WP4. “Training path design”

Training paths of “new skills” in Greece

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Content

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1 - Major findings from the Analysis of the national training offer in Greece

Industrialized construction in Greece, like in many other countries, is experiencing a transformation with the adoption of new technologies and methods aimed at increasing efficiency and sustainability. Especially for the four occupations that this study refers to, there are several skills that are becoming increasingly important.

While there are training opportunities available for the essential skills in Greece, the sufficiency and quality can vary. There is a notable presence of vocational training, but some specialized skills, particularly those related to new technologies and sustainability practices, may require further development.

Here's an overview of the current state of training offer in Greece for the mentioned occupations:

- There is an extent offer for electrical engineers considering their technical proficiency, knowledge of codes and standards, troubleshooting and problem-solving, reading blueprints and schematics, technological adaptability, and safety practices.
- Courses in HVAC systems are available, focusing on both theory and practical skills, while private training centres provide short courses and certifications in HVAC system design, installation, and maintenance.
- Limited formal training programs exist specifically for roof labourers. However, general construction programs at vocational schools often cover roofing techniques. Much of the skill development for roof labourers occurs through apprenticeships and hands-on experience under the guidance of experienced workers.
- The building construction labourer skills included are essential to meet the demands of modern industrialized construction and ensure high standards of quality and efficiency in the Greek construction industry. Nevertheless, the current training offer seems to need enhancement being the only of the four occupations with training gaps in more than two skills.

Overall, while the foundational training infrastructure exists, there is a need for continual enhancement to meet the evolving demands of industrialized construction in Greece.

Matches between the current training offer and the Map of Competences

According to the experts, the skills identified for the four occupations (electrical installer, HVAC engineering technician, roof labourer, building construction labourer) predominantly match the Map of Competences and specifically:

-The **Electrical installers** need to be highly skilled professionals, since the contemporary construction methods combine the traditional building techniques with advanced technologies such as IoT, BIM etc. In that sense, the presented training courses cover the needs of the Greek construction market. In addition, the "focus has been given on hospitality investments, since tourism has been booming in Greece for the last 5 years with a lot of brownfield investment projects".

-In a similar fashion, the **HVAC engineering technician** works in parallel with the electricians for new constructions or renovation projects. Even though geothermal solutions are not that common in Greece, however they seem to have gained ground in the last few years. In addition, training in energy efficiency technologies is quite often required.

-The **roof labourers** should be trained and upskilled, and the research results cover a large spectrum of their needs.

-The identified training schemes for the **building construction labourer** are deemed sufficient, in the sense that they provide a holistic view of the modern construction environment.

Major deviations of the current training offer from the Skills Map

At the same time, experts identified also important additions for specific skills:

-Even though geothermal solutions are not that common in Greece, however they seem to have gained ground in the last few years. HVAC engineering technician training in thermal insulations in addition with training in energy efficiency technologies is quite often required.

- An additional feature for the roof labourers would be training courses for thermal insulations, which are required by law in Greece for the fulfilment of the 2030 agenda.

- For the building construction labourer training in structural frame reinforcement activities is required by law in order to restore the standards of seismic insulation in contemporary structures but there is no corresponding training offer for the specific skill.

2 – The Greek scenario for a new training offer

The scope of this activity is to design a common framework for the training path and determine the elements to be included starting from the existing courses mapped in task 4.1. A series of experts' interviews[1] has been conducted with the purpose of validating the key findings of the desk research and/or completing any missing information on the current training offer to fill the identified skills gap, and the tables are thus exploiting the experts' view on the new scenario right to be integrated with the current offer.

For Electrical Installers:

Course 1 - Eco- Sensor Installation Technician

Course 2 - Sustainable Mechatronics and Electrical Systems Assembler

For HVAC Engineers:

Course 3 - Sustainable HVAC Systems Maintenance Technician

For Roof Labourers:

Course 4- Roof Conservation Green Techniques

For Building construction Labourers

Course 5- Modular Construction Blueprint Interpreter

Course 6- Sustainable Materials Maintenance and Demolition Assistant

Course 7 - Photovoltaic Wall Installation Assistant

Course 8- Modular Building Installation Technician

[1] At least 3 different experts have been interviewed in each country.

