WP3

D3.1: SEBCoVE Knowledge Triangles design and road-mapping

Co-funded by the European Union

101144027 — SEBCoVE — ERASMUS-EDU-2023-PEX-COVE

SEB CoVE

SMART ELECTRICITY FOR BUILDINGS

D3.1: SEBCoVE Knowledge Triangles design and road-mapping

SEB CoVE

SMART ELECTRICITY FOR BUILDINGS

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Abstract

The *SEBCoVE Knowledge Triangles Roadmap* provides a structured and strategic framework to foster collaboration between Vocational Education and Training (VET) providers, industry, and research institutions in the Smart Electricity for Buildings (SEB) sector across four European regions: Crete (Greece), Veneto-Lombardia-Friuli Venezia Giulia-Piemonte (Italy), Basque Country (Spain), and North Macedonia. Developed within Work Package 3 of the SEBCoVE project, the roadmap unfolds through three key phases: (1) Needs Assessment using a design thinking approach to map stakeholder roles, motivations, and engagement levels; (2) Design of Collaborative Models, including governance structures, incentive mechanisms, and sustainability frameworks; and (3) Implementation and Monitoring, where formal partnerships, pilot initiatives, and quality assurance mechanisms are introduced.

The roadmap emphasizes a human-centered, iterative model of collaboration, introducing Knowledge Triangle (KT) personas, engagement matrices, and adaptive learning strategies, including modular curricula and microcredentials. Common challenges across regions—such as siloed systems, curriculum misalignment, and limited industry-VET-research collaboration—are addressed through interactive workshops and stakeholder co-creation. Ultimately, the roadmap serves as a replicable blueprint for building sustainable, responsive, and innovation-driven regional skills ecosystems in the SEB sector.

This framework establishes SEBCoVE as a **scalable and adaptable model for vocational excellence**, ensuring **long-term impact, workforce readiness, and innovation** in the **smart electricity and energy transition sector**.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Keywords

Knowledge Triangle (KT): *A strategic collaboration framework among VET providers, industry, and research institutions to promote innovation, skills development, and applied knowledge transfer.*

SEBCoVE: *An Erasmus+ Center of Vocational Excellence initiative focused on Smart Electricity for Buildings (SEB), aiming to align education, research, and industry across Europe.*

Smart Electricity for Buildings (SEB): *An emerging sector combining energy efficiency, automation, and digital technologies for managing electricity in residential, commercial, and industrial buildings.*

Vocational Education and Training (VET): *Educational programs that equip learners with practical skills and knowledge for specific trades, industries, or occupations.*

Design Thinking: *A human-centered problem-solving methodology used to engage stakeholders, identify needs, and co-create solutions through empathy, ideation, and iteration.*

Stakeholder Persona: *A fictional but realistic profile that represents key stakeholder types (e.g., VET educator, industry CEO, researcher) and their motivations, challenges, and roles within KTs.*

Journey Mapping: *A visual tool showing the engagement path of stakeholders from initial awareness to active collaboration, identifying key touchpoints and barriers.*

Engagement Matrix: *A structured table that tracks stakeholder participation, comparing current and desired engagement levels, with action plans for improvement.*

Microcredentials: *Short, stackable learning units or certifications that validate specific skills and competencies, often aligned with labor market needs.*

Adaptive Learning Framework: *A flexible, learner-centered education model that adjusts to feedback, performance data, and industry evolution to keep training relevant and effective.*

CoVE (Center of Vocational Excellence): *A European initiative to create high-performing VET ecosystems that foster innovation, inclusion, and regional development through collaboration.*

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Governance Structures: *Organizational frameworks that define roles, responsibilities, and decision-making processes among KT stakeholders to ensure effective collaboration.*

Pilot Initiatives: *Small-scale, real-world experiments used to test and refine the KT models before broader implementation.*

Memoranda of Understanding (MoUs): *Formal agreements between stakeholders that define mutual commitments and collaboration terms within the KT framework.*

Continuous Improvement Quality Plan: *A strategy for ongoing evaluation, feedback, and enhancement of the KT activities using KPIs, reviews, and stakeholder input.*

Smart Specialization Strategy (S3): *A regional innovation policy concept aiming to develop unique strengths and competitive advantages through targeted investments in key sectors.*

Collaboration Canvas: *A visual planning tool used during workshops to outline what each stakeholder offers and needs, identify barriers, and spot collaboration opportunities.*

.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Table of Contents

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

REVISION HISTORY

Rev.	Date	Author	Document Sponsor	Revision Summary
1	14/11/2024	Fabio Castro, Bruno Canizes	IPP	First edition
2	20/2/2025	Fabio Castro	IPP	Small Structural Changes, Proof-Reading and fixing
3	05/2/2025	Fabio Castro	IPP	Accommodating a roadmap style approach (document merging)
4	10/2/2025	Konstantinos Androulakis	IPP	Restructuring to meet revrewrs comments about road mapping and Design thinking methodology adoption
5	20/3/2025	Emmanouela Vizaro.	IPP	Current situation in Italy, personas, stakeholder engagement matrix, journey mapping
6	20/3/2025	Spyros Apostolakis, Emmaouiel Karapidakis	IPP	Current situation in Greece, personas, stakeholder engagement matrix, journey mapping
7	20/3/2025	Ilija Vuckov	IPP	Current situation in N Macedonia personas, stakeholder engagement matrix, journey mapping
8	20/3/2025	Jesús Rosel Martínez	IPP	Current situation in Spain personas, stakeholder engagement matrix, journey mapping
9	28/3/2025	Konstantinos Androulakis	IPP	Drafting final edition

