electric mobility, relevant components are being gradually embedded into existing qualifications, particularly in automotive mechanics, electromechanics, and industrial automation.



Vocational institutions across the country are beginning to update their curricula to reflect technological advances and labour market needs.

3.4.5 Constanța and the electric mobility.

Constanța is a city in southeastern Romania, located by the Black Sea. It is an important port and industrial centre, with many companies in transport and logistics. In recent years, Constanța has started to develop projects related to electric mobility. The city is working to reduce pollution and modernise its transport system. There is

growing interest in electric cars, charging stations, and new technologies to support green mobility.

An example is the Liceul Tehnologic in Constanța, which has partnered with Avia Motors to reintroduce practical training in electrical systems and provide students with direct exposure to hybrid and electric vehicle technologies. This collaboration responds to a long-standing skills gap caused by earlier reductions in funding and curriculum content in the field of electrical engineering.

Through this partnership, students have access to real-world learning environments where they acquire experience in diagnostics, battery safety, and electric drivetrain maintenance skills that are increasingly demanded by employers in the automotive and energy sectors. The practical component is supported by Romania's dual-type training framework, which allows up to 720 hours of workplace training per academic year under Law 335/2013, even in the absence of a formal apprenticeship contract.

National strategies also reinforce this shift. The National Strategy for the Development of Vocational Education and Training 2021–2027 outlines digitalisation, sustainability, and flexibility as key priorities. It encourages partnerships with industry, supports short-cycle training formats, and promotes the integration of green competences into mainstream qualifications. Romania also participates in European

platforms such as Centres of Vocational Excellence and Erasmus+ partnerships, which contribute to building capacity and fostering innovation in the VET system.

Taken together, these developments indicate a growing awareness in Romania of the need to prepare a qualified workforce capable of supporting the transition to low-emission mobility. The following table summarises the main training opportunities currently available in this field.

<i>Vocational Training in Motor Vehicle Maintenance and Technology</i>
Level: Upper Secondary VET (EQF level 4) Description: Prepares students to work with electrical and electronic systems in motor vehicles, with modules focused on hybrid and electric powertrains, battery technologies, and digital diagnostics. Structure: School-based learning combined with mandatory workplace training (up to 720 hours annually) under dual-type agreements. Duration: 3 years Language: Romanian Institution: Liceul Tehnologic (Constanța), in cooperation with Avia Motors Source: Romanian Ministry of Education, Avia Motors partnership documentation.
<i>Electromechanics for Sustainable Transport</i>
Level: Post-Secondary VET (EQF level 5)

Description: Provides specialised knowledge in mechatronics and electric propulsion systems, with emphasis on automation, control units, and sustainable vehicle technologies. Structure: Full-time technical programme including theoretical modules and laboratory-based practice. Duration: 2 years Language: Romanian Institutions: Colegiul Tehnic Energetic, other regional technical colleges Source: National Centre for TVET Development, 2023

3.5 Spain's VET system.

3.5.1 Overview

Spain's vocational education and training system is organised through a decentralised model that combines national regulation with regional implementation. It integrates both school-based learning and workplace experience, offering flexible pathways that lead to qualifications recognised under the European Qualifications Framework (EQF), thus facilitating access to employment and further education for young people and adults (Cedefop, 2023).

VET is governed nationally by the Ministry of Education, Vocational Training and Sports, which establishes the general framework, curricula, and national standards. However, the Autonomous Communities are responsible for the planning and delivery of programmes, including collaboration with local

companies and social partners. Qualifications are based on the National Catalogue of Professional Qualifications (CNCP), ensuring nationwide recognition and alignment with EU learning outcomes (MEFP, 2022).

Spain offers two main modalities of work-based learning within the VET system:

- General dual VET
- Intensive dual VET

The 2022 Organic Law on the Organisation and Integration of VET (Ley Orgánica 3/2022) unified initial and continuing vocational training into a single system and reinforced the dual approach across all qualification levels. It also introduced short learning units and micro-credentials, improved guidance and support services, and expanded opportunities for adult learners and upskilling (MEFP, 2022).

Recent reforms have prioritised the digital and green transitions, with significant investment under Spain's National Recovery and Resilience Plan. Over €2.1 billion have been allocated to modernise vocational schools, develop strategic training programmes in areas such as renewable energy, electric mobility, and cybersecurity, and foster innovation through collaboration between VET centres and companies (Gobierno de España, 2023).

3.5.2 Structure and access

Spain's VET system is structured into three main levels, each corresponding to different stages of education and aligned with the European Qualifications Framework (EQF):

- Basic VET (Formación Profesional Básica) – EQF level 3
- Intermediate VET (Ciclo Formativo de Grado Medio) – EQF level 4
- Advanced VET (Ciclo Formativo de Grado Superior) – EQF level 5

These programmes are integrated into upper secondary and post-secondary education and are also accessible to adults through flexible lifelong learning pathways (MEFP, 2022a). All official qualifications are included in the National Catalogue of Professional Qualifications which ensures nationwide recognition and alignment with labour market needs (Cedefop, 2023).

Access requirements vary by level as it can be seen at Annex (Image 5):

- Basic VET is open to students aged 15 or older who have completed the first cycle of compulsory secondary education (ESO) and are identified as being at risk of early school leaving.
- Intermediate VET requires completion of ESO or Basic VET.
- Advanced VET requires a *bachillerato* diploma or a related

Intermediate VET qualification (MEFP, 2022a).

All programmes include a mandatory module of workplace training (FCT – *Formación en Centros de Trabajo*). In standard programmes, this consists of approximately 300–400 hours in a company. In dual VET, work-based learning is extended throughout the programme, with general or intensive formats depending on the share of time spent in the workplace and the type of agreement or contract involved (BOE, 2022).

The system also offers distance learning, modular enrolment, and short-cycle specialisation courses, introduced under the 2022 VET reform to improve flexibility, promote upskilling and reskilling, and respond to fast-changing sectoral demands. The reform also enhances the system for recognition of prior learning, allowing workers to obtain full or partial qualifications based on professional experience or non-formal learning (MEFP, 2022b).

3.5.3 Dual Vocational Education.

In response to the need to better adapt vocational training to the demands of the labor market, and to match certain European countries (e.g., such as Germany), Spain has progressively strengthened its dual vocational training system. Currently, the model combines school-based education with work-based learning in companies,

with the aim of improving students' employability and encouraging a more direct involvement of the productive sector as well as avoiding early dropout. The current framework is governed by Organic Law 3/2022 on the Organization and Integration of Vocational Training, which mandates a dual approach for all VET programs.

Although the legal framework is national, the 17 Spanish autonomous communities have executive competencies in education and are responsible for the implementation and adaptation of dual vocational training in their territories. This gives rise to significant regional variations, both in the intensity of workplace training and in the mechanisms used to involve companies.

As mentioned previously, the dual system in Spain is implemented through two main modalities:

- **FP Dual General:** This modality requires that at least 25% of the total program hours be completed in a company. Students do not have an employment contract and are not entitled to mandatory remuneration, although some regions or companies may offer scholarships. The school, the company and the student sign a training agreement.
- **FP Dual Intensiva:** This modality involves a minimum of 35% of training hours in the company, often within the framework of a training

and apprenticeship contract, or through a paid internship. The student is considered an employee and is covered by social security. This form of dual training is particularly encouraged in strategic sectors or specialized training centers. Companies may receive financial incentives and the centers must ensure close coordination for the design and monitoring of the training program. In some cases, a shared evaluation process between the company and the school is required.

3.5.4 Dual vocational education related to Electric Mobility in Catalonia.

Catalonia has developed a comprehensive strategy to adapt its VET system to the demands arising from the transition to electric mobility. This transformation responds both to regulatory and technological changes in the automotive sector and to the challenges in terms of sustainability, digitization and the needs of the Catalan business sector. The strategy is articulated through the expansion of the initial vocational training offer, the promotion of dual mode programs, the introduction of curricular adaptations and the approval of specialization courses (Fundació BCN Formació Professional, 2022b).

a) Initial vocational training offer linked to electric vehicles

The Catalan vocational training system organizes its studies in professional families. Although electric mobility is transversal in nature, this article focuses on three families that are particularly relevant due to their direct link to the sector: Mechanical manufacturing, Vehicle transport and maintenance, and Electricity and electronics. These cover three key areas: component manufacturing, vehicle maintenance and installation of recharging points.

Within the framework of Initial Vocational Training, two main entry routes stand out:

- **Training and Insertion Programs (PFI):** aimed at young people between 16 and 21 years of age who have not obtained the ESO diploma. They last 1,000 hours and lead to a professional certificate. In the province of Barcelona, 24 centers offer PFIs related to the automotive and electric vehicle sector. These include professional profiles such as mechanical manufacturing assistants, bodywork maintenance, repair of personal mobility vehicles and assembly of electrotechnical installations (Fundació BCN Formació Professional, 2022b).
- **Intermediate (CFGM) and higher (CFGS) training cycles:** with a duration of 2,000 hours divided between the educational center and the company. Thirteen training cycles directly related to EVs have

been identified: five in manufacturing, five in maintenance and three in installation of recharging points. Most of these courses are taught in centers in the province of Barcelona.

An outstanding example is the Sales and Commercial Space Management course adapted to the automotive sector, taught in dual mode at the Joan Brossa (Barcelona) and Montserrat Roig (Terrassa) high schools. It has a duration of 2,300 hours, of which at least 970 are developed in the company, and has been promoted by the Gremi del Motor (Catalan motor businesses' association) with the support of the Generalitat de Catalunya (regional Government of Catalonia) (Fundació BCN Formació Professional, 2022b).

b) Curricular adaptations with a territorial approach

A relevant experience has been the project *Plataforma d'impuls al vehicle elèctric* led by the City Council of Santa Perpètua de Mogoda through the Centre de Recursos del Vehicle Elèctric (CREVE). In collaboration with the Department of Education and the Eix de la Riera de Caldes supra-municipal association, two curricular adaptations were designed with the aim of aligning vocational training with the industrial transformation of the territory (Fundació BCN Formació Professional, 2021).

- Adaptation of the CFGM in Electromechanics of motor vehicles through the TM10 module on electric and hybrid vehicles, with specific training for students and teachers. (Fundació BCN Formació Professional, 2022b)..
- Adaptation of the CFGM in Electrical and Automatic Installations with content on recharging infrastructures in homes and parking lots, also accompanied by teacher training.

c) Specialization courses linked to electric vehicles

Maintenance and safety in hybrid and electric vehicle systems (RD 109/2022): 650 hours, aimed at graduates of CFGS in automotive or aeronautical maintenance. It enables the development of maintenance, repair and verification tasks of EV components with guaranteed safety and sustainability.

Maintenance of hybrid and electric vehicles (RD 281/2021): also of 650 hours, aimed at graduates in electromechanics. Its objective is to train students to perform troubleshooting tasks, adjustments and replacement of hybrid or electric propulsion systems.