Course 1 - Green Sensor Installation Technician

Title of the module	**Eco- Sensor Installation Technician** EQF Level 4
Target Audience: **Duration:** **Prerequisites:**	• Individuals seeking to enter or upskill in the green building or environmental technology sectors, professionals in construction, energy management, or technical trades. • 60 hours (including theory and practical application). • Basic understanding of electrical systems, construction safety regulations, and proficiency in using hand tools or willingness to complete a short introductory course.
Expected results	By the end of this course, participants will acquire expertise in assembling and installing sensors within energy-efficient systems. They will gain practical skills to integrate sensors into construction projects, optimizing energy use and environmental impact. Trainees will also learn to troubleshoot and adapt sensor systems to meet sustainability goals. In addition, they will be prepared to assess the contribution of these sensors to green certifications and energy efficiency benchmarks.
Indicators	• Successful integration of sensors into smart building systems. • Reduction of energy consumption by 10-15% in simulated environments. • Compliance with green building standards and certifications. • Accurate documentation of sensor performance for energy audits. • Proficiency in using sensors within renewable energy systems (e.g., solar, wind). • Enhanced ability to monitor and maintain sensor efficiency.
Capacity	• Mastering sensor assembly, installation, and integration into smart systems. • Understanding green energy systems, regulatory frameworks, and their environmental impacts.

	• Developing practical troubleshooting skills to resolve sensor and system inefficiencies. • Gaining knowledge of energy conservation, renewable energy integration, and certification standards.
Knowledge	• Fundamentals of sensor technology and smart systems. • Understanding of energy-efficient and green energy systems. • Practical skills in assembling and installing environmental sensors. • Knowledge of energy conservation methods and their environmental impacts. • Familiarity with green building certifications and regulatory frameworks. • Proficiency in troubleshooting and maintaining sensor systems. • Integration of sensors within renewable energy systems (e.g., solar, wind). • Ability to assess and document the performance and efficiency of sensors for energy audits.
Contents	**1. Introduction to Green Building Concepts** • Overview of sustainable construction and green building principles. • Importance of energy efficiency and environmental impact reduction. • Understanding certifications: LEED, BREEAM, etc. **2. Types of Green Sensors and Their Applications** • Introduction to sensors used in green buildings (e.g., temperature, humidity, air quality, light sensors). • Energy management systems (EMS) and smart home technologies. • Case studies of sensor applications in green buildings. **3. Fundamentals of Sensor Installation** • Electrical and technical foundations for sensor installation. • Safety protocols and regulations (emphasis on eco-friendly practices). • Tools, equipment, and materials used in sensor installation. **4. Sustainable Power Systems for Sensors**

	• Solar panels and other renewable energy sources for powering sensors. • Low-energy consumption devices and battery management. • Practical installation techniques using sustainable energy. **5. Data Collection and Smart Building Automation** • How sensors collect and transmit data in a smart building system. • Integration of sensors into building management systems (BMS). • Monitoring and adjusting systems for energy efficiency and environmental sustainability. **6. Maintenance and Troubleshooting** • Regular sensor maintenance for green buildings. • Troubleshooting common issues in sensor installations. • Upgrading systems for improved energy performance. **7. Green Skills and Environmental Impact** • Reducing the environmental footprint of construction through green technologies. • Lifecycle impact of sensor installations: sourcing, use, and disposal. • Promoting sustainability through hands-on applications.

Course 2 - Sustainable Mechatronics and Electrical Systems Assembler

Title of the module	**Sustainable Mechatronics and Electrical Systems Assembler** EQF Level 4
Target Audience: **Duration:** **Prerequisites:**	• Aspiring technicians in renewable energy systems, construction, or manufacturing; professionals seeking upskilling in green technology and sustainable electrical/mechatronic assembly. • 80 hours (combination of theory, hands-on practice, and case studies) • Basic understanding of electrical systems and mechanical assembly, or completion of an introductory technical course.
Expected results	Upon completing the course, participants will gain proficiency in assembling electrical and mechatronic components used in green technologies, such as renewable energy systems and electric vehicles. They will also develop skills in optimizing these components for energy efficiency and sustainability, while ensuring compliance with environmental standards.
Indicators	• Successful assembly and integration of components into green technologies. • Application of sustainable methods during assembly. • Ability to troubleshoot and optimize component performance. • Compliance with environmental and energy-efficiency standards. • Increased system efficiency through component assembly
Capacity	• Mastering the assembly of electrical and mechatronic components. • Understanding energy-efficient design principles in green technologies. • Developing skills in troubleshooting and maintenance of mechatronic systems. • Gaining knowledge of renewable energy systems and their components.

	• Acquiring awareness of environmental standards and sustainability in mechatronics.
Knowledge	• Fundamentals of electrical and mechatronic component assembly. • Integration of components into renewable energy systems. • Knowledge of energy efficiency and sustainability in mechatronics. • Proficiency in working with motors, control units, and sensor systems. • Awareness of green industry standards and environmental regulations. • Troubleshooting and optimizing mechatronic systems for energy efficiency. • Familiarity with renewable energy systems (e.g., solar, wind, and electric mobility).
Contents	**1. Introduction to Green Electrical and Mechatronic Systems** • Overview of sustainable technologies in the electrical and mechatronic fields. • Principles of energy-efficient design and renewable energy integration. • Importance of reducing the environmental impact of electrical components. **2. Electrical Components and Green Technologies** • Understanding low-energy consumption electrical systems. • Introduction to renewable power sources (e.g., solar, wind, geothermal) used in electrical systems. • Case studies: Green electrical systems in practice. **3. Mechatronic Components and Sustainable Assembly** • Overview of mechatronics in eco-friendly automation systems. • Tools, techniques, and materials for green mechatronic assembly. • Applications of mechatronic components in green buildings and renewable energy projects. **4. Installation and Assembly Techniques** • Best practices for assembling green electrical systems.