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

REVIEWERS

Rev.	Date	Reviewer	Document Sponsor	Reviewed
1	16/2/2025	Konstantinos Androulakis	KA	YES
2	20/3/2025	Konstantinos Androulakis	KA	YES
3	27/3/2025	Constantinos Andronis	KA	YES

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

SEBCoVE Knowledge Triangles design and road-mapping

Executive Summary

The SEBCoVE Knowledge Triangles Roadmap report is a strategic document developed under Work Package 3 of the SEBCoVE initiative. It outlines a comprehensive plan to establish sustainable collaboration models—**Knowledge Triangles (KTs)**—that connect **Vocational Education and Training (VET) providers**, **industry**, and **research institutions** in the **Smart Electricity for Buildings (SEB)** sector across four European regions: **Greece (Crete)**, **Italy (Veneto, Lombardia, Friuli Venezia Giulia, Piemonte)**, **Spain (Basque Country)**, and **North Macedonia**.

Chapter 1: Designing the SEBCoVE Knowledge Triangles Roadmap

Chapter 1 introduces the conceptual and methodological framework of the Knowledge Triangle (KT) roadmap. The roadmap is structured around **three core phases**:

1. **Needs Assessment**: Employing **Design Thinking**, this phase maps key stakeholders, defines engagement levels, and explores their motivations, barriers, and potential contributions through the development of **personas**, **journey maps**, and **engagement matrices**.
2. **Design of Collaborative Models**: This phase focuses on building **governance structures**, **incentive mechanisms**, and **sustainability strategies** to foster long-term, value-driven collaboration. Tools such as the **Collaboration Canvas** help structure stakeholder contributions and expectations.
3. **Implementation and Monitoring**: Plans for **formalizing partnerships** through Memoranda of Understanding (MoUs), **launching pilot initiatives**, and establishing a **continuous improvement quality plan** are detailed. These include the development of **performance indicators**, **feedback mechanisms**, and **adaptive learning frameworks** (e.g., microcredentials).

The chapter provides a scalable and flexible roadmap aligned with regional smart specialization strategies and capable of adapting to evolving sectoral and technological trends.

Chapter 2: Knowledge Triangle Development in the SEBCoVE Countries

Chapter 2 presents the tangible progress made in translating the roadmap into action across the four SEBCoVE countries. Following the design and stakeholder alignment activities, **formalised collaborations have been established** using a shared MoU framework. As a result, **three KTs in North Macedonia and one in Greece have entered the pilot implementation phase**, with **Italy and the Basque Country** also demonstrating full readiness to launch their pilot activities.

These efforts were supported by interactive workshops, co-created stakeholder personas, and collaborative planning tools, which enabled the contextualisation of the roadmap for each region. Common barriers—such as fragmented ecosystems and low policy integration—were addressed through regional co-design, ensuring both relevance and feasibility. The chapter demonstrates that the roadmap is not only conceptually sound but also practically implementable across diverse environments, paving the way for SEBCoVE's long-term impact.

Conclusion

The roadmap presented in this report offers a replicable and scalable model for developing dynamic, responsive, and innovation-driven Knowledge Triangels under skills ecosystems in many sectors of economic and social activity. Through structured engagement, strategic governance, and early pilot success, SEBCoVE has demonstrated the viability of the Knowledge Triangle model in promoting skills development and sectoral innovation in Smart Electricity for Buildings. The project is now entering a critical phase of real-world implementation, positioning its Knowledge Triangles as enduring platforms for collaboration, excellence, and regional transformation.

.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Introduction

SEBCoVE is a Center of Vocational Excellence (CoVE) initiative designed to foster innovation and excellence in the SEB sector by aligning education, research, and industry needs. The knowledge triangle concept emphasizes the critical relationship between these three sectors, aiming to facilitate a seamless exchange of knowledge, skills, and innovation.

The SEBCoVE roadmap provides an integrated approach to bridging gaps between vocational education, applied research, and industry demands. Through the establishment of four regional CoVEs, the initiative intends to create lasting collaborations that promote skills development, technological advancements, and economic growth in the SEB sector.

Objectives

- Establish four regional CoVEs serving as reference points for skills development in the SEB sector.
- Create knowledge triangles to ensure a structured flow of expertise between VET, academia, and industry.
- Identify and address barriers to effective knowledge transfer, ensuring stakeholders remain actively engaged.
- Develop a roadmap for sustainable collaboration and governance models for KTs, ensuring long-term effectiveness.