Both courses are part of the professional family of vehicle transport and maintenance, and their implementation is foreseen as part of the modernization process of the training offer associated with sustainable mobility

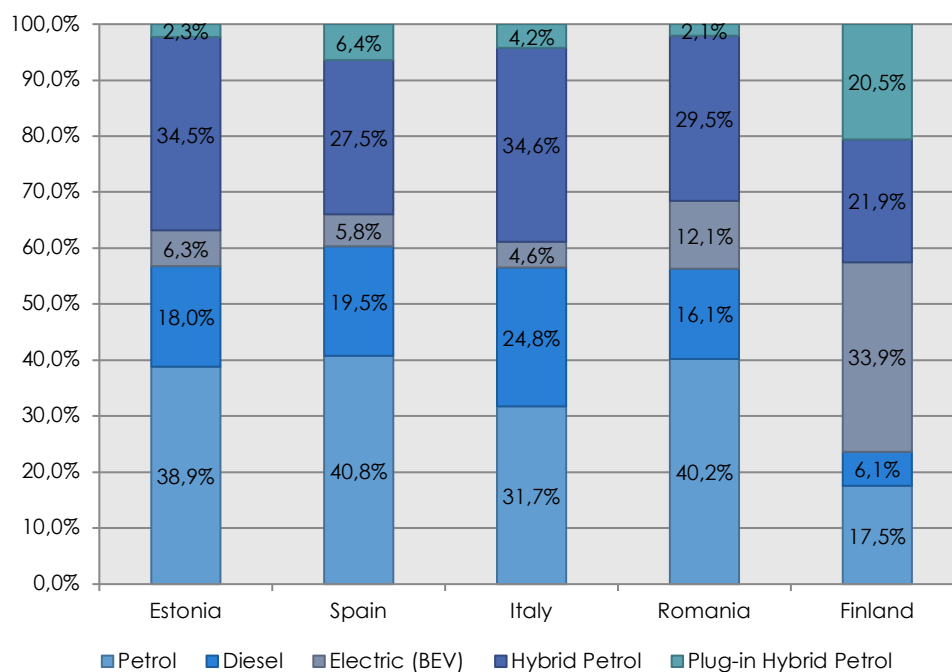
4. Key Indicators of the electric mobility in Europe by country.

This section provides a comparative overview of the most relevant indicators shaping the development of electric mobility focus on transport across five European countries: Finland, Estonia, Italy, Romania, and Spain. These indicators reflect the degree of infrastructure deployment, market uptake, and institutional support for the transition to electric vehicles.

As can be observed in the figure below (Figure 1), the distribution of new passenger car registrations by energy type from 2023

varies significantly across the five countries analyzed. While petrol vehicles continue to dominate in most cases, Finland clearly stands out due to its high share of battery electric vehicles (33.9%), significantly ahead of the other countries as Spain (5.8%) or Estonia (6.3%). In contrast, Italy still shows a strong presence of diesel cars (24.8%), along with a substantial portion of hybrid petrol vehicles (34.6%), reflecting a more gradual shift towards electrification.

Figure 1. Distribution of new passenger car registrations by energy type (2023).



Spain
and

Romania exhibit similar patterns, with petrol

and hybrid petrol vehicles representing the majority, and moderate adoption of Electric Vehicles (5.8% and 12.1%, respectively). Estonia, although showing a relatively high share of hybrid petrol cars (34.5%), has the lowest BEV (Battery Electric Vehicle) adoption (6.3%) among the five countries.

In summary, the figure showed diverse national trajectories in the transition towards sustainable mobility, with Finland emerging as a leader in full electrification, and other countries progressing through hybridization. One of the factors that can help explain this transition is the availability of charging infrastructure. As shown in the table below (Table 1), the number of charging points per 1,000 inhabitants varies across countries and is directly related to the number of electric vehicles on the road. For example, Finland, which leads in BEV registrations, also has the highest infrastructure availability, with 3.0 chargers per 1,000 inhabitants. In contrast, Romania has the lowest charger-per-person ratios (0.3). It is also important to note that countries like Italy and Spain, despite having the highest total number of charging points in absolute terms, still have a relatively low ratio per capita (1.10 and 0.9, respectively).

Table 1. Recharging points (EVSE)

Country	Total Chargers	Population (2024) ¹	Chargers / 1 000 inh.
Spain	44.330	48.807.014	0,91%
Italy	64.975	58.986.020	1,10%
Romania	5.731	19.069.034	0,30%
Finland	17.745	5.637.021	3,15%
Estonia	1.577	1.371.029	1,15%

Source: Own calculations based on data retrieved from the European Alternative Fuels Observatory (EAFO): <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/european-union-eu27/country-comparison>, and population from Eurostat (2023).

The effort made by countries towards the green transition is reflected not only in their electrification levels and infrastructure deployment, but also in the share of their national recovery plans (RRP)⁵ allocated to climate-related objectives. According to the European Commission's Recovery and Resilience Scoreboard, Estonia stands out with 87.9% of its RRP contributing to climate-related objectives. Romania (59.2%), Finland (57.7%), and Spain (51.7%) also show strong alignment with EU climate goals. Italy, while slightly lower at 48.4%, remains well above the minimum threshold set by the European Union which is 37%. This shows that, although the green transition is a gradual process, these

⁵

[https://ec.europa.eu/economy_finance/recovery-and-resilience-](https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html?lang=en)

[scoreboard/country_overview.html?lang=en](https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html?lang=en)

countries are making steady progress and clearly moving in the right direction.

5. Best practice to improve the electric mobility by country.

In this section a set of good practices are presented, as it is explained below, these are structured into three thematic blocks. Together, they illustrate how different countries, regions, and training ecosystems are responding to the complex challenges of not electric transport through vocational education and training. Each block highlights a distinct yet interconnected dimension of this transformation, showcasing a diverse range of approaches, stakeholders, and implementation strategies

- The first block, *Infrastructure and public policies for electric mobility*, shows how governments are helping big changes happen. They do this by building more charging stations, giving money to support electric vehicles, and using electric cars in public services.
- The second block, *VET and technical training for the e-mobility workforce*, talks about the new skills and jobs needed for people who work in electric mobility.
- The third block, *Innovation and international cooperation in VET*, shows new ideas and projects that improve training programs, use digital tools, and connect people from different countries.

A) Infrastructure and Public Policies for Electric Mobility.

Estonian e-Mobility Programme (ELMO): Advancing Electric Mobility Nationwide	
Country and City	Estonia, Tallin
Organisation name	Ministry of Economic Affairs and Communications of Estonia
Practice image:	
Geographical scope of the practice:	National
Short summary of the practice	

Estonia launched the ELMO programme to develop a nationwide EV charging infrastructure and

provide incentives for electric vehicle adoption, positioning itself as a pioneer in sustainable transport.

Detailed information on the practice:

The Estonian e-Mobility Programme (ELMO) was introduced in 2011 with the goal of reducing carbon emissions, increasing energy efficiency, and fostering the adoption of electric vehicles (EVs) in Estonia.

Key objectives and implementation:

- **Nationwide Charging Network:** Estonia became the first country in the world to establish a nationwide fast-charging network, consisting of 165 fast-charging stations located across cities, highways, and rural areas. The stations use CHAdeMO connectors and allow for rapid charging within 30 minutes.
- **Financial Incentives for EVs:** To encourage private adoption, the programme provided grants of up to 50% of the EV purchase price, significantly reducing costs for individuals and businesses.

Public Sector EV Fleet Integration: ELMO introduced 500 Mitsubishi i-MiEV electric cars into government and municipal fleets, particularly for social services, to showcase EV viability in public operations.

- **ELMO EV Car Sharing Service:** A unique nationwide car-sharing scheme was introduced, allowing residents and visitors to rent electric cars for short-term use. This initiative familiarized the public with EV technology while promoting eco-friendly urban mobility.
- **Educational & Awareness Campaigns:** The programme engaged citizens through promotional campaigns, test-driving events, and public demonstrations to raise awareness of electric mobility benefits.
- **Key stakeholders and beneficiaries:**
 - Ministry of Economic Affairs and Communications – Policy development and funding allocation.
 - Foundation KredEx – Managed financial support schemes for EV adoption.
 - State Grid Operators & Private Sector – Implemented and maintained charging infrastructure.

- Municipalities & Public Services – Adopted EVs in fleets to reduce emissions.
- General Public & Businesses – Benefited from grants, infrastructure, and car-sharing services.

Some details:

Resources needed:	• €10 million funding from the sale of CO₂ emissions credits to Mitsubishi Corporation. • Additional financing from the European Regional Development Fund (ERDF) for infrastructure upgrades. • Human resources: Involvement of technical experts, policymakers, and maintenance teams for infrastructure deployment and management.
Timescale (start/end date):	2011 -2014
Evidence of success (results achieved):	• Estonia became the first country to establish a nationwide fast-charging EV network, setting an example for other nations. • By 2022, Estonia had 3,300 registered electric vehicles, comprising 3% of new car sales in the country. • The programme successfully reduced CO₂ emissions in urban areas through increased EV adoption. • Over 500 electric cars were integrated into public sector operations. • Thousands of citizens engaged in the ELMO car-sharing service, demonstrating public interest in EVs.

Challenges encountered	• Financial Sustainability: The charging network's profitability has been a challenge due to low user fees, requiring additional government support. • Evolving EV Standards: The CHAdeMO charging standard became less prevalent as new EV models adopted CCS (Combined Charging System), requiring infrastructure updates. • Awareness & Adoption Barriers: Public resistance to EVs due to concerns about range anxiety and higher upfront costs persisted despite financial incentives.
Potential for learning or transfer:	Estonia's comprehensive national e-mobility strategy serves as a valuable model for other regions transitioning towards electric mobility. Key transferable elements include: 1. Nationwide Charging Infrastructure: Estonia's approach to deploying fast-charging stations with strategic placement can be replicated in countries aiming for full EV coverage. 2. Financial Incentives for EV Adoption: Government-backed grants significantly increased private and public EV adoption, showcasing the impact of targeted financial support. 3. Integration into Public Services: Using EVs in municipal and governmental fleets demonstrated their reliability and efficiency, encouraging further adoption. 4. Car-Sharing as an Awareness Tool: The ELMO car-sharing model effectively introduced the public to EV technology and promoted sustainable urban mobility. 5. Policy and Industry Collaboration: Partnerships between government, private sector, and energy providers ensured efficient infrastructure development and support. These elements provide a scalable and adaptable framework for other countries and cities looking to establish long-term e-mobility strategies aligned with climate goals.
Further information:	https://kredex.ee/et/elmo

	contact@elmo.ee
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Estonia's Zero- Emission Vehicle Purchase Support Program	
Country and City	Estonia, Tallin
Organisation name	Environmental Investment Centre (KIK)
Practice image:	
Geographical scope of the practice:	<i>National</i>
Short summary of the practice	

Estonia's Zero-Emission Vehicle Purchase Support Program, managed by the Environmental Investment Centre (KIK), provides financial incentives for individuals and businesses to purchase electric vehicles (EVs) and reduce transport-related emissions

Detailed information on the practice:

Estonia launched the Zero-Emission Vehicle Purchase Support Program to promote the adoption of electric vehicles (EVs) and reduce greenhouse gas emissions in the transport sector. The program is funded by the European Union Recovery and Resilience Facility and focuses on encouraging private and business users to switch from fossil-fuel vehicles to cleaner alternatives.