	• Integration of renewable power sources into mechatronic systems. • Tools and safety considerations in assembling eco-friendly components. **5. Energy Storage and Management** • Introduction to energy-efficient storage solutions (e.g., battery systems, energy recovery). • How to optimize mechatronic systems for minimal energy consumption. • Real-world applications of energy management technologies in sustainable projects. **6. Smart Systems and Automation** • Incorporating smart technology in sustainable electrical and mechatronic systems. • Role of sensors, controllers, and automated systems in energy-efficient buildings. • Configuring automated systems for optimal energy use and performance. **7. Green Skills for Sustainable Development** • Environmental regulations and certifications relevant to electrical and mechatronic assembly. • Lifecycle impact of components: From sourcing materials to end-of-life recycling. • Promoting sustainability in technical practices. **8. Maintenance, Troubleshooting, and Upgrades** • Maintaining green electrical and mechatronic systems for long-term efficiency. • Troubleshooting common issues while keeping energy efficiency in focus. • Upgrading systems to enhance sustainability and incorporate new technologies.

Course 3 - Sustainable HVAC Systems Maintenance Technician

Title of the course	**Sustainable HVAC Systems Maintenance Technician** EQF Level 4
Target Audience **Duration:** **Prerequisites**	• Technicians, maintenance workers, or those in the HVAC industry looking to upskill in sustainable practices; professionals working in green buildings or energy management sectors. • 70 hours (including theoretical instruction and practical hands-on training). • Basic knowledge of HVAC systems or completion of an introductory course on HVAC technologies. Familiarity with mechanical systems or general maintenance principles.
Expected results	By the end of this course, participants will have developed the ability to lead a team of HVAC technicians through complex maintenance tasks, ensuring that all safety protocols are followed, and that the equipment is restored to optimal operating conditions. Participants will also enhance their troubleshooting skills, improve team coordination, and boost overall system performance with minimal downtime.
Indicators	• Teams consistently perform maintenance tasks within designated time frames • Reduction in equipment downtime following maintenance • Positive feedback from team members on leadership effectiveness • Fewer maintenance errors or incidents due to improved oversight and communication • Adherence to safety protocols and maintenance guidelines in all procedures • Regular team debriefings to assess and improve maintenance strategies
Capacity	• Develop leadership skills specific to HVAC maintenance operations.

	• Understand the responsibilities of a team leader in maintaining HVAC systems. • Coordinate and delegate tasks among team members efficiently. • Apply troubleshooting techniques to identify and fix common HVAC issues. • Ensure adherence to safety standards during maintenance tasks. • Enhance communication and teamwork within the maintenance crew. • Conduct performance reviews and provide feedback to team members after maintenance activities.
Knowledge	• In-depth understanding of HVAC system components and their maintenance requirements • Knowledge of common maintenance procedures and troubleshooting techniques • Leadership techniques tailored to technical maintenance teams • Safety regulations and best practices in HVAC maintenance • Communication and delegation skills for effective team management • Methods for ensuring quality control and reporting on maintenance outcomes • Techniques to motivate, mentor, and support a team in a high-pressure environment
Contents	**1. Introduction to Sustainable HVAC Technologies** • Overview of energy-efficient HVAC systems and their role in green building design. • Understanding environmental impacts of traditional HVAC systems and the benefits of sustainability. • Overview of regulatory frameworks and standards (e.g., Energy Star, LEED). **2. Energy-Efficient Heating, Ventilation, and Air Conditioning Systems** • Introduction to modern energy-efficient HVAC systems: heat pumps, geothermal systems, and energy recovery ventilation.

	• Methods to optimize HVAC systems for energy efficiency. • Overview of green refrigerants and their role in reducing environmental impact. **3. Installation and Maintenance of Sustainable HVAC Systems** • Techniques for installing sustainable HVAC systems in both new and existing buildings. • Best practices for maintenance with a focus on sustainability. • Proper use of tools and equipment for maintaining eco-friendly HVAC components. **4. Troubleshooting and Diagnostics for Sustainable Systems** • Identifying and addressing common issues in sustainable HVAC systems. • Tools and techniques for effective system diagnostics and repairs. • Strategies for maximizing the efficiency and longevity of HVAC equipment while minimizing environmental impact. **5. HVAC Automation and Smart Control Systems** • Introduction to smart thermostats, zoning systems, and automated HVAC controls. • Integration of sensors and IoT (Internet of Things) technologies in optimizing energy use. • Case studies: Smart control systems for sustainable building environments. **6. Refrigerants and Environmental Impact** • Understanding the environmental consequences of conventional refrigerants (CFCs, HCFCs). • Alternatives: Green refrigerants and their proper use in sustainable systems. • Proper disposal and recycling of refrigerants to reduce ecological impact. **7. Green Skills and Sustainable Practices in HVAC Maintenance** • Life cycle analysis of HVAC systems: sourcing materials, energy use, and disposal. • Methods to reduce waste, improve energy use, and promote sustainability through maintenance practices.