Align the initiative with regional smart specialization strategies, contributing to economic and workforce development

The report presents a comprehensive framework for designing the SEBCoVE Knowledge Triangles (KTs) roadmap, a key deliverable under Work Package 3 of the SEBCoVE initiative. The roadmap aims to enhance collaboration among businesses, vocational education and training (VET) providers, and research institutions in the "Smart Electricity for Buildings" (SEB) sector. The objective is to support regional smart specialization strategies and create sustainable regional skills ecosystems across region of Crete (Greece), regions of Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte, (Italy), Basque Country (Spain), and regions in North Macedonia. The

roadmap integrates stakeholder analysis, existing KTs practices, and strategies for sustainable collaboration. It explores methodologies, challenges, and implementation strategies in depth, providing a **practical guide to successfully establishing knowledge triangles within SEBCoVE regions.** Finally, a detailed engagement matrix and sustainability plan ensure the roadmap remains adaptable and impactful in the long run.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Chapter 1: Designing the SEBCoVE Knowledge Triangles Roadmap: Framework, Methodology, and Strategic Foundations

Methodology

To guide the effective implementation of Knowledge Triangles (KTs) within the SEBCoVE initiative, a structured roadmap was developed, unfolding over three key phases.

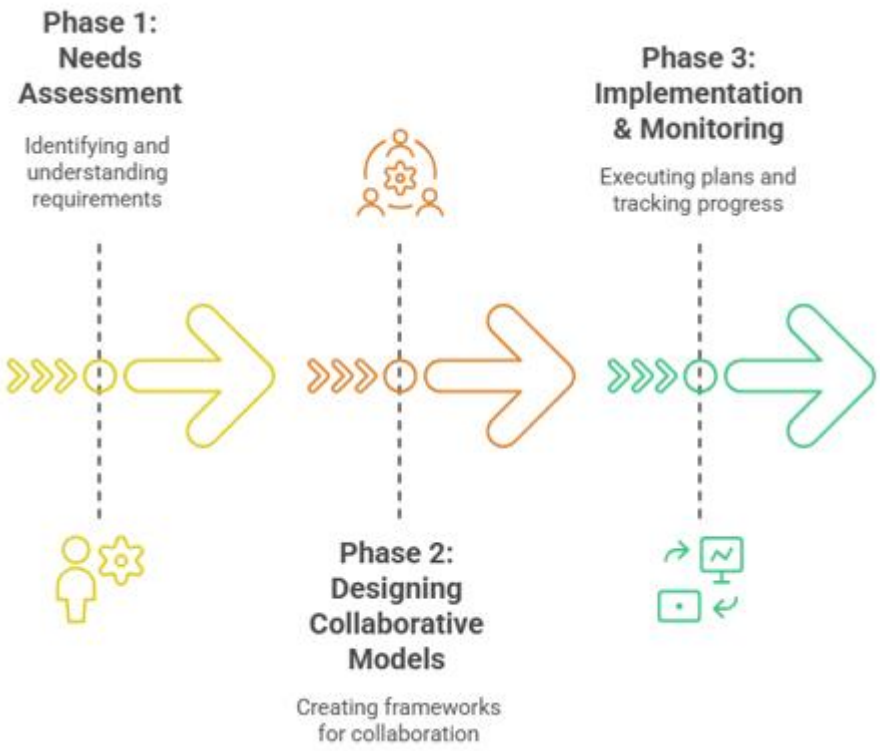


Figure 1: Phases of KTs creation roadmap

The journey begins in phase 1, with a comprehensive **Needs Assessment**, grounded in design thinking principles. Stakeholders across the vocational education, research, and industry spectrum are mapped and analyzed to understand their engagement

levels and potential roles within the KTs. This phase focuses on identifying the most pressing skill gaps in the SEB sector, as well as current industry demands. Through direct consultations, the team also explored existing barriers to collaboration, aiming to lay a solid foundation for meaningful and practical knowledge exchange.

Following this, the initiative moves into phase 2, the **Design of Collaborative Models**. Here, governance structures were carefully defined to ensure clear roles and responsibilities among participants. Incentive mechanisms were introduced to motivate sustained involvement, while engagement frameworks were crafted with a focus on long-term sustainability and impact. These models aimed to make collaboration not just functional, but also appealing and valuable to all parties involved.

Finally, in the phase 3, **Implementation and Monitoring** the plans are brought to life. Collaborations are formalized through Memoranda of Understanding (MoUs), marking a shared commitment to the KT vision. Pilot initiatives are launched to test and refine the proposed frameworks in real-world conditions. To maintain momentum and ensure continuous improvement, an annual review mechanism are established—providing a structured way to evaluate progress, gather feedback, and optimize engagement strategies over time.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Phase 1: Needs Assessment - KTs Stakeholder Engagement

To define **stakeholder needs** and engagement solutions, a human-centered design thinking approach is used. As is pictured in figure 2, the process includes:

- → **Stakeholder Mapping:** Identifying key actors within the SEB ecosystem, analyzing their roles, interests, and challenges.
- → **Development of Stakeholder Personas:** Creating representative profiles to understand motivations, engagement patterns, and specific needs.
- → **Journey Mapping:** Visualizing the transition from the current to the desired engagement state, ensuring a strategic approach to knowledge triangle implementation.
- → **Interactive Workshops:** Engaging stakeholders in co-creation sessions to refine collaborative approaches.