Key Objectives and Implementation:

- **Financial Support for EVs:**
 - Individuals and businesses can receive up to €4,000 per electric vehicle to encourage adoption.
 - A total budget of €10 million has been allocated for the program.
 - The program applies to new electric passenger cars (M1) and small commercial vehicles (N1) with zero emissions.
- **Environmental Impact:**
 - The initiative supports Estonia's goal to reduce transport sector emissions by 55% by 2030 in line with EU climate targets.
 - Encourages businesses to transition their fleets to sustainable alternatives.
- **Application Process:**
 - Applicants must register the vehicle in Estonia for at least four years after receiving the grant.
 - The subsidy applies only to vehicles with a net price below €60,000 (excluding VAT).
 -
 - The application period is open until 2024 or until funds are exhausted.
- **Stakeholders and Beneficiaries:**
 - The program is managed by the Environmental Investment Centre (KIK).
 - Private individuals, businesses, and leasing companies are eligible beneficiaries.
 - Estonia's Ministry of Climate oversees the overall policy framework for transport decarbonization.

Some details:	
Resources needed:	€10 million in funding from the EU Recovery and Resilience Facility. Administrative and technical support from KIK and the Ministry of Climate.
Timescale (start/end date):	2023- currently
Evidence of success (results achieved):	Since the launch of the program, over 2,000 applications have been submitted, highlighting strong public interest and demand. The initiative is expected to lead to significant CO ₂ reductions by replacing fossil-fuel vehicles with electric alternatives. It also provides a substantial boost to Estonia's electric vehicle (EV) market, encouraging both businesses and individuals to adopt zero-emission transport solutions. Additionally, the growing number of electric vehicles is driving the expansion of the national EV infrastructure, increasing the demand for public charging stations.
Challenges encountered:	Despite the program's success, several challenges remain. Limited awareness persists among potential applicants, with some unsure about the application process or eligibility requirements. Additionally, the high initial cost of electric vehicles continues to pose a barrier for many, even with available subsidies. Finally, the expansion of Estonia's public and private charging infrastructure is essential to support wider adoption and ensure convenient access to charging for all users.

Potential for learning or transfer:	Estonia's Zero-Emission Vehicle Purchase Support Program offers a scalable model for regions and countries seeking to accelerate electric vehicle (EV) adoption. Several key lessons can be drawn from its implementation: • Direct financial incentives are effective in promoting the uptake of clean vehicles. • Targeted support for businesses facilitates the decarbonization of commercial transport fleets. • Long-term vehicle registration requirements help prevent misuse of subsidies. • Coordinating EV adoption with strategic investments in charging infrastructure ensures seamless integration into national transport systems. • Flexible and user-friendly application processes encourage participation from both individuals and businesses. This model can be adapted by other EU member states and regions aiming to advance sustainable mobility and meet the European Green Deal and climate neutrality targets.
Further information:	https://kik.ee/et/toetatavad-tegevused/nullheitega-soidukite-ostutoetus info@kik.ee

Collaboration with Vocational Training Centers (FP) to Enhance Skills in Electric Mobility

Country and City

Spain, Barcelona

Organisation name	Powerdot
Practice image:	
Geographical scope of the practice:	<i>Regional</i>
Short summary of the practice	
Powerdot collaborates with vocational training centers to develop innovative solutions for EV charging stations, fostering student engagement and professional growth.	
Detailed information on the practice:	
Powerdot is participating in a program that connects companies with vocational training centers to develop innovative projects that create social, economic, and cultural value. By presenting real-world challenges, we encourage students to actively participate in identifying innovative solutions, reinforcing our commitment to sustainability and accessibility. The project follows three key stages: • Exploration and creativity: Teams analyze the problem and develop innovative ideas.	

- Prototyping: The most promising proposals are transformed into functional prototypes.
- Final presentations: Teams showcase their solutions, and a winner is selected.

As part of the initiative, students will visit one of our locations to experience the charging stations firsthand. During the visit, they will engage with technical and operational aspects, ask questions, and receive direct feedback to refine their proposals.

Some details:

- | | |
|--------------------------|---|
| Resources needed: | <ul style="list-style-type: none"> ● Funding for curriculum development and training materials. ● Technical personnel and specialized instructors. ● Physical spaces and materials for practical training. |
|--------------------------|---|

Timescale (start/end date):	2024- ongoing
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- | | |
|--|---|
| Evidence of success (results achieved): | <ul style="list-style-type: none"> ● Implementation of training programs in electric mobility. ● Participation of 19 student teams in the challenge. ● Creation of innovative proposals for accessible EV charging stations. |
|--|---|

Challenges encountered:	
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Potential for learning or transfer:	This collaboration model presents a valuable opportunity for replication in other regions, as it bridges the gap between vocational education and industry needs. By adapting training content to local market demands, companies and educational institutions can create tailored programs that enhance workforce readiness.
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The integration of hands-on experience with real-world industry challenges not only strengthens technical competencies but also fosters problem-solving, teamwork, and creativity among students. This approach prepares them for dynamic work environments while encouraging innovation in vocational training. Additionally, the model promotes stronger collaboration between businesses and educational centers, leading to long-term partnerships that benefit both sectors. Companies gain access to fresh ideas and future talent, while students receive practical exposure and career-building opportunities. By implementing similar initiatives, other regions can enhance the employability of vocational students, support the development of emerging industries, and contribute to a more sustainable and inclusive workforce.	
Further information:	cac@powerdot.es

Recharging Stations For Electric Vehicles	
Country and City	Romania, Constanta
Organisation name	The City Hall of Constanta

Practice image:	
Geographical scope of the practice:	<i>Local</i>
Short summary of the practice	
The project is financed by the Bucharest Environment Fund Administration, through the Program on the reduction of greenhouse gas emissions in transport, by promoting infrastructure for energy-efficient road transport vehicles.	
Detailed information on the practice:	
The City Hall of Constanta is implementing the project "Recharging stations for electric vehicles in the Municipality of Constanta". Objective: Reducing greenhouse gas emissions from car traffic by developing infrastructure to power vehicles with electricity. The project is financed by the Bucharest Environment Fund Administration, through the Program on the reduction of greenhouse gas emissions in transport, by promoting infrastructure for energy-efficient road transport vehicles. Each station consists of two recharging points (one direct current with a power of 50 kW and one alternating current with a power of 22 kW). The 18 stations for recharging electric cars will be able to be used by drivers in the coming period. They are located on the main traffic arteries and in the Mamaia resort.	

Some details:		
Resources needed:	The total value of the project is 882,945.51 EUR (VAT included), of which the value of eligible expenses is 767,914.682 EUR.	
Timescale (start/end date):	2021-2025	
Evidence of success (results achieved):	Reducing greenhouse gas emissions from car traffic by developing infrastructure to power vehicles with electricity.	
Challenges encountered:		
Potential for learning or transfer:	This practice offers valuable experiences for other cities, towns or even villages in the Constanta county and in the South East region of Romania, helping improving the air quality indicators and the people sustainable mentality.	
Further information:	https://primaria-constantia.ro/pagina-pmc/informatii-de-interes-public/proiecte-locale/proiecte-cu-finantare-europeana/	

Confartigianato Orderzo- Motta

Country and City	Italia, Treviso
Organisation name	Azionamento ecologico - Eco-friendly drive
Practice image:	
Geographical scope of the practice:	Regional
Short summary of the practice	
The association prioritizes electric mobility, anticipating changes in transportation and aiming to create local job opportunities. Its main focus is developing a network of charging stations in the region.	
Detailed information on the practice:	

The initiative began by identifying strategic locations for installing charging stations, often on public land, which required building effective relationships with local municipalities and the

provincial government. The next step involved selecting an energy supplier that was efficient,

competitive, and reasonably priced. Finally, the association sought out the best charging station products available, prioritizing quality, reliability, and professional support. The installation process actively involved local artisan businesses such as electricians, bricklayers, and carpenters, supporting the local economy.

Some details:

Resources needed:	Confartigianato Oderzo-Motta works with several partners for the purchase of charging stations, for the application that manages the purchase of energy from the customer, for the purchase of energy and for on-site installation. Here are some of the partners: - Ingeteam - E-station - Next-charge.
Timescale (start/end date):	2017-Ongoing
Evidence of success (results achieved):	The initiative attracted strong interest from several public entities, which were, at the time, unprepared for the mobility transition and uncertain about how to address the emerging infrastructure needs.
Challenges encountered:	

Potential for learning or transfer:	This initiative offers a valuable model for regions aiming to accelerate the transition to electric mobility. It demonstrates how local associations can take a proactive role in infrastructure planning, stakeholder coordination, and support for local businesses. The step-by-step approach—from site selection and collaboration with public authorities to market research and involvement of local artisans—can be replicated in other territories facing similar challenges. The project also highlights the importance of fostering public-private partnerships and building local capacity to ensure a sustainable and inclusive mobility shift
Further information:	https://www.confartigianatoservizi.it/

Euro Vial Lighting	
Country and City	Romania, Constanta
Organisation name	Euro Vial Lighting
Practice image:	
Geographical scope of the practice:	Local
Short summary of the practice	
Euro Vial Lighting, a key partner of Liceul Energetic Constanța, offers charging stations among its products, featuring user benefits that are in high demand.	
Detailed information on the practice:	

Euro Vial Lighting- as the main practicing partners of Liceul Energetic Constanta (Constanta Energetic Highschool) -offers to students the opportunity to observe important and extremely current characteristics:

1. Weather Protection: built from high quality materials, offering high protection against adverse weather conditions.
2. UV Resistance: keeping clean and fresh appearance over time.
3. Clean and Minimalist Design: fits perfectly in any urban or suburban context.
4. Easy to Use: equipped with standard power outlets, easy to manage through a patented management system.
5. Connectivity to E-Mobility Services: possibilities of being connected to external providers of e-mobility services, thus extending their functionality and accessibility.

Some details:

Resources needed:

**Timescale
(start/end date):**

2024- ongoing

**Evidence of
success (results
achieved):**

Increasing the number of charging stations in Constanta, SE region and NE region of Romania

**Challenges
encountered:**

Potential for learning transfer:	This practice can be adapted or replicated in different situations or settings, becoming relevant to others. It emphasize new skills, knowledge and perspectives providing for students.
Further information:	https://www.eurovial.ro/

Confartiagianato Marca Trevigiana: Promote electric mobility and the transition from termal vehicles to electric vehicles.	
Country and City	Italia, Treviso
Organisation name	Azionamento ecologico - Eco-friendly drive
Practice image:	

Geographical scope of the practice:

Regional

Short summary of the practice

Treviso Car Mobility supports all car repair companies in the transition phase towards electric mobility, providing training and both technical and administrative-bureaucratic assistance in the province.

It has been the promoter of a project for the conversion of a thermal vehicle into an electric one.

Detailed information on the practice:

As the Province of Treviso is relatively small, both the ordinary citizen and the car repairers are very prudent about electric mobility.

The cost of energy is very high and therefore not very cost-effective, except for those who have their own energy sources, mainly photovoltaic but also hydroelectric or biomass.

The electrical grid can currently handle the demand, but technicians predict that same difficulties will arise in the near future due to old infrastructures that are not suited for high-intensity electricity usage.

Treviso car mobility developed a kit to convert a thermal vehicle into an electric one, a few years ago.

The project was then interrupted due to the no longer competitive costs, especially after car manufacturers started producing mass-market electric vehicles. Additionally, in Italy, there was no possibility to homologate the vehicle and allow it to circulate.

Confartigianato spent a long time trying to resolve the issue with national institutions, but without success.