	• Adherence to sustainability standards and certifications in HVAC. **8. Retrofitting Existing Systems for Sustainability** • Techniques for upgrading traditional HVAC systems to meet energy efficiency standards. • Retrofitting for renewable energy integration (e.g., connecting HVAC systems to solar or geothermal sources). • Cost-benefit analysis of retrofitting HVAC systems for sustainability.

Course 4 - Roof Conservation Green Techniques

Title of the course	**Roof Conservation Green Techniques** EQF Level 4
Target Audience **Duration** **Prerequisites**	• Construction professionals, landscapers, or environmental technicians interested in green building practices; individuals looking to specialize in eco-friendly roofing solutions. • 60 hours (including theoretical knowledge and practical hands-on training). • Basic knowledge of construction or landscaping techniques; understanding of roofing systems or completion of an introductory green building course is preferred.
Expected results	Participants will learn how to assess roof conservation needs using environmentally sustainable techniques. They will develop the ability to evaluate a roof's condition, identify conservation opportunities, and implement green methods such as sustainable materials and energy-efficient repairs.
Indicators	• Accurate assessment of roof conservation needs. • Implementation of energy-efficient and green roof repair techniques. • Reduction of environmental impact during roof maintenance.

	• Compliance with green building standards. • Increased use of sustainable materials in roofing projects.
Capacity	• Mastering roof condition assessments with a focus on sustainability. • Understanding the use of green materials and techniques for roof repairs. • Developing skills in energy-efficient roofing methods. • Gaining knowledge of eco-friendly insulation and waterproofing. • Learning to apply green building standards and regulations.
Knowledge	• Fundamentals of roof conservation and green techniques. • Knowledge of energy-efficient materials and sustainable roofing solutions. • Proficiency in assessing roof structures for conservation opportunities. • Awareness of green building standards and environmental regulations. • Skills in using eco-friendly insulation, waterproofing, and repair methods. • Techniques for minimizing environmental impact during roof maintenance.
Contents	**1. Introduction to Green Roofs and Sustainable Urban Infrastructure** • Overview of green roofs as part of sustainable urban development. Environmental benefits of green roofs: stormwater management, urban cooling, biodiversity, and energy efficiency. • Types of green roofs (intensive, extensive, semi-intensive) and their applications. **2. Design and Installation of Green Roof Systems** • Key components of green roofs: waterproofing layers, root barriers, drainage systems, and growing medium. • Step-by-step installation process for various green roof types.

	• Tools, equipment, and materials used in green roof construction. **3. Plant Selection and Ecological Design for Green Roofs** • Criteria for selecting native and drought-tolerant plants suited to green roofs. • Understanding microclimates and how they affect plant growth on roofs. • Techniques for designing green roofs to enhance biodiversity and support local ecosystems. **4. Green Roof Maintenance and Conservation Techniques** • Regular maintenance tasks for preserving green roof health: irrigation, weeding, and fertilization. • Techniques for ensuring long-term sustainability and minimizing resource use. • Identifying and addressing common green roof issues: drainage problems, plant diseases, and structural concerns. **5. Sustainable Water Management and Irrigation** • Water conservation strategies for green roofs. • Designing and installing efficient irrigation systems. • Collecting and reusing rainwater on green roofs for optimal sustainability. **6. Structural Integrity and Safety in Green Roof Conservation** • Assessing and ensuring the structural integrity of green roof installations. • Safety considerations when working on rooftops: fall protection, weight load distribution, and access points. • Retrofitting existing roofs for green roof installation. **7. Environmental Impact and Certifications for Green Roofs** • Contribution of green roofs to reducing urban heat island effects and improving air quality. • Green building certifications (e.g., LEED, BREEAM) and how green roofs contribute to earning points. • Analysing the life cycle impact of green roofs from installation to decommissioning. **8. Retrofitting Traditional Roofs for Green Roof Applications**

	• Techniques for converting traditional roofs into green roofs. • Integrating renewable energy solutions (e.g., solar panels) with green roofs. • Case studies of successful green roof retrofitting projects.