→

Figure 2: Stakeholders' needs assessment

1.1 Mapping Stakeholders and their Engagement Levels

The SEBCoVE project starts by revisiting the stakeholder mapping document titled *"D2. Stakeholders Mapping / Skills Ecosystems Creation."* This review helps identify

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE
Co-funded by the European Union

which stakeholders are suitable to participate in a Knowledge Triangle (KT), assess their current level of engagement, and define the desired level of involvement within the KT framework. The entire process is documented through journey mapping, supported by the use of an engagement matrix (Annex III).1.2

1.2 Interactive Workshops

The implementation of interactive workshops for diagnosing barriers to effective collaboration in each SEBCoVE region. Using *Design Thinking methodology* partners can gather qualitative insights directly from stakeholders and create personas of representative participants in a Knowledge Triangle. This process is essential for identifying:

- **Hidden needs** not captured by formal indicators.
- **Motivators for engagement** (e.g., access to skilled workers, innovation potential)
- **Challenges**
- **Needs for collaboration**

Using **Design Thinking's empathy**, this task goes beyond surface-level needs to capture the motivations, constraints, and expectations of KTs stakeholders.

1.3 Stakeholder Personas

Each **Knowledge Triangle (KT)** consists of stakeholders of the following representatives :

1. A **VET representative** (Educator or Administrator). **VET Educator**: He works with **Researcher** to integrate new findings into training modules.
2. A **Research expert** (Applied Researcher or Tech-Transfer Specialist). He collaborates with **Industry CEO** to test new technology in smart buildings.
3. An **Industry leader** (Sustainability CEO or Skilled Technician). He Provides **feedback** on curriculum needs and hires trained VET graduates.

Stakeholder personas as KTs representative profiles are created for companies (e.g. electrical firms, IoT developers), VET providers, and research entities, matched with predefined archetypes.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Journey mapping: Visual pathways show how stakeholders move from initial contact to active collaboration, identifying touchpoints where support or incentives are needed to deepen engagement. This mapping exercise is key to understanding how stakeholders can transition from passive actors to fully engaged KT members. In line with this, *PED_D2.2* emphasizes that successful smart building deployment relies on multidisciplinary teams and collaboration across sectors—from data analysts to engineers, software developers, and managers.

SEBCoVE KTs Archetypes

To understand motivations, engagement patterns, and specific needs of a VET representative, the following archetypes have been defined, to ease the process of personas creation. A persona can be a mix of one or more archetypes, or a completely new persona.

The following archetypes will guide the personas creation and their interactions in the Knowledge Triangle.

VET Sector Archetypes

The Forward-Thinking VET Educator

Background: Senior instructor at a vocational school specializing in smart electricity for buildings.

Motivation: Wants to update the curriculum to align with industry needs.

Challenges: Limited access to the latest industry developments and research trends.

Needs: Partnerships with industry experts and researchers for hands-on training.

Contribution to KT: Bridges **education** with **industry**, ensuring trainees develop **job-ready skills**.

The Policy-Aligned VET Administrator

Background: Director of a VET center working on aligning courses with European regulations.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Motivation: Ensures compliance with national and EU-level vocational training policies.

Challenges: Bureaucratic constraints in rapidly adapting training programs.

Needs: Structured collaborations with researchers and companies to facilitate **curriculum innovation**.

Contribution to KT: Ensures the **sustainability** of industry-VET partnerships.

Research Institution Archetypes

The Applied Researcher

Background: University professor specializing in **renewable energy and smart grids**.

Motivation: Interested in **translating** research findings into practical applications.

Challenges: Struggles to connect with companies willing to test prototypes.

Needs: Industry collaborations for **real-world pilot testing**.

Contribution to KT: Provides **cutting-edge research** insights that drive industry innovation.

The Tech-Transfer Specialist

Background: Works in the university's **technology transfer office**, focused on patenting innovations.

Motivation: Seeks to commercialize university research in **smart building energy management**.

Challenges: Faces slow technology adoption from companies unfamiliar with R&D-driven solutions.

Needs: Active industry engagement and funding opportunities.

Contribution to KT: Helps businesses adopt **new technologies** and provides research expertise.

Industry sector Archetypes

The Sustainability-Oriented CEO

Background: Founder of an SME that specializes in smart building solutions.

Motivation: Wants to lead the market in **green energy solutions**.

Challenges: Needs skilled employees trained in **emerging smart electricity trends**.

Needs: Close partnerships with **VET providers** to develop tailored training programs.

Contribution to KT: Invests in **work-based learning** opportunities.

The Skilled Technician

Background: An experienced electrician with expertise in **smart home automation**.

Motivation: Wants to upskill and learn about **next-generation energy-efficient systems**.