Confartigianato is also active in the area in terms of training both for car repairers and actively collaborating with the vocational schools, assisting with student internships, supporting technicians and raising awareness in the community.

Some details:

Resources needed:	Projects in the area are often supported by collaboration with the Chamber of Commerce and EBAV, the bilateral body for employers and employees. These organizations analyse the projects with their objectives, each time monitoring the activities and providing financial support to the initiatives.
Timescale (start/end date):	2012- Ongoing
Evidence of success (results achieved):	Treviso car mobility has been very successful among car repairers because it has provided technical skills related to electric and hybrid vehicles. It has provided technical courses to obtain the technical qualifications to safely work on electric and hybrid vehicles.
Challenges encountered:	The main challenge in promoting electric vehicles is overcoming scepticism from repairers and citizens. They doubt the potential of electric mobility and its nationwide feasibility, as well as its pollution-reducing benefits. Concerns about autonomy, recharging time, and costs persist.
Potential for learning or transfer:	Treviso Car mobility and Confartigianato have supported public institutions, which are often struggling to afford a very specific and technical matter. They have also provided assistance and expertise to the various public spheres by creating working groups to ensure the successful implementation of projects in the area.

Further information:	https://www.trevisocarmobility.it/
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B) VET and Technical Training for the E-Mobility Workforce

SEAT Apprenticeship Program in Electromobility	
Country and City	Spain, Barcelona
Organisation name	SEAT
Practice image:	

Geographical scope of the practice:

Local

Short summary of the practice

In response to the automotive sector's transition towards electrification, SEAT's School of Apprentices in Barcelona has incorporated electric mobility into its dual VET programs. The school equips young professionals with skills in electromobility technologies, aligning with the company's strategic vision for sustainability and the future of work.

Detailed information on the practice:

SEAT's School of Apprentices, located in Martorell (Barcelona) has operated for years under the German dual VET model, combining classroom instruction with in-company training. In recent years, SEAT has progressively adapted its programs to address the shift towards electric vehicles.

The integration of electric mobility includes:

- Specific modules on high-voltage systems, EV diagnostics, battery management, and safety protocols.
- Use of real EV platforms and components (including models such as the CUPRA Born) in hands-on training.
- Close mentoring by SEAT engineers, many of whom are involved in the company's R&D and electrification departments.
- Collaboration with the Generalitat de Catalunya and local training centres (e.g. Institut Escola del Treball, Institut Castellarnau) to disseminate expertise in EV systems.
- Inclusion of soft skills and sustainability awareness, reflecting the needs of a rapidly evolving industry.

The initiative also supports the company's broader goal of retraining workers and preparing new generations of technicians for the production of electric vehicles, in line with Volkswagen Group's investment in Martorell as a future hub for EV manufacturing.

Some details:

Resources needed:	• Technical training staff certified in electromobility. • Investment in modern EV equipment and diagnostic tools. • Collaboration with public education authorities. • Ongoing R&D input from SEAT engineers.
Timescale (start/end date):	2019-ongoing
Evidence of success (results achieved):	• More than 250 apprentices trained annually in dual programs, with increasing emphasis on electric mobility. • Over 90% employability rate after graduation. • The school received the "Premio Alianza para la FP Dual" in recognition of its excellence and innovation. • Positive evaluation by the Chamber of Commerce of Spain and international partners. • Increased participation of female students in technical EV-related fields.
Challenges encountered:	• Need for continuous curriculum updates due to the rapid pace of innovation in EV technologies. • Shortage of VET teachers with specific knowledge in electromobility. • Balancing standard curriculum with company-specific technical training.

Potential for learning or transfer:	The SEAT Apprenticeship School shows how a large automotive company can become a driver of transformation in VET systems. Its model is highly transferable to other industrial sectors undergoing green and digital transitions. Public-private partnerships, hands-on experience, and forward-looking skills are key to preparing youth for sustainable employment.
Further information:	https://jobsaprendices.seatjobs.com/

VET Program in Sustainable Mobility	
Country and City	Spain, Barcelona
Organisation name	Fundación Naturgy
Practice image:	 The logo for Naturgy Foundation, featuring the word "Naturgy" in a bold, blue, sans-serif font, with "Foundation" in a smaller, lighter blue font below it. To the right of the text is an orange graphic element resembling a stylized flame or a leaf.
Geographical scope of the practice:	National

Short summary of the practice

Fundación Naturgy, in collaboration with several vocational training centres in Spain, has launched a technical education programme focused on the maintenance of vehicles powered by compressed natural gas. The aim is to train professionals in sustainable mobility technologies through a combination of theoretical learning and hands-on experience.

Detailed information on the practice:

As part of its commitment to environmental sustainability and employability,

Fundación Naturgy developed a specialised vocational training initiative in alternative

fuel technologies. The training focuses on the maintenance and safety protocols for vehicles using CNG and includes:

- Vocational courses in vehicle electromobility and mechanics
- Official certificates in engine maintenance and auxiliary systems (Level 3)
-
- Basic training in mechanical and electrical vehicle operations (Level 1)

Participants have access to modern learning materials and simulation equipment provided by Fundación Naturgy. The programme also incorporates real-world training through partnerships with key companies in the mobility sector.

Several training centres across Catalonia are part of this initiative, including:

- Institut La Guineueta, Barcelona
- Institut Mare de Déu de la Mercè, Barcelona
- Institut Pere Martell, Tarragona
- Institut Caparrella, Lleida
- Institut Montilivi, Girona

Some details:

Resources needed:	• Specialised teaching materials on CNG and vehicle maintenance • Collaboration agreements with public VET centres and private companies • Technical infrastructure for hands-on training
Timescale (start/end date):	Programme initiated in 2020 – currently ongoing
Evidence of success (results achieved):	• Dozens of students trained annually in CNG vehicle technologies • Increased employability in the automotive and energy sectors • Strengthened cooperation between the VET system and sustainable transport industries
Challenges encountered:	• Rapid technological developments requiring constant curriculum updates • High costs associated with specialised equipment and maintenance tools
Potential for learning or transfer:	This model of collaboration between a private foundation, VET providers, and industry actors can be adapted to other clean mobility technologies such as electric or hydrogen vehicles. It provides a blueprint for future-ready vocational training systems aligned with sustainable transport goals.
Further information:	https://www.fundacionnaturgy.org/en/education-and-dissemination/vocational-training-for-employability/vocational-training-on-vehicular-natural-gas/

Toyota Safety First: Preparing VET students for Safe EV Handling

Country and City

Estonia, Tartu

Organisation name

Toyota Company

Practice image:

TOYOTA

Geographical scope of the practice:

Regional

Short summary of the practice	
Toyota in Tartu provides VET students with mandatory safety training on electric vehicles, including a comprehensive manual and a test, before starting their internships.	
Detailed information on the practice:	
In Tartu, Toyota has implemented a thorough safety training program for VET students before they begin their internships. As part of this initiative, students are required to read a 200-page manual on safety, which covers key aspects of working with electric vehicles (EVs) and best practices for accident prevention. After studying the material, students must complete a test to evaluate their understanding.	
Some details:	
Resources needed:	Online assessment platform for the test, and instructor supervision.
Timescale (start/end date):	2023- ongoing
Evidence of success (results achieved):	The program has significantly improved students' awareness of safety protocols, particularly in handling electric vehicles. Feedback from both students and supervisors indicates increased confidence and preparedness. No major safety incidents have been reported among trained students during internships, highlighting the program's effectiveness.

Challenges encountered:	Ensuring all students fully comprehend the extensive manual content and maintaining their engagement throughout the learning process.
Potential for learning transfer:	This practice can be easily adopted by other automotive companies or vocational training centers aiming to improve student safety in practical environments, especially in electric vehicle-related training
Further information:	Voco Center

Comiato Elettrotecnico Italiano	
Country and City	Italia, Treviso
Organisation name	Azionamento ecologico
Practice image:	 COMITATO ELETTROTECNICO ITALIANO

Geographical scope of the practice:	<i>Regional and National</i>
Short summary of the practice	
The CEI mandates that car repairers of electric and hybrid vehicles complete a compulsory course and register in a national database to certify their competence and ensure safe practices.	
Detailed information on the practice:	
The mandatory training course for professionals repairing electric and hybrid vehicles consists of 16 hours of instruction, combining both theoretical and practical components. The curriculum addresses key topics such as identifying electrical hazards, recognizing high-risk components, and adopting safe working practices. It also covers the correct use of personal protective equipment and safety devices during interventions. Additionally, participants learn how to position vehicles within the workshop, select the appropriate tools, and secure the working environment to ensure safety during repairs. The course concludes with a final examination to obtain the official qualification. To maintain certification, a 4-hour refresher course is required every four years. All courses are delivered by companies and trainers certified by the Ministry of Education.	
Some details:	
Resources needed:	The courses are organized by private training institutions and are paid for by participants. Some professional institutes also offer the possibility of obtaining this certification as part of their school curriculum.. For companies registered with EBAV there is the possibility of receiving a financial contribution for the training provided to their employees.
Timescale (start/end date):	2012- Ongoing

Evidence of success (results achieved):	The certification requirement has successfully motivated many car repairers to re-engage with formal training, strengthening their professional skills and fostering continuous learning. It has also significantly increased awareness of the electrical hazards associated with electric and hybrid vehicle components, promoting a stronger culture of safety and responsibility within the sector.
Challenges encountered:	
Potential for learning or transfer:	This Italian regulation highlights how setting mandatory qualification standards can drive widespread improvements in training and safety across an entire sector. By requiring certified personnel for the maintenance of electric and hybrid vehicles, manufacturers have been prompted to provide targeted training for their staff and to demand the same from partner companies. This model has also been adopted by rental vehicle fleets, further reinforcing the standard. Other countries or regions can learn from this approach to enhance workforce readiness, ensure consistent safety practices, and align vocational training with evolving industry needs.
Further information:	https://www.ceinorme.it/

Toyota Co-operation with selected VET-organisations	
Country and City	Finland, Rovaniemi
Organisation name	REDU

Practice image:	
Geographical scope of the practice:	National
Short summary of the practice	
Toyota Co-operation with selected VET-organisations. Goal is to improve VET- teachers further education and awareness of Toyota brand and it's car models.	
Detailed information on the practice:	
Toyota dealership has asked REDU to join this T-TEP (Toyota- Technical education Program) in 1995. Since then we have been a member of ten different VET- organisations together with Toyota dealership on Finland. Toyota's goal is to improve automotive teacher's technical skills and also offer short courses and information how to maintain and repair Toyota vehicles. Toyota has also offered various materials for teaching purposes. This co-operation has been very beneficial for the T-TEP members. Members of this group join together yearly to benchmark teaching methods and relevant information regarding to VET.	
Some details:	

Resources needed:	This resource is mainly offered by Toyota
Timescale (start/end date):	Ongoing
Evidence of success (results achieved):	Teachers are more suitable for the job.
Challenges encountered:	Difficult to find suitable date or place to organize meetings
Potential for learning or transfer:	To have detailed information about different car manufacturers can be costly.
Further information:	Hannu Uimaniemi@redu.fi

VET-training periods as a way of recruiting new employees	
Country and City	Finland, Rovaniemi
Organisation name	REDU

Practice image:	
Geographical scope of the practice:	Local, National
Short summary of the practice	
Car mechanic students spend at least 1/3 of their studies training in car companies. After and even during these periods companies can hire students to become their employees	
Detailed information on the practice:	
During the holiday season companies need to hire temporary staff. They have to start recruiting process few months earlier in order to get enough employees and they also need time to make proper induction to new employees. This requires a lot of time and effort in order to get properly done. VET-training periods offer companies a way to recruit enough staff for this purpose without separate recruiting process. During VET-training period companies can evaluate candidates who match their needs, they are able to give proper induction to new employees and can get enough labour this way. Students benefit about this as they get to know the job and its requirements beforehand so they are able decide whether this job is the one they are willing to apply. These periods of employment can be taken into account in studies as an apprenticeship period which may speed up students graduating. Main stakeholders and beneficiaries of this practice are logistics companies, students and VET organisations.	