Course 5 - Modular Construction Blueprint Interpreter

Title of the course	**Modular Construction Blueprint Interpreter** EQF Level 3
Target Audience **Duration:** **Prerequisites**	• Entry-level construction workers, apprentices, or those supporting site managers in modular construction projects. • 40 hours (including basic theory and guided practical activities). • Familiarity with construction environments; no prior technical experience required, but basic literacy and numeracy are recommended.
Expected results	Participants will gain the ability to accurately interpret and apply construction plans for modular buildings while incorporating sustainability principles. They will learn to identify eco-friendly materials, assess environmental impacts, and implement modular construction techniques that reduce waste and energy use.
Indicators	• Accurate interpretation of modular construction plans. • Identification of sustainable materials and eco-friendly practices in plans. • Reduction of waste during the construction process. • Compliance with sustainable building standards and regulations. • Increased use of modular construction techniques that lower environmental impact.
Capacity	• Mastering the interpretation of modular construction plans. • Understanding how to incorporate sustainable practices in modular construction.

	• Gaining knowledge of eco-friendly materials and energy-efficient methods. • Developing the ability to reduce waste and improve sustainability in building projects. • Learning to apply sustainable building regulations and certifications.
Knowledge	• Fundamentals of modular construction and sustainable building techniques. • Skills in interpreting construction plans with a sustainability focus. • Understanding of eco-friendly materials, waste reduction, and energy efficiency. • Knowledge of sustainable construction standards and environmental regulations. • Ability to assess and implement sustainable modular construction methods.
Contents	**1. Introduction to Modular Construction** • Basic overview of modular construction and how it differs from traditional construction. • Key advantages: faster build times, cost efficiency, and waste reduction. • Introduction to prefabricated modules and their assembly. **2. Reading Basic Modular Construction Blueprints** • Introduction to reading simple floor plans, sections, and elevation views. • Understanding symbols, basic measurements, and legends used in modular construction plans. • Identifying key components in a modular blueprint (walls, windows, doors, etc.). **3. Supporting Modular Construction Assembly** • Understanding how modules fit together and identifying critical connection points from plans.

	• Assisting with the sequencing and positioning of modules based on simple plan layouts. • Overview of how to handle and store modules prior to assembly. **4. Introduction to Structural and MEP (Mechanical, Electrical, and Plumbing) Systems** • Basic recognition of structural elements and MEP layouts in modular plans. • Understanding simple system connections in modular units (e.g., where water pipes or electrical conduits connect). • Supporting qualified personnel in identifying key MEP components. **5. Safety in Modular Construction** • Reading site plans and understanding safety zones for assembly. • Basic principles of lifting and positioning modules safely. • Identifying critical safety symbols and notations in modular construction plans. **6. Supporting Sustainable Practices in Modular Construction** • Introduction to sustainable building practices in modular construction. • Recognizing green elements in modular plans (e.g., insulation, renewable energy systems). • How modular construction reduces environmental impact through off-site fabrication. **7. Tools for Plan Interpretation** • Basic digital tools used for viewing and printing modular construction plans. • Introduction to simple digital modelling tools used in the modular construction process. • Supporting the team by ensuring that digital and printed plans are up-to-date on-site. **8. Quality Control Support in Modular Construction** • Assisting with basic checks for compliance with plans and layouts. • Reporting discrepancies or issues to supervisors during assembly.

	• Basic quality control tasks to ensure modules are placed and connected correctly.

Course 6 - Sustainable Materials Maintenance and Demolition Assistant

Title of the course	**Sustainable Materials Maintenance and Demolition Assistant** EQF Level 3
Target Audience **Duration** **Prerequisites**	• Entry-level construction workers, maintenance assistants, or demolition crew members interested in sustainable practices. • 40 hours (combining introductory theory and hands-on tasks). • Basic understanding of construction or demolition environments; no prior technical experience required, but basic literacy and numeracy are recommended.
Expected results	Participants will acquire the ability to assess the longevity and environmental impact of building materials during maintenance and demolition. They will learn how to evaluate the durability of materials, plan for sustainable disposal, and minimize waste by extending material life cycles.
Indicators	• Accurate assessment of material lifetimes for maintenance and demolition. • Reduced environmental impact by selecting materials with longer lifespans. • Increased use of sustainable disposal methods during demolition. • Compliance with regulations on sustainable material disposal. • Reduction in waste and carbon footprint during maintenance and demolition.
Capacity	• Mastering the evaluation of material lifetimes and sustainability in building projects. • Understanding the environmental impact of materials from maintenance to demolition.