Challenges: Faces gaps in **formal education** about smart technologies.

Needs: Practical, hands-on training from VET providers and access to research findings.

Contribution to KT: Acts as the **real-world tester** for research and VET training improvements.

1.4 Journey Mapping - Knowledge Triangle Engagement Matrix

A dynamic Knowledge Triangle Engagement Matrix will be developed to monitor stakeholder involvement, providing an annual assessment of the progress and alignment with regional smart specialization strategies. The matrix will include:

- **Current Engagement Levels:** Baseline assessment of stakeholder participation.
- **Desired Engagement Levels:** Target metrics for enhanced collaboration.
- **Action Plan for Progress:** Steps required to bridge the gap between current and desired engagement.
- **Annual Review Mechanism:** Regular evaluations and updates to ensure continued relevance and effectiveness.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Phase 2: Designing Collaborative Models

Following this, the initiative moves into the **design of Collaborative Models (**phase 2). Here, governance structures are carefully defined to ensure clear roles and responsibilities among participants. Incentive mechanisms are introduced to motivate sustained involvement, while engagement frameworks are crafted with a focus on long-term sustainability and impact. These models aim to make collaboration not just functional, but also appealing and valuable to all parties involved.

Phase 2: Designing Collaborative Models

Defining governance structures.
Establishing incentive mechanisms to drive active participation.
Designing engagement frameworks to ensure long-term sustainability.

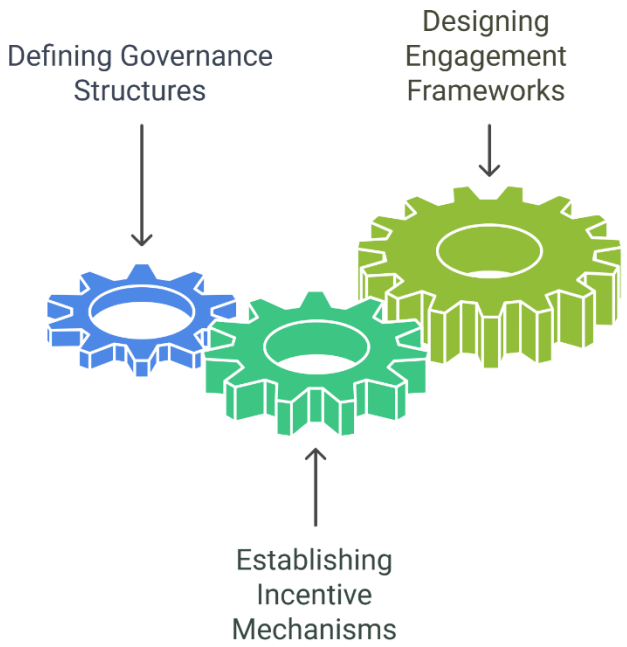


Figure 3: design of Collaborative Models

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE
Co-funded by the European Union

2.1 Defining governance structures

Establishing clear and functional **governance structures** is essential for the effective operation and long-term success of the SEBCoVE Knowledge Triangles. Governance provides the backbone for collaboration, ensuring that all stakeholders—VET providers, research institutions, industry actors, and policymakers—understand their roles, responsibilities, and decision-making mechanisms within the KT framework. Without a well-defined structure, even the most promising partnerships risk fragmentation or inactivity over time. This section introduces the governance models designed to foster transparency, accountability, and shared ownership across all levels of the SEBCoVE initiative.

The SEBCoVE KTs governance approach promotes both strategic oversight and operational coordination through bodies such as **Joint Steering Committees (JSCs)** and specialized **working groups**. These entities ensure that regional actions align with overarching project goals while allowing flexibility to adapt to local contexts. Additional mechanisms, including quality monitoring systems, industry-led learning pathways, and interregional networking strategies, contribute to making the Knowledge Triangle a dynamic and responsive structure. Together, these governance elements provide the structural foundation to institutionalize collaboration, scale innovation, and embed the KT model into regional smart specialization policies and skills strategies.

- **Steering Committees (Industry & Academic Council)**: Comprising representatives from academia, industry, and policymakers to oversee the effective implementation of the Knowledge Triangle model and ensure alignment with EU policies and labor market trends.
- **Quality Monitoring Mechanisms**: Establishing continuous assessment frameworks to measure the impact of knowledge-sharing initiatives, ensuring that training curricula remain relevant and industry-aligned.
- **Regional and International Networking**: Facilitating exchanges between SEBCoVE regions and international vocational centers to benchmark best practices and create a globally connected learning ecosystem.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

- **Industry-Led Learning Pathways**: Incorporating direct input from industry stakeholders to develop specialized learning pathways that reflect emerging market needs and skill requirements.

2.2 Establishing incentive mechanisms to drive active participation.

- **Training and Upskilling Programs**: Rolling out targeted training programs for educators and trainers to equip them with the latest pedagogical methodologies and technical expertise in Smart Electricity for Buildings.
- **Joint Research Initiatives**: Promoting collaborative research projects between educational institutions and businesses to drive innovation and create new training methodologies.
- **Stakeholder Engagement and Co-Creation**: Encouraging active participation of students, educators, businesses, and policymakers in the continuous refinement of the Knowledge Triangle model.
- **Sustainability and Scalability**: Ensuring the long-term sustainability of knowledge-sharing frameworks through dedicated funding mechanisms and policy integration at national and EU levels.