Some details:	
Resources needed:	
Timescale (start/end date):	Ongoing
Evidence of success (results achieved):	Success isn't easily measurable by numbers. The best evidence of success is measured by our VET-training effectivity which shows that our students get a job by quite high percentage. Other evidence is that our students get training possibilities relatively easily from the delivery companies.
Challenges encountered:	One challenge in this practice is to train the staff at the companies to guide students to meet the expected goals of the studies at spesific part of the training.
Potential for learning or transfer:	This practice is widely accepted by the companies and it is normally a win-win situation for all parties involved in this process.
Further information:	Hannu Uimaniemi@redu.fi

Invest to return: Theory adapted to practise

**Country and
City**

Romania, Constanța

**Organisation
name**

Licee – Avia Motor

Practice image:



**Geographical
scope of the
practice:**

Local and National

Short summary of the practice

Due to funding cuts between 2007 and 2017, electrical theory was removed from VET curricula, creating a skills gap. Licee partnered with Avia Motors to reintroduce practical training and address industry needs.

Detailed information on the practice:

Between 2007 and 2017, government investment in VET (Vocational Education and Training) programs declined, leading to the removal of electrical theory from the curriculum. This caused an increased demand for professionals such as electricians, mechanics, and painters. Licee saw this challenge as an opportunity and collaborated with Avia Motors to integrate practical electrical knowledge into the training, addressing the gap left by the curriculum change.

Some details:

Resources needed:

Teachers, time, and funding.

Timescale (start/end date):

Evidence of success (results achieved):

Thanks to the partnership between Licee and Avia Motors, students gained access to hands-on electrical training, enhancing their employability and technical skills. Several graduates successfully entered the labour market in sectors such as automotive repair and electrical maintenance. The initiative also fostered stronger links between the school and local industry, ensuring training remained relevant to current market demands.

Challenges encountered:

The government showed little concern about the removal of electrical training from the curriculum, making it difficult to reintroduce the subject.

Potential for learning or transfer:	Despite challenges, building strong relationships—both formal and informal—with companies can help integrate essential knowledge into education, even in less-than-ideal circumstances.
Further information:	

C) Innovation and International Cooperation in VET

Auto Cove 2.0 : Automotice Engineering Education	
Country and City	Estonia, Tartu
Organisation name	Auto Cove 2.0 consortium
Practice image:	

**Geographical
scope of the
practice:**

EU wide

Short summary of the practice

Auto-Cove 2.0 consortium combats on its own behalf on climate

change by developing the European Education and Training Area in Vehicle Sector of VET towards greener innovations

Detailed information on the practice:

- Make skills-gap-analysis in vehicle field in 7 partner countries
- Develop technical innovative transnational study modules and training courses for secondary and tertiary level vehicle field education
- Upskill vehicle field teachers' and already working company representatives' know-how about clean-tech-vehicles
- Include different countries VET-policy makers and curriculum legislative bodies into the project as associate partners
- Produce and publishing all main project outputs on readily existing international platform
- Internationalize consortium's staff and students
- Attend two vehicle field international conferences and disseminate project outputs

There are 14.6 million people in Europe working in vehicle sector. For instance, vehicle sector employs 55.000 people in small Finland and 840.000 people in Germany.

Target groups

EUROPEAN / INTERNATIONAL LEVEL

- 3400 VET-schools in 70 countries, who already use Electude International platform.
- Higher Education Institutions (HEI).

- European Commission/EACEA.

REGIONAL / NATIONAL LEVEL

- Institutions and Organisations.
- VET- policy makers.
- Erasmus+ National Agencies.
- Boards of Education.
- National networks of employment.
- National networks Auto Cove 2.0 partners belong to.

LOCAL LEVEL

- Partner Organisations' staff.
- VET Providers' staff and learners.
- VET Schools' leaders
- Local authorities.
- Companies and Business actors
- Organisations engaged in national networks of Stakeholders.

Some details:

Resources needed:	This project is co-funded by Erasmus+
Timescale (start/end date):	June 2023 – May 2027
Evidence of success (results achieved):	Auto CoVE is an ongoing initiative that has already demonstrated positive impacts in bridging vocational education with the evolving needs of the automotive sector. The project has successfully initiated collaboration between VET institutions, industry experts, and policymakers to develop specialized curricula in electric and hydrogen mobility. Preliminary results show increased industry engagement, early

	adoption of new training modules, and a growing interest from students in sustainable mobility careers. Initial feedback from stakeholders highlights the potential for long-term improvements in employability and skills alignment with industry needs.
Challenges encountered:	Adapting to rapidly evolving technologies in electric and hydrogen mobility has posed challenges, requiring continuous updates to training materials and investment in modern equipment. Additionally, coordinating diverse stakeholders across different regions has required significant effort to ensure alignment in objectives and execution.
Potential for learning or transfer:	Auto CoVE's approach provides valuable lessons for other regions looking to modernize their vocational training in automotive technologies. The structured collaboration between education providers and industry ensures that training remains relevant to labor market demands. The project also serves as a model for integrating emerging technologies into VET curricula, highlighting best practices in industry-driven apprenticeships, flexible curriculum design, and investment strategies for upskilling the workforce. Its emphasis on electric and hydrogen mobility makes it particularly relevant for regions aiming to transition toward sustainable transportation.
Further information:	https://www.autocove.eu/about-us/ elina.kollanus@omnia.fi

Car Mechanic's Pictionary	
Country and City	Multinational (Estonia, France, Germany, Spain, Lithuania, Slovenia,)

Organisation name	Partnership of VET and HE organizations (Erasmus+ Strategic Partnership for Innovation)- in Tartu VOCCO
Practice image:	
Geographical scope of the practice:	<i>Regional</i>
Short summary of the practice	
Estonia's Zero-Emission Vehicle Purchase Support Program, managed by the Environmental Investment Centre (KIK), provides financial incentives for individuals and businesses to purchase electric vehicles (EVs) and reduce transport-related emissions	
Detailed information on the practice:	
The <i>Multilingual Car Mechanics E-Pictionary</i> aims to expand the existing English platform into six European languages—French, German, Spanish, Lithuanian, Slovenian, and Estonian. Developed by a consortium of VET and HE institutions, the platform offers a visual glossary of car mechanics terminology, illustrated with images of components such as the engine, chassis, tools, electronics, as well as systems related to hybrid and electric vehicles, supporting multilingual learning in the evolving automotive sector.	

Some details:	
Resources needed:	Technical Support • Web development to add multilingual functionality and maintain the platform. Translation and Content Experts • Translators and automotive specialists to ensure accurate terminology in six languages. • Experts in hybrid and electric vehicle systems for updated content. Visual Materials • Images or diagrams of car parts, including traditional, hybrid, and electric components. Partnership Coordination • Collaboration between VET and HE institutions for content validation and updates. Basic Promotion • Materials and channels to share the platform with educators, students, and training centers.
Timescale (start/end date):	January to October 2025
Evidence of success (results achieved):	The success of the <i>Carpictionary</i> platform is evidenced by its effective use in vocational and higher education settings across Europe. The original English version has received positive feedback from both educators and learners for its clarity, visual quality, and practical application in automotive training. It has been integrated into teaching practices and curricula, supporting both in-class and remote learning. The platform's steady usage and user engagement, including regular visits and resource downloads, confirm its value. The decision

	to expand into six additional European languages is based on this demonstrated impact and the growing demand for accessible, multilingual tools in technical education.
Challenges encountered:	Ensuring consistency in translations across different languages, integrating search engine functionality for user accessibility, and maintaining the platform's user-friendliness.
Potential for learning or transfer:	The project will create a vast, user-friendly digital database of car mechanics terms, searchable by keyword and accessible on any device. This online resource will be invaluable for VET students, professionals, and lifelong learners, supporting both distant learning and ongoing skill development across Europe. It can serve as a model for other fields of technical education in adapting to the digital era.
Further information:	www.carpictionary.eu

Smart Energy Expo	
Country and City	Romania, Constanta
Organisation name	Chamber of Commerce, Industry, Navigation and Agriculture of Constanta (CCINA)

Practice image:	
Geographical scope of the practice:	<i>Local</i>
Short summary of the practice	
The Chamber of Commerce, Industry, Navigation and Agriculture of Constanta organizes one of the newest tech fairs connected to the sustainable needs of technologies. SMART ENERGY EXPO brings together exhibitors from various fields such as renewable energy, photovoltaic systems, electric car charging stations, lighting solutions and many more.	
Detailed information on the practice:	
Since 2021 the Chamber of Commerce, Industry, Navigation and Agriculture of Constanta organizes SMART ENERGY EXPO as an excellent opportunity to showcase products and solutions to an interested and diverse audience. This expo fair has at least two sections: <i>Innovation and Technology</i>- promoting the latest technologies and solutions in the field of smart energy, ensuring that participants are always up to date with the latest trends. <i>Education and Information</i>- offering training sessions and workshops supported by experts, designed to improve the knowledge and professional skills of participants. This last section	

involve the VET highschoools and their students or teachers, participating at different workshops and meetings. Students have the opportunity to see the the latest trends in electric field and not only.

Some details:

Resources needed:

CCINA members and partners provide all the needed resources

Timescale (start/end date):

Since 2021 every year (in autumn)

Evidence of success (results achieved):

The program has seen a significant increase in female participation, with women representing 40% of participants in 2023, compared to just 15% in 2020. Over 60% of graduates secure jobs in the electric mobility sector within six months. The adoption of electric vehicles in Catalonia has also grown, contributing to sustainability goals.

Challenges encountered:

Potential for learning or transfer:

This practice offers valuable lessons for other regions looking to address gender imbalance in technical sectors. The combination of practical training, targeted outreach, and industry collaboration can be replicated to encourage women's participation in electric mobility. Additionally, it helps accelerate the adoption of sustainable transportation solutions

Further information:

<https://www.ccina.ro/>

Euro Vial Lighting

Country and City

Romania, Constanta

Organisation name

Faculty of mechanical, industrial and maritime engineering-
Constanta Ovidius University

Practice image:



Geographical scope of the practice:

Local

Short summary of the practice

Smart Air car demonstrates how technology can be used to create sustainable and smart solutions for the future.

Detailed information on the practice:

A team of teachers and students from Constanta Ovidius University(Faculty of mechanical, industrial and maritime engineering) and a Constanta VET Highschools(Liceul Energetic, Liceul D.Leonida), in collaboration with Constanta Maritime University have refurbished an old electric car, equipping it with state-of-the-art technology and naming Smart Air. As cities face similar challenges, projects like this demonstrate how technology can be used to create sustainable and smart solutions for the future. The vehicle has been equipped with a series of advanced sensors, cameras and equipment capable of recording and interpreting complex data, including through the use of Artificial Intelligence. These technologies allow the vehicle to monitor traffic flow and pollution levels in different areas of the city in real time.