	• Developing skills in selecting long-lasting, eco-friendly materials. • Gaining knowledge of sustainable waste disposal practices. • Learning to comply with environmental regulations in demolition and maintenance processes.
Knowledge	• Fundamentals of material durability and sustainability. • Skills in assessing the environmental impact of materials during maintenance and demolition. • Knowledge of sustainable disposal methods and waste reduction strategies. • Understanding of regulations related to material disposal and environmental impact. • Ability to choose materials with longer lifespans to reduce environmental footprint.
Contents	**1. Introduction to Construction Materials and Their Lifespan** • Basic overview of common materials used in construction (concrete, steel, wood, etc.). • Understanding material durability and lifespan in different environments (e.g., weathering, corrosion, wear). • Introduction to factors that affect material degradation over time. **2. Role of Maintenance in Extending Material Lifespan** • Basic maintenance techniques to preserve building materials and prolong their use. • Identifying materials that require regular maintenance (e.g., wooden structures, metal frames). • Simple strategies for cleaning, coating, and protecting materials from environmental damage. **3. Assessing Material Condition for Maintenance or Demolition** • Recognizing when materials need maintenance or are ready for demolition. • Introduction to common signs of material failure (cracking, rusting, rotting).

	• Supporting qualified personnel in assessing the condition of structures and materials. **4. Sustainable Demolition Practices and Material Recycling** • Basic principles of sustainable demolition, focusing on material recovery and reuse. • Introduction to methods for deconstructing buildings with minimal waste. • Understanding which materials can be recycled and how to identify them during demolition. **5. Health, Safety, and Environmental Considerations in Maintenance and Demolition** • Basic safety practices for working in maintenance and demolition environments. • Recognizing hazardous materials (e.g., asbestos, lead) and the importance of proper disposal. • Environmental impact of material disposal and benefits of recycling. **6. Supporting Green Building Practices in Maintenance and Demolition** • Introduction to green building certifications (LEED, BREEAM) and how they relate to material sustainability. • Identifying sustainable materials and their role in reducing environmental impact during demolition. • How proper maintenance contributes to the lifecycle sustainability of construction materials. **7. Tools and Techniques for Maintenance and Demolition** • Overview of tools used in material maintenance and basic demolition (e.g., hand tools, power tools). • Introduction to methods for safely handling and disposing of materials during demolition. • Assisting with site preparation and clean-up after demolition tasks. **8. Quality Control and Documentation** • Basic tasks related to quality control during maintenance and demolition.

	• Supporting documentation of material conditions before and after maintenance or demolition. • Simple methods for tracking recycled materials and ensuring compliance with sustainability goals.

Course 7 - Photovoltaic Wall Installation Assistant

Title of the course	**Photovoltaic Wall Installation Assistant** EQF Level 3
Target Audience **Duration** **Prerequisites**	• Entry-level construction workers, electrical assistants, or technicians involved in sustainable construction and renewable energy installations. • 50 hours (including theoretical learning and practical exercises). • Basic understanding of electrical systems or construction environments; no prior expertise in photovoltaics is necessary, but basic literacy and numeracy are recommended.
Expected results	Participants will learn to prepare building envelopes for the installation of PV walls, focusing on energy efficiency and sustainability. They will acquire the skills to ensure that the building surface supports optimal solar energy capture and minimizes heat loss, contributing to an eco-friendly and energy-efficient structure.
Indicators	• Successful preparation of the building envelope for PV wall installation. • Increased energy efficiency due to proper envelope preparation. • Reduction in thermal losses through the building's envelope. • Compliance with sustainability and energy-efficiency standards. • Use of eco-friendly materials in the preparation process.
Capacity	• Mastering the preparation of building envelopes for PV installation. • Understanding the role of thermal insulation and airtightness in energy efficiency.

	• Gaining knowledge of eco-friendly materials used in the envelope preparation. • Developing skills to enhance the building's energy performance through proper preparation. • Learning to comply with energy efficiency regulations for PV wall installations.
Knowledge	• Fundamentals of building envelopes and their impact on energy efficiency. • Techniques for preparing surfaces for photovoltaic wall installation. • Understanding thermal performance and how to minimize energy loss. • Knowledge of sustainable materials for PV installations. • Skills in ensuring airtightness and insulation to optimize energy savings. • Compliance with sustainability standards and energy regulations.
Contents	**1. Introduction to Photovoltaic (PV) Systems** • Overview of photovoltaic technology and how solar energy is harnessed. • Differences between PV systems for rooftops and walls (vertical integration). • Basic concepts of electricity generation using solar panels. **2. Building Envelopes and PV Walls** • Introduction to building envelopes and their role in energy efficiency. • How PV walls are integrated into the exterior structure of buildings. • Understanding the importance of positioning and orientation for optimal solar energy capture. **3. Components of PV Wall Systems** • Basic components of a PV wall system: panels, inverters, mounting systems, and wiring.