2.3 Designing engagement frameworks to ensure long-term sustainability

Designing engagement frameworks that ensure the long-term sustainability of Knowledge Triangles (KTs) is a critical component of the SEBCoVE roadmap. While initial collaboration can be sparked through workshops and pilot activities, maintaining stakeholder commitment over time requires structured mechanisms that embed cooperation into everyday practice. This section focuses on developing resilient engagement models that are adaptable to evolving industry needs, technological advancements, and policy landscapes. It introduces strategies for ongoing stakeholder involvement, including digital platforms, annual feedback loops, and forward-looking governance tools. These frameworks aim to create a culture of continuous

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

collaboration and innovation, positioning SEBCoVE's Knowledge Triangles as lasting drivers of regional development in the Smart Electricity for Buildings sector.

Sustainability and Future Directions

- **Continuous adaptation of the KT roadmap** to emerging trends in SEB, ensuring long-term impact.
- **Long-term governance and financial sustainability strategies** to maintain stakeholder engagement and funding stability.
- **Annual updates based on stakeholder feedback**, ensuring that the roadmap remains aligned with industry needs.
- **Integration of digital platforms and AI-driven solutions** to enhance collaboration, streamline data-sharing, and improve decision-making processes.
- **Scaling the knowledge triangle model** beyond SEBCoVE regions, providing a blueprint for similar sectoral initiatives across Europe.
- **Phase 2: Designing Collaborative Models**

Phase 3: Implementation & Monitoring

The **Implementation and Monitoring** phase brings these plans described in the two previous phases to life. **Collaborations are formalized** through Memoranda of Understanding (MoUs), marking a shared commitment to the KT vision**. Pilot initiatives** are launched to test and refine the proposed frameworks in real-world conditions. To maintain momentum and ensure continuous improvement, an **annual review mechanism** will be established—providing a structured way to evaluate progress, gather feedback, and optimize engagement strategies over time. More specifically, the plans in phase 3 include:

1. Formalizing collaborations through Memoranda of Understanding (MoUs).
2. Launching pilot initiatives to test KT frameworks.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

3. Establishing an annual review mechanism to track progress and optimize engagement strategies

3.1 Formalise Collaborations

The third phase of the SEBCoVE Knowledge Triangle roadmap begins with the formalization of partnerships among stakeholders through the signing of a Memorandum of Understanding (MoU). This document, detailed in Annex v, serves as a foundational agreement among SEBCoVE project partners and selected stakeholders—including VET providers, industry representatives, research institutions, and policymakers. The purpose of this MoU is to establish a clear, structured framework for cooperation in the development of Knowledge Triangles (KTs) focused on Smart Electricity for Buildings (SEBs). It articulates a shared commitment to fostering research, innovation, and training ecosystems that are aligned with energy efficiency and smart specialization goals across the participating regions.

The MoU outlines specific areas of collaboration such as joint research and innovation, curriculum development, industrial engagement, policy support, and technology transfer. Roles and responsibilities are distributed among academic institutions (knowledge creation), industry (skills identification and practical applications), training providers (curriculum implementation), and policymakers (enabling regulation and support). The governance structure includes the creation of a Joint Steering Committee (JSC) to oversee implementation, supported by thematic working groups and an annual SEB Innovation Forum to monitor progress and share best practices. While non-binding, the MoU marks a crucial milestone in translating the roadmap into action, ensuring mutual understanding, coordinated effort, and long-term sustainability through shared resources and access to European and regional funding opportunities.

3.2 Launch Pilot KTs initiatives

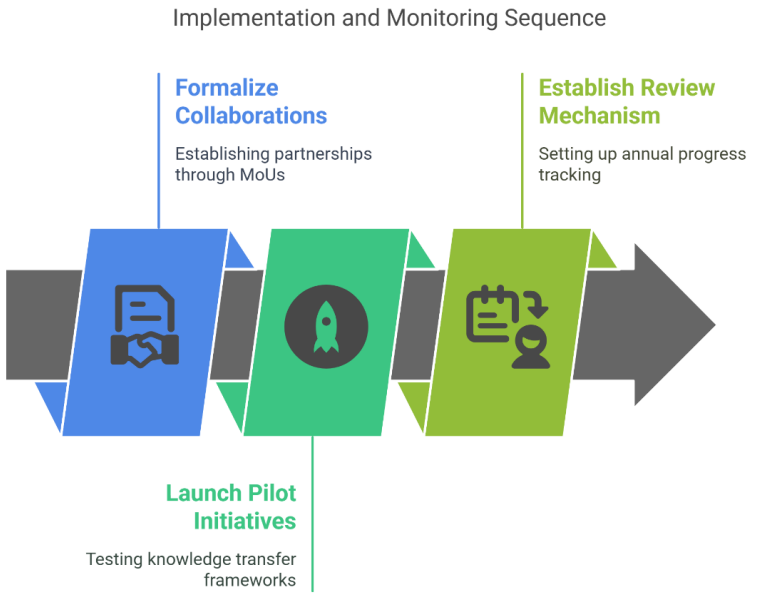
The launch of KTs **pilot initiatives** marks a pivotal step in operationalizing the SEBCoVE Knowledge Triangle roadmap. These pilots serve as real-world testbeds to validate the collaborative models, governance structures, and training frameworks designed in the previous phases. Implemented across the four SEBCoVE regions—