The Smart car is equipped with air quality sensors that measure levels of particulate matter and other air pollutants generated by cars in urban traffic. Cameras mounted on the vehicle provide

detailed images of the traffic, allowing Artificial Intelligence algorithms to analyze vehicle density and speed in real time. All this data is collected and transmitted to a digital platform, where it is interpreted and displayed on an interactive map.

Users of the platform will be able to access real-time data to avoid congested routes or areas with high pollution. This not only improves transport efficiency, but also helps reduce exposure to harmful pollutants. In addition, road managers can use this information to make informed decisions about traffic management and implementing solutions to improve air quality.

<https://youtu.be/Y35R1duBPiM?feature=shared>

As cities face similar challenges, projects like this demonstrate how technology can be used to create sustainable and smart solutions for the future.

Some details:

Resources needed:	Own financial resources and support from Constanta Exclusive Auto company(as practicing partner of Liceul D.Leonida)
Timescale (start/end date):	2024- ongoing
Evidence of success (results achieved):	This prototype has already participated to some exhibitions and the two teachers involve different new students to learn and to be innovative in this challenge. https://www.dobrogeaexplore.ro/masina-inteligenta-care-poate-schimba-constant-a-video-reportaj/
Challenges encountered:	
Potential learning transfer:	The two teachers involve different new students to learn, to practice, to create and to be innovative in this challenge.
Further information:	https://www.dobrogeaexplore.ro/masina-inteligenta-care-poate-schimba-constant-a-video-reportaj/

Cooperation between VET organisations, central organisations (employees, employers) and authorities nationally	
Country and City	Finland, Rovaniemi
Organisation name	REDU
Practice image:	 The logo for REDU, featuring a green stylized leaf or tree icon to the left of the word "REDU" in a bold, green, sans-serif font.

**Geographical
scope of the
practice:**

National

Short summary of the practice

In Finland, parties influencing the car sector co-operate extensively and in various ways in development work related to the sector.

Detailed information on the practice:

Working life (employers, employees), VET organisers and relevant authorities are actively cooperating, for example in reforming the diplom criteria, reforming legislation in the field and evaluating educational needs.

The work on reforming the diplom criteria takes into account the views of working life and various fields of study, but the work is carried out in close co-operation with the education providers and the National Board of Education. The result of this cooperation in the field is the widest possible common understanding and state of mind about the educational needs and the contents of the education.

There is also a wide range of co-operation in the reform of legislation in this area, and industry is generally well placed to influence and comment on legislation at various stages of its preparation.

The Finnish Ministry of Education and Culture and the National Board of Education maintain a joint expert group on foresight - the Competence Foresight Forum (OEF). The Competence Foresight Forum is divided into industry-specific foresight groups, each with 15-25 members. The steering group and foresight groups of the Competence Foresight Forum are represented by employers, employees and entrepreneurs, vocational education and training providers and universities, teaching staff, representatives of research in the field and the education administration. The steering group also includes representatives of students in vocational education and higher education, experts in education research and

evaluation, and regional foresight. The basic idea of the competence foresight forum is to bring the various parties in education and working life into a common dialogue about the future. OEF produces, analyzes and disseminates foresight information and raises training development needs based on foresight information.

Some details:

Resources needed:	
Timescale (start/end date):	Ongoing
Evidence of success (results achieved):	VET organisations and industry have a shared view on the promotion of VET training in the field and skills that are needed among the field.
Challenges encountered:	One challenge was overcoming the skepticism around women's abilities in technical fields. Additionally, securing partnerships with local businesses for internships and navigating regulatory hurdles for funding and infrastructure support posed initial difficulties. Despite this, the project has successfully gained momentum over time.
Potential for learning transfer:	Extensive co-operation brings out the perspectives of the various players in the sector and in this way creates a consensus and a common will on how things should be done. A better understanding of the operating environment and realities of the various parties.
Further information:	Hannu Uimaniemi@redu.fi

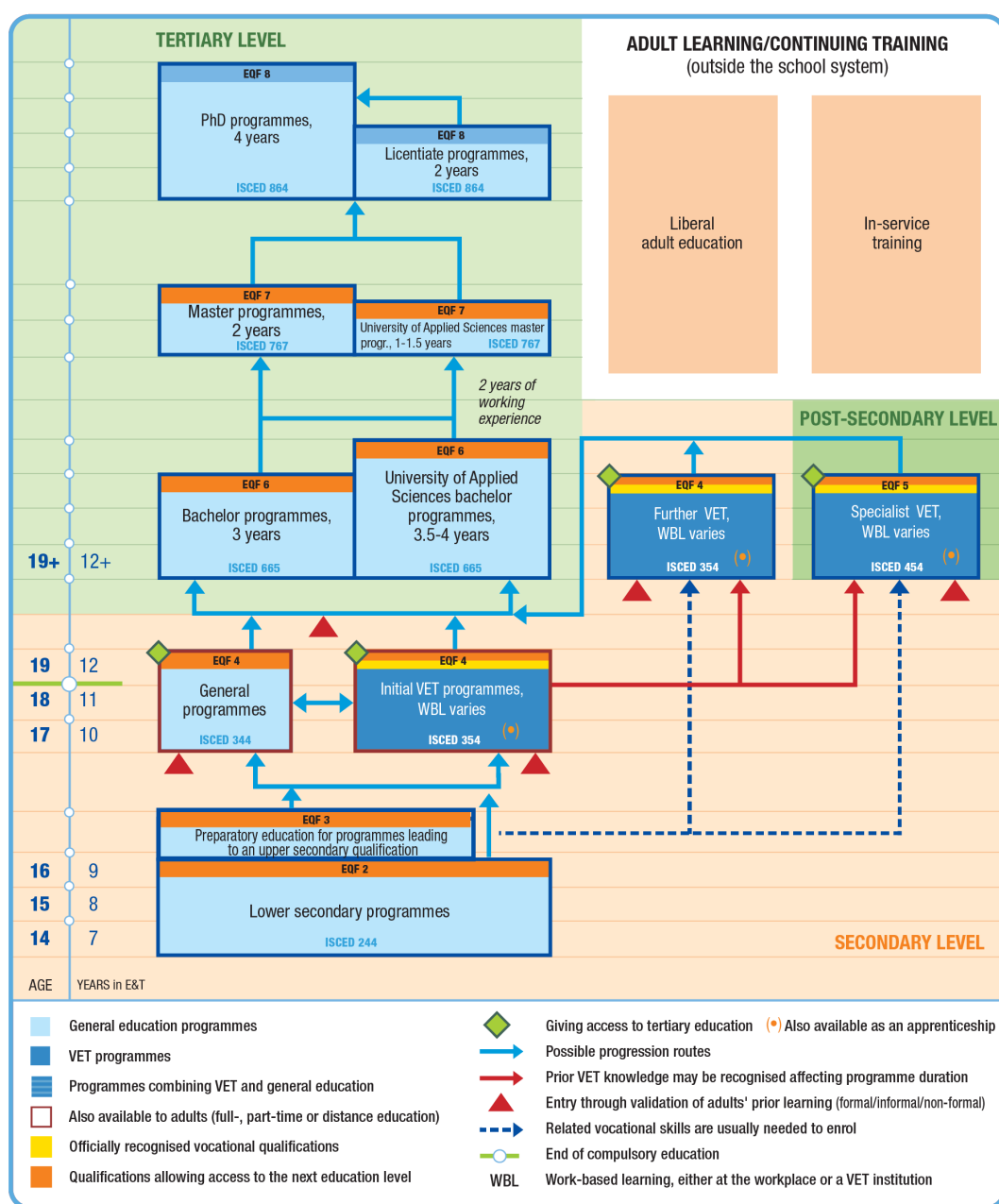
List of Acronyms

- **ANPAL** – National Agency for Active Labour Policies (Italy)
- **CNCP** – National Catalogue of Professional Qualifications (Spain)
- **CVET** – Continuing Vocational Education and Training
- **ECTS** – European Credit Transfer and Accumulation System
- **EIT** – European Institute of Innovation and Technology
- **EQF** – European Qualifications Framework
- **EQAVET** – European Quality Assurance in Vocational Education and Training
- **ESO** – Educación Secundaria Obligatoria (Compulsory Secondary Education – Spain)
- **EU** – European Union
- **EV** – Electric Vehicle
- **FCT** – Formación en Centros de Trabajo (Workplace Training – Spain)
- **FP** – Formación Profesional (Vocational Education and Training – Spain)
- **IAL** – Istituto per l’Addestramento dei Lavoratori (Italy)
- **IeFP** – Istruzione e Formazione Professionale (Italy)
- **IMg** – Marginal Revenue
- **INAPP** – National Institute for Public Policy Analysis (Italy)
- **IVET** – Initial Vocational Education and Training
- **LUT** – Lappeenranta-Lahti University of Technology (Finland)
- **MEFP** – Ministry of Education, Vocational Training and Sports (Spain)

- **MEF** – Ministry of Economy and Finance (Italy)
- **OSKA** – Occupational Sectoral Qualifications System (Estonia)
- **PES-PAV** – Personal Electrically Skilled/Authorised Person Certification (Italy)
- **PFI** – Programa de Formación e Inserción (Training and Insertion Program – Spain)
- **PNRR** – National Recovery and Resilience Plan (Italy)
- **SDGs** – Sustainable Development Goals
- **STE** – Simulated Training Enterprise
- **TVET** – Technical and Vocational Education and Training
- **VET** – Vocational Education and Training
- **VOCO** – Tartu Vocational Education Centre (Estonia)
- **WBL** – Work-Based Learning

Annex

Annex 1. Vocational education and training system in Finland.