	• Recognizing different types of PV panels and their application in vertical surfaces. • Introduction to structural requirements for mounting PV panels on building facades. **4. Installation of PV Walls** • Step-by-step guide to assisting in the installation of PV panels on walls. • Basic techniques for safely handling and mounting panels on vertical surfaces. • Understanding electrical connections and supporting electricians in wiring PV systems. **5. Maintenance and troubleshooting of PV Wall Systems** • Routine maintenance tasks for PV walls: cleaning, inspecting for damage, and checking connections. • Recognizing common issues (e.g., shading, wiring faults, panel damage) and reporting them to supervisors. • Supporting qualified personnel in diagnosing and fixing minor faults in PV wall systems. **6. Safety Considerations for PV Walls** • Basic safety practices when working with solar panels and electrical systems. • Understanding risks related to electrical installations, working at heights, and handling heavy materials. • Identifying potential hazards and ensuring compliance with safety regulations during installation and maintenance. **7. Supporting Sustainable Building Practices with PV Walls** • How PV walls contribute to building energy efficiency and reducing carbon footprints. • Introduction to green building certifications and how PV walls can help meet sustainability goals. • Promoting renewable energy adoption through the use of PV wall installations. **8. Tools and Techniques for PV Wall Installation**

	• Overview of tools used in PV wall installations (drills, mounting brackets, safety gear, etc.). • Introduction to measuring and levelling tools to ensure correct panel placement. • Supporting the team by ensuring all tools and equipment are properly maintained and available during installation. **9. Quality Control in PV Wall Installation** • Assisting with basic quality control tasks to ensure proper alignment and installation of PV panels. • Checking for proper connections and verifying that the system is operational. • Reporting any installation discrepancies or safety issues to the lead technician.

Course 8 - Modular Building Installation Technician

Title of the course	**Modular Building Installation Technician** EQF Level 4
Target Audience **Duration** **Prerequisites**	• Experienced construction workers, technicians, or apprentices looking to advance their skills in modular construction and installation practices. • 75 hours (including theoretical learning, hands-on practice, and assessments). • Completion of a Level 3 qualification in construction or a related field; prior experience in construction is recommended.
Expected results	Participants will acquire essential skills for installing connections of modular building elements, enabling them to confidently assess installation requirements and navigate architectural plans. They will gain hands-on experience in executing precise installation techniques for various components—such as walls, roofs, and floors—while prioritizing safety and adhering to industry regulations.
Indicators	• Ability to accurately interpret and apply modular construction plans in practical settings. • Demonstrated identification and selection of sustainable materials in project proposals. • Measurable reduction of waste produced during construction through effective planning and execution. • Compliance with specified sustainable building standards in completed projects. • Increased implementation of modular construction techniques as evidenced by project outcomes. • Positive feedback from project managers and supervisors regarding adherence to project timelines and budgets. • Evidence of understanding local building codes and regulations through successful project inspections.

Capacity	• Develop the ability to accurately interpret modular construction plans and specifications. • Identify sustainable materials and eco-friendly practices relevant to modular construction. • Understand waste reduction strategies during the construction process. • Ensure compliance with sustainable building standards and regulations. • Increase proficiency in utilizing modular construction techniques to minimize environmental impact. • Gain insights into effective project management and teamwork in modular construction projects. • Foster awareness of local building codes and regulations related to sustainable construction practices.
Knowledge	• Understanding of modular construction terminology and principles. • Familiarity with various sustainable materials used in modular construction and their environmental benefits. • Knowledge of waste management strategies and techniques applicable during construction. • Awareness of sustainability standards and regulations governing building practices. • Insights into modular construction techniques and their advantages in reducing environmental impact. • Understanding of project management fundamentals specific to construction projects. • Knowledge of local building codes and regulations relevant to sustainable and modular construction practices.
Contents	**1. Advanced Principles of Modular Construction** • In-depth exploration of modular construction techniques and systems.

	- Analysing the lifecycle of modular buildings from design to installation. - Understanding industry standards and regulations relevant to modular construction. **2. Safety Management in Modular Installation** - Comprehensive safety management practices specific to modular construction sites. - Developing risk assessment skills and emergency response protocols. - Leading safety briefings and ensuring compliance among team members. **3. Advanced Tools and Equipment for Modular Installation** - Overview of advanced tools and machinery used in modular installation (e.g., cranes, lifting devices). - Techniques for operating heavy equipment safely and efficiently. - Ensuring maintenance and safety checks are conducted on tools and equipment. **4. Detailed Analysis of Modular Building Plans and Specifications** - Advanced techniques for reading and interpreting complex construction plans. - Understanding building codes and regulatory compliance. - Developing skills in creating and modifying installation plans based on site-specific needs. **5. Site Preparation and Logistics for Modular Installation** - Advanced site preparation techniques, including site layout and utility planning. - Coordinating logistics for transporting and staging modular elements on-site. - Managing timelines and workflow during installation processes. **6. Installation Techniques for Modular Elements** - Mastering advanced installation techniques for various modular components. - Problem-solving common installation challenges and ensuring structural integrity.