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Greece, Italy, Spain, and North Macedonia—the pilot activities aim to demonstrate how VET providers, industry partners, and research institutions can co-create and deliver solutions that address current and emerging skills needs in the **Smart Electricity for Buildings (SEB)** sector.

Each pilot initiative is tailored to regional contexts and stakeholder capabilities, focusing on areas such as **joint curriculum development**, **work-based learning programs**, **microcredential delivery**, and **research-to-practice collaborations**. By involving KT members in the design, implementation, and evaluation of these initiatives, the pilots foster ownership and commitment while offering actionable insights into what works, what needs adjustment, and how collaboration can be scaled. The outcomes of these pilots will inform future improvements to the roadmap and contribute to a replicable model for building sustainable, innovation-driven VET ecosystems across Europe.



3.3 Establish a Review Mechanism - Continuous Improvement Quality Plan

A quality plan for evaluation and continuous monitoring creates a dynamic, responsive environment where the KT approach can thrive. By integrating clear performance

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE
Co-funded by the European Union

indicators, robust feedback mechanisms, and adaptive learning frameworks, the program will not only measure its effectiveness in skill acquisition and innovation but also continuously evolve to meet the demands of the smart electricity sector. The key is to maintain an iterative loop of evaluation, feedback, and adaptation to ensure that all training programs remain relevant, effective, and forward-thinking.

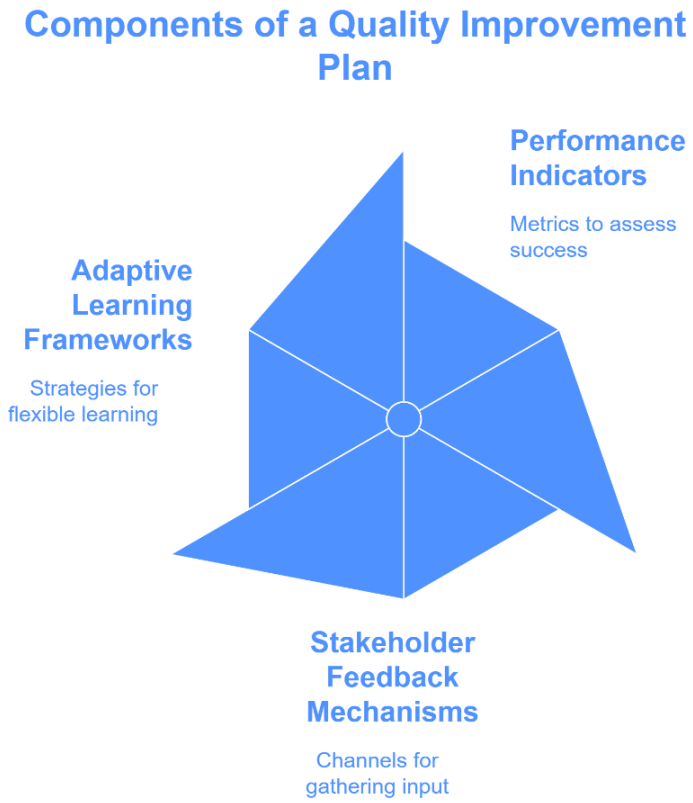
This framework provides a blueprint that can be tailored and expanded over time, ensuring that as technological advancements and market demands shift, the KT remains at the forefront of industry innovation and education.

The structured plan presented below, outlines the process of evaluation for continuously improvement the Knowledge Triangle (KT) in the Smart Electricity for Building sector. This plan addresses three key aspects by establishing clear metrics, feedback channels, and flexible educational models that evolve with industry and technological changes.

1. Performance Indicators,
2. Stakeholder Feedback Mechanisms, and
3. Adaptive Learning Frameworks

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union



Performance Indicators

Desining clear KPIs to measure the effectiveness of the Knowledge Triangle approach in terms of skill acquisition, and innovation outputs.

Goal: Measure the effectiveness of the KT model in promoting skill acquisition and innovation outputs.

a. Define Clear KPIs:

- **Skill Acquisition Metrics:**
  - **Competency Assessments:** Develop pre- and post-training evaluations to measure the growth in technical and soft skills.
  - **Certification Rates:** Track the number of participants earning microcredentials or other certifications.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

- **Engagement Levels:** Monitor attendance, participation in workshops, and usage of online resources.