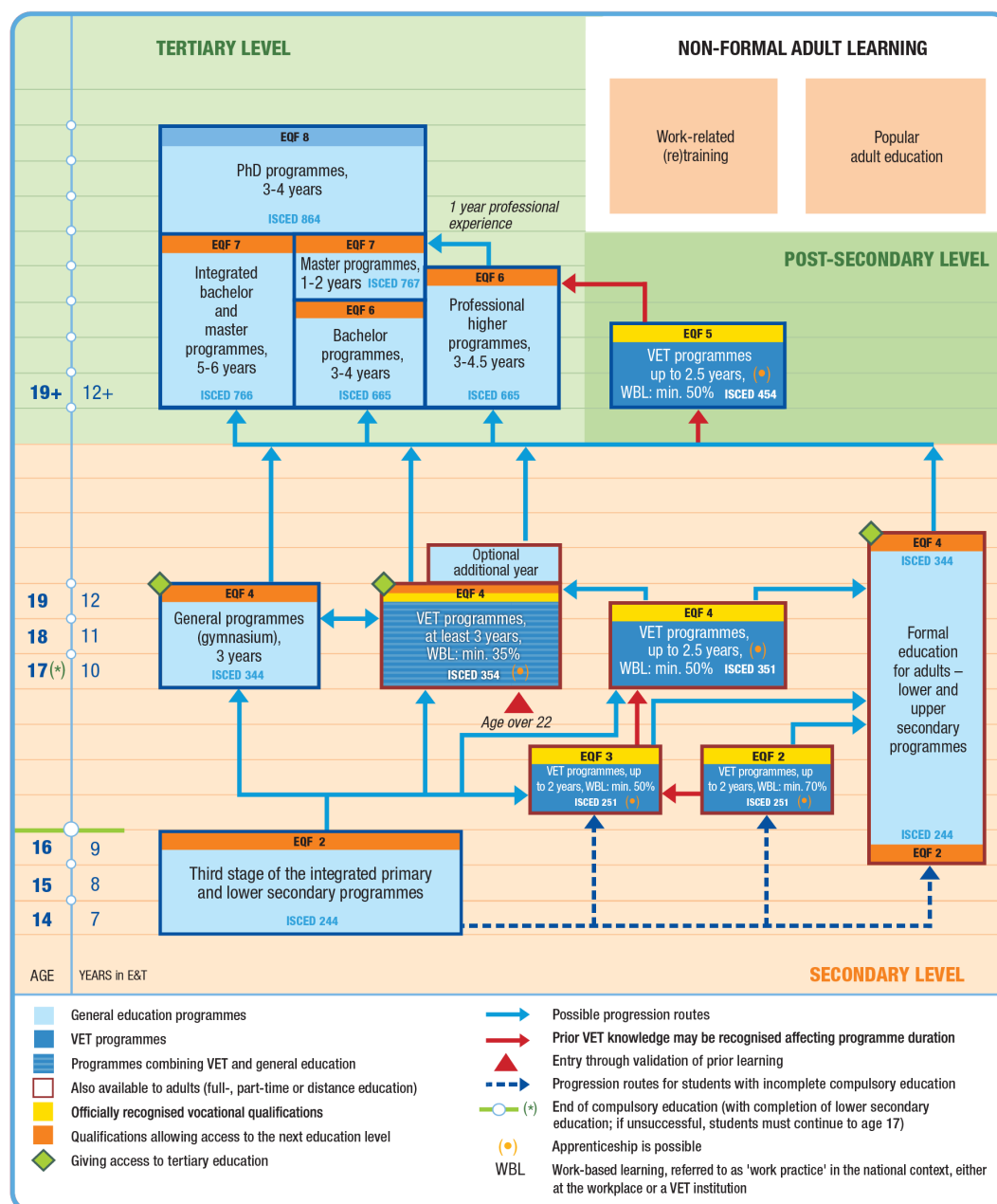
NB: ISCED-P 2011.

Source: Cedefop, & Finnish National Agency for Education. (2023). Vocational education and training in Europe – Finland: system description.

In Cedefop, & ReferNet. (2024). Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions [Database].

www.cedefop.europa.eu/en/tools/vet-in-europe/systems/finland-u3

Annex 2. Vocational education and training system in Estonia.



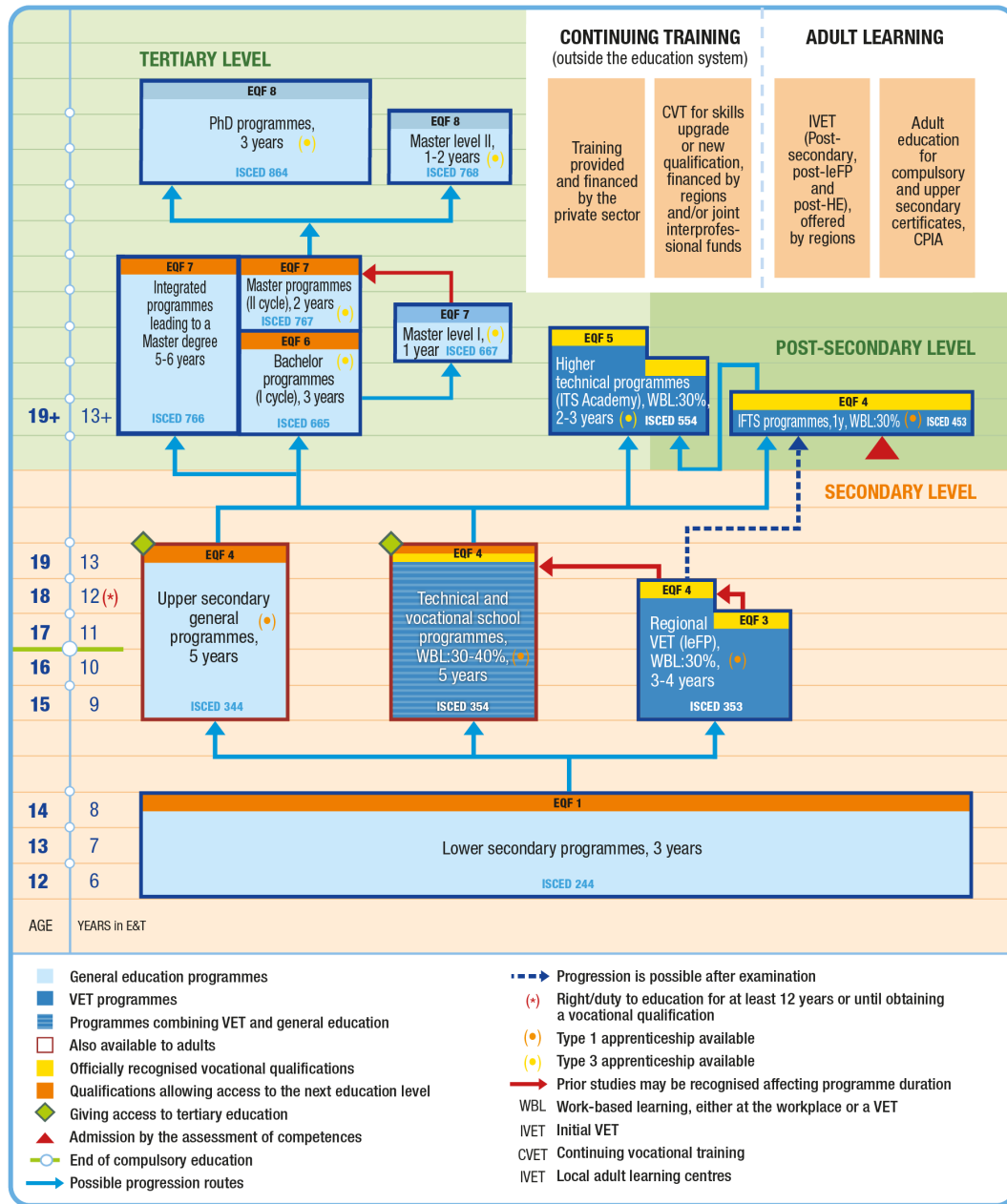
NB: ISCED-P 2011.

Source: Cedefop, & Estonian Ministry of Education and Research. (2023). Vocational education and training in Europe – Estonia: system description.

In Cedefop, & ReferNet. (2024). Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions [Database].

www.cedefop.europa.eu/en/tools/vet-in-europe/systems/estonia-u3

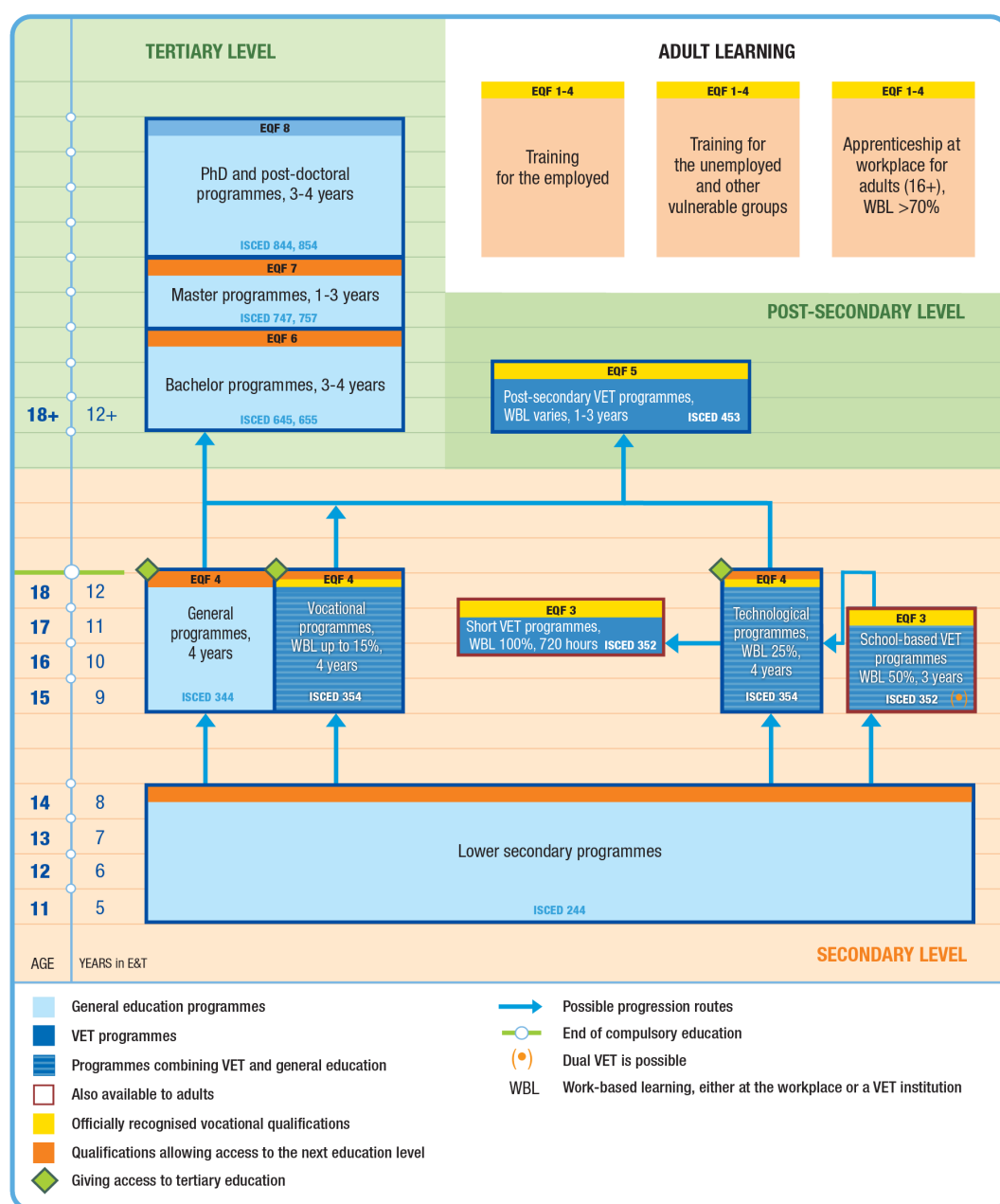
Annex 3. Vocational education and training system in Italy.



NB: ISCED-P 2011.

Source: Cedefop, & National Institute for the Analysis of Public Policies (INAPP). (2023). Vocational education and training in Europe – Italy: system description. In Cedefop, & ReferNet. (2024). *Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions* [Database]. www.cedefop.europa.eu/en/tools/vet-in-europe/systems/italy-u3

Annex 4. Vocational education and training system in Romania.