	• Conducting site surveys to assess conditions before and during installation. **7. Quality Assurance and Control in Modular Installation** • Implementing quality control measures to ensure the accuracy of installations. • Conducting inspections and testing of modular elements post-installation. • Documenting quality assessments and reporting findings to management. **8. Sustainable Practices in Modular Construction** • Evaluating the environmental impact of modular construction methods. • Implementing sustainable practices in material selection and waste management. • Promoting energy-efficient solutions and renewable resources in modular building designs. **9. Leadership and Communication Skills on the Job Site** • Developing leadership skills to manage teams effectively during installation. • Enhancing communication skills for better coordination with clients, subcontractors, and team members. • Facilitating teamwork and fostering a positive work environment on-site.

3 – The experts' validation

Synthesis of Experts' Validation

The focus groups in Greece provided essential insights into the challenges and opportunities for developing a standardized training path focused on green skills for the construction sector. Experts from vocational education, industry, and policy emphasized the need for a unified framework that addresses the fragmented nature of the current vocational education and training (VET) system and the slow adoption of green technologies.

Experts agreed that a standardized training path is critical for ensuring the integration of green skills into construction roles. Current offerings are inconsistent, with some focusing on traditional methods and others incorporating emerging green technologies. A unified framework would address this fragmentation and ensure alignment with European sustainability standards while adapting to the specific needs of the Greek market. The proposed path addresses roles such as Green Roof Conservation Technicians, Green Electrical Installers, and HVAC Technicians, but requires tailoring for local needs.

While the proposed training path aligns with European goals, it needs further adaptation to Greece's specific economic, regulatory, and market conditions. For example, trainers recommended integrating content on cost-effective green methods, local green certifications, and government incentives for sustainability, making the training more applicable to national conditions.

Participants noted that the current VET offerings are heavily focused on technical skills, while overlooking soft skills like leadership, team coordination, and communication, which are essential for supervisory roles in green construction. Adding modules focused on these skills will improve the overall effectiveness of the training.

The need for trainer development was identified as a key gap in the current system. Trainers should not only have technical knowledge but also direct industry experience and expertise in modern green technologies. Continuous professional development (CPD) and industry placements were suggested to ensure trainers remain up-to-date with evolving construction trends.

Evidence of the major deviations with the current Map of the national offer

To align the Greek VET system with the proposed map, significant deviations need to be addressed. The introduction of modern green skills, adoption of blended learning methodologies, incorporation of modular certification, and enhancement of trainer qualifications will create a more dynamic and responsive training environment. By addressing these gaps, the Greek construction industry can better prepare its workforce for the challenges of sustainable and offsite construction, ensuring that the sector meets both national and European sustainability goals.

Major Deviations:

1. **Content Gaps**: The current national VET programs lack the depth in green skills training that the proposed path advocates. Emerging skills like **green sensor installation**, **environmental assessments**, and **modular construction techniques** are either absent or minimally covered in the existing courses. The proposed training path includes modules specifically aimed at filling these gaps.
2. **Methodology and Delivery Gaps**: The Greek VET system primarily uses classroom-based learning with limited application of practical simulations or digital tools like BIM. The proposed training path emphasizes **blended learning**, combining theory with practical on-site and digital experiences, which is a significant deviation from current methods. Without adopting these modern methodologies, the training will not adequately prepare workers for real-world applications in green construction.
3. **Assessment and Certification**: Current VET courses in Greece lack modular certification and continuous assessment. The proposed framework advocates for **micro-certifications** for specific skills, allowing for more flexible and progressive learning. This is a departure from the current system, which typically ends in one final assessment without recognizing intermediate skills development.
4. **Trainer Development**: The national VET framework does not require trainers to have industry experience or training in the latest green technologies. The proposed path suggests that trainers undergo regular **CPD** and **industry placements** to stay current, ensuring the quality of education and training delivery. This represents a critical deviation that could enhance training outcomes if addressed.

Recommendations for New Modules

In summary, while the proposed training path offers a comprehensive approach, adjustments to reflect local conditions, economic realities, and practical training needs are necessary for its successful implementation. By addressing these deviations, the Greek construction sector can better prepare its workforce for the future of sustainable construction. Based on the findings and expert insights, additional recommended new modules could directly address critical gaps in the current VET system and equip trainees with essential skills for sustainable construction, namely:

Green Certification and Local Standards: Provides essential knowledge on Greece-specific green certifications, sustainable construction standards, and government incentives.

Green Project Management and Leadership: Focuses on soft skills like leadership and team coordination, preparing trainees for supervisory roles in sustainable construction.

Modular Construction Techniques: Teaches offsite and modular construction skills, emphasizing sustainable practices to minimize waste.

Practical Applications of BIM and Digital Tools: Incorporates hands-on training with tools like Building Information Modelling (BIM) to effectively plan and manage green projects.

These recommendations aim to align the Greek VET system with European sustainability standards and create a workforce prepared for the demands of green and sustainable construction in Greece.