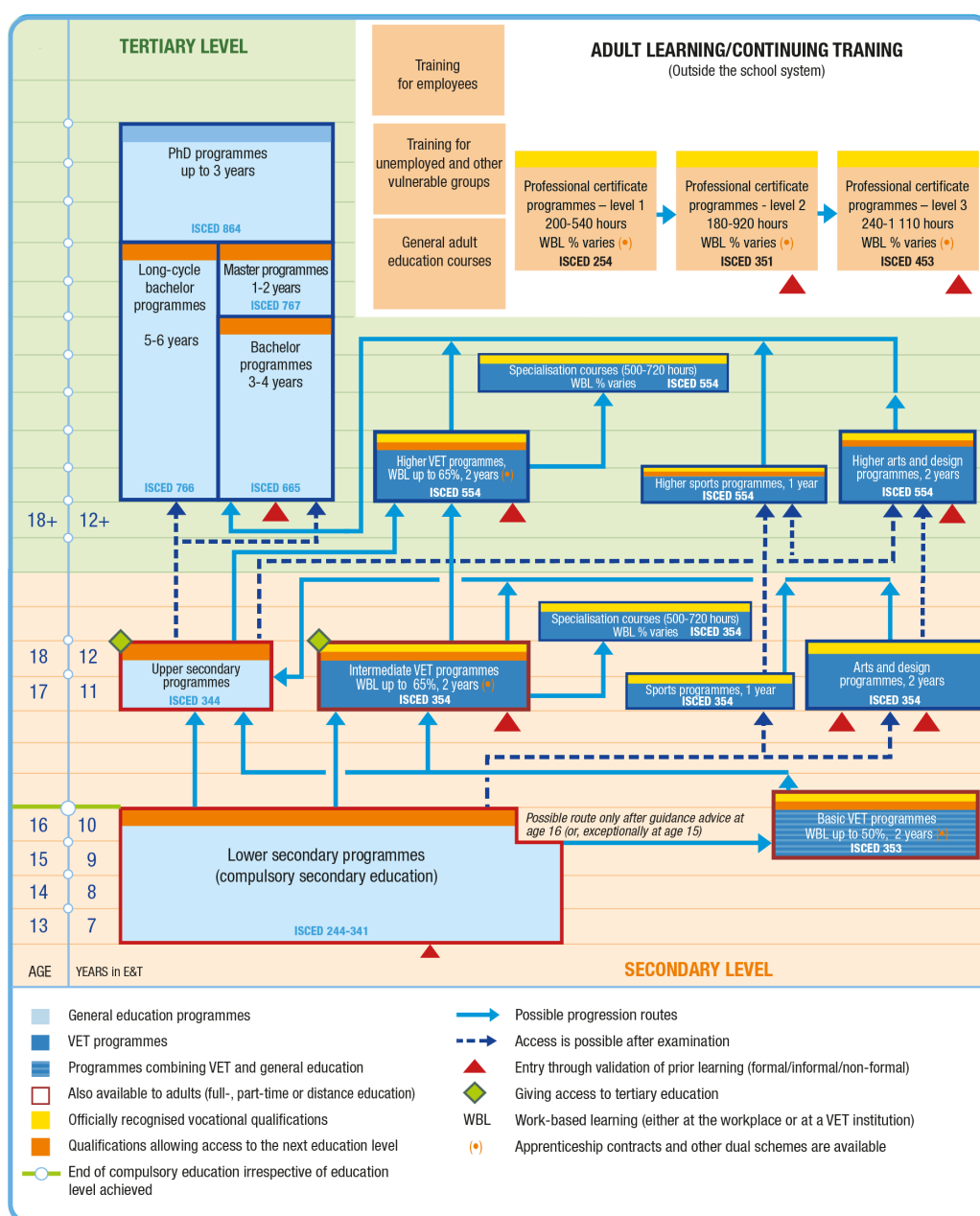
NB: ISCED-P 2011.

Source: Cedefop, & National Centre for TVET Development. (2023). Vocational education and training in Europe – Romania: system description.

In Cedefop, & ReferNet. (2024). Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions [Database].

www.cedefop.europa.eu/en/tools/vet-in-europe/systems/romania-u3

Annex 5. Vocational education and training system in Spain.



NB: ISCED-P 2011. The Spanish education system is not referenced to EQF levels.

Source: Cedefop, & State Foundation for Training in Employment (Fundae). (2023). Vocational education and training in Europe – Spain: system description. In Cedefop, & ReferNet. (2024). Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions [Database]. www.cedefop.europa.eu/en/tools/vet-in-europe/systems/spain-u3

6. References.

- ANPAL Servizi. (2020). *Modello di apprendimento duale e contratto di apprendistato*. <https://www.anpalservizi.it>
- BOE (2022). Ley Orgánica 3/2022, de 31 de marzo, de ordenación e integración de la Formación Profesional. Boletín Oficial del Estado. Disponible en: <https://www.boe.es/eli/es/lo/2022/03/31/3>
- Cedefop & INAPP. (2023). *Vocational education and training in Europe – Italy: system description*. In Cedefop & ReferNet. *VET in Europe database*. Retrieved from <https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/italy-u3>
- Cedefop (2020). VET in Europe: Estonia – Country Report. [Estonia | CEDEFOP](#)
- Cedefop (2023). Vocational Education and Training in Europe – Spain. Cedefop – European Centre for the Development of Vocational Training.: <https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/spain>
- Cedefop (2023). *Vocational education and training in Europe – Trends, challenges and opportunities*. <https://www.cedefop.europa.eu/>
- Cedefop, & Estonian Ministry of Education and Research. (2023). Vocational education and training in Europe – Estonia: system description. In Cedefop, & ReferNet. (2024). *Vocational education and training in Europe: VET in Europe database – detailed VET system descriptions* [Database]. <https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/estonia-u3>
- Cedefop. (2015). *Skill shortages and gaps in European enterprises*. Luxembourg: Publications Office. <https://doi.org/10.2801/042499>
- Cedefop. (2020). *Vocational education and training in Europe: Finland*. <https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/finland-u2>
- **City of Tartu**. (2023). *Green City and Smart City Initiatives*. Tartu City Government. <https://tartu.ee/en>
- Confartigianato Marca Trevigiana. (2023). *Treviso Car Mobility project*. Retrieved from: <https://www.trevisocarmobility.it>
- Education Estonia (2023). Vocational Education and Training Overview. [Explore Estonian Vocational Education](#)
- **Education Estonia**. (2023). *Vocational Education and Training Overview*. Retrieved from: <https://educationestonia.org/vet>
- EIT InnoEnergy (2023). *European Battery Alliance*. <https://www.eba250.com>
- ElectriCars VET Hub (2024). *Project Overview*. Xarxa FP. <https://www.xarxafp.org/actions/vet-innovation/electriccars-vet-hub/>
- Estonian Ministry of Education and Research (2022). Annex – National Implementation Plan of the Council Recommendation on VET. [Annex - Estonian National Implementation Plan of the Council Recommendation on VET](#)
- European Commission (2019). *The European Green Deal*. https://ec.europa.eu/info/publications/communication-european-green-deal_en
- European Commission (2020). *Sustainable and Smart Mobility Strategy*. https://transport.ec.europa.eu/transport-themes/mobility-strategy_en
- European Commission (2021). *Fit for 55 Package*. https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541
- European Commission (2021). *Reducing emissions from transport*. https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-transport_en

- European Parliament and Council (2014). *Directive 2014/94/EU on the deployment of alternative fuels infrastructure*. Official Journal of the European Union, L 307.
- Finnish National Agency for Education. (2023). *Vocational education and training in Finland*. <https://www.oph.fi/en/education-system/vocational-education-and-training>
- Gobierno de España (2023). Plan de Recuperación, Transformación y Resiliencia – Componente 20: Modernización del sistema educativo y refuerzo de las capacidades del sistema nacional de ciencia, tecnología e innovación. Disponible en: <https://www.lamoncloa.gob.es/temas/fondos-recuperacion/Documents/05052021-Componente20.pdf>
- IAL FVG. (2020). *Simulated Enterprise Case Studies*.
- INAPP. (2018). *Studi internazionali comparativi su IeFP, IFTS, apprendistato*. <https://oa.inapp.org/handle/123456789/633>
- INAPP. (2022). *XIX Rapporto di monitoraggio del sistema duale nell'IeFP*. <https://oa.inapp.org/handle/20.500.12916/3542>
- **Kutsekoda – OSKA**. (2021). *Overview of Skills Needed for the Digital and Green Transition*. Retrieved from: <https://oska.kutsekoda.ee>
- Lapin Liitto. (2023). *Smart Specialisation in Lapland (S3)*. Council of Lapland. <https://www.lapinliitto.fi/en/>
- Lepido Rocco & Confartigianato Marca Trevigiana. (2023). *Technical training and VET collaboration for electric mobility in Treviso*. Internal documentation shared in the “Progetto Buone Prassi – marzo 2025”.
- MEF. (2021). *Piano Nazionale di Ripresa e Resilienza (PNRR)*. <https://www.mef.gov.it>
- Ministerio de Educación y Formación Profesional (MEFP) (2022). La nueva Formación Profesional: un sistema único para la cualificación y recualificación permanente. Gobierno de España. Disponible en: <https://www.todofp.es>
- Ministry of Education and Culture. (2023). Vocational education and training reform. <https://okm.fi/en/vocational-education-and-training>
- Observatori de l'FP. (2022). *Guía práctica para implementar la FP Dual en los ayuntamientos*. Fundació BCN Formació Professional. Recuperado de <https://www.fundaciobcnfp.cat/es/estudio/guia-practica-para-implementar-la-fp-dual-en-los-ayuntamientos/fundaciobcnfp.cat+3fundaciobcnfp.cat+3fundaciobcnfp.cat+3>
- Observatori de l'FP.. (2022b). El sector del vehículo eléctrico en clave de FP. Barcelona: Fundació BCN Formació Professional. Recuperado de <https://www.fundaciobcnfp.cat/es/estudio/el-sector-del-vehiculo-electrico-en-clave-de-fp/fundaciobcnfp.cat>
- Provincia di Treviso. (2023). *Mobility and sustainability policies*. Retrieved from: <https://www.provincia.treviso.it>
- Regione Lombardia. (n.d.). *Istruzione e formazione professionale - IeFP: che cos'è?*. Retrieved from <https://www.regione.lombardia.it/wps/portal/istituzionale/HP/formazioneprofessionale/iefp-cos-e>
- Riboni, E. (2021). *Apprendistato, la soluzione. Chi non ci crede?* Corriere della Sera.
- Scuola Centrale Formazione. (2018). *Impresa Formativa. Esperienze a confronto*.
- Sicurello, R. (2016). *Potential benefits and challenges of work-based learning*. Lifelong Lifewide Learning, 12(28), 1–19.
- Statistics Finland. (2023). Education Statistics. <https://stat.fi>
- Studyinfo. (2023). *Vocational education and training (VET)*. <https://opintopolku.fi/konfo/en/sivu/vocational-education-and-training-vet>

- **Tartu Vocational Education Centre (VOCO).** (2023). *AutoCoVE Project – Development of Training Modules in Sustainable Automotive Technology*. <https://en.voco.ee/development-projects/auto-cove>
- **Xarxa FP** (2024). *ELECTRICARS VET HUB – Promoting electric mobility through innovation in VET*. <https://www.xarxafp.org/actions/vet-innovation/electricars-vet-hub/>