- **Innovation and Outcome Metrics:**
  - **Project Outputs:** Measure the number and quality of innovative projects or research outputs generated by KT members.
  - **Industry Impact:** Assess contributions to energy efficiency, reduced carbon footprints, or technology adoptions in smart electricity.
  - **Employment and Career Advancement:** Track how skills acquired translate into job placements, promotions, or increased responsibility in the field.

b. Implementation Strategy:

- **SMART Criteria:** Ensure each KPI is Specific, Measurable, Achievable, Relevant, and Time-bound.
- **Data Collection Tools:** Use digital dashboards, learning management systems (LMS), and performance analytics software.
- **Review Cycles:** Set regular intervals (e.g., quarterly or biannually) for performance reviews to align training outcomes with industry standards and innovation targets.

Key Areas & Suggested KPIs:

Area	KPI	Description
Skill Acquisition	Learner Progress Rate	% of learners completing training modules (esp. microcredentials) on time
	Skills Application Rate	% of learners applying new skills in a real-world context (e.g., internship feedback, lab assessments)
	Certification Achievement	% of learners earning industry-recognized certifications
Innovation Output	Co-created Projects	Number of innovative projects/products developed by joint KT efforts (HEI, VET, industry)
	Industry Uptake	% of innovations adopted by industry partners

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Area	KPI	Description
	Research-to-Market Time	Average time from prototype (HEI) to pilot/implementation (Industry/VET)

Evaluation Tools:

- Annual KT Dashboard
- Comparative KPI Reports (per cycle)
- Benchmarking with other sectors or CoVE initiatives

KTs stakeholder Feedback Mechanisms

Implementing structured feedback loops to collect insights from KTs members to improve training programs and curriculum design.

a. Structured Feedback Channels:

- **Surveys and Questionnaires**
  - Develop regular surveys for participants, trainers, industry experts, and other stakeholders to evaluate course content, delivery methods, and overall satisfaction.
  - Include both quantitative (rating scales) and qualitative (open-ended questions) data to capture a comprehensive view of the experience.
- **Focus Groups and Workshops**
  - Organize periodic focus groups with KT members to discuss challenges, suggestions, and success stories.
  - Facilitate workshops that encourage collaborative brainstorming sessions between industry experts and educators.
- **Digital Feedback Platforms**
  - Implement a digital platform (or integrate feedback tools into your LMS) where stakeholders can submit real-time feedback.
  - Encourage an open-door policy for continuous feedback rather than only at fixed intervals.

b. Actionable Analysis

- **Data Synthesis:** Use analytics tools to aggregate and analyze feedback, identifying common themes and areas needing attention.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

- **Feedback Loop:** Ensure that insights gained are shared with all stakeholders and that specific action plans are developed to address critical feedback.
- **Communication:** Maintain transparent communication about changes made based on feedback, reinforcing trust and collaborative improvement.

c. Goal

Gather actionable feedback from KT members to continuously refine learning pathways, curriculum content, and collaborative models.

Mechanisms

Stakeholder	Feedback Tool	Frequency	Responsible Entity
Learners	Post-training surveys, focus groups	After each module	VET Providers
Trainers / Educators	Curriculum feedback forms, workshops	Quarterly	HEIs & VET Centers
Industry Partners	Online feedback portal, co-design sessions	Biannually	Industry Liaisons
Research Institutions	Peer-review of educational content	Annually	KT Secretariat

Key Quality Loop Tools:

- PDCA Cycle (Plan-Do-Check-Act)
- Evaluation Reports

Adaptive Learning Frameworks

Introducing flexible learning pathways (microcredentials) that evolve in response to feedback from the KTs member and are in line with technological advancements and market demands.

a. Flexible Learning Pathways:

- **Modular Curriculum Design:**
  - Break down the curriculum into smaller, independent modules that allow learners to customize their educational journey based on their interests and career needs.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

- Integrate microcredentials that recognize completion of modules or skills mastery, providing a stackable pathway toward larger qualifications.

- **Personalization and Adaptive Technologies:**
  - Utilize adaptive learning systems that adjust content delivery based on learner performance and feedback.
  - Incorporate learning analytics to offer personalized recommendations, ensuring that each learner's path evolves with their progress and emerging industry trends.

b. Continuous Curriculum Evolution:

- **Feedback Integration:**
  - Use the stakeholder feedback data to regularly update and refine course content, ensuring that the training remains relevant in the context of technological advancements.
  - Establish a curriculum review board comprising educators, industry experts, and KT members to oversee content updates and approve new modules.
- **Market and Technology Alignment:**
  - Monitor market trends, technological breakthroughs, and regulatory changes to ensure that the curriculum evolves in tandem with the smart electricity sector.
  - Foster partnerships with industry leaders to co-develop content that addresses current and future skill requirements.

c. Pilot Programs and Iterative Development:

- **Testing New Modules:**
  - Launch pilot programs for new microcredentials or course modules and gather data on learner performance and satisfaction.
  - Use pilot feedback to refine content before broader implementation.
- **Iterative Improvement:**
  - Adopt an agile methodology where the curriculum is seen as a living document, regularly refined based on continuous input from performance indicators and stakeholder feedback.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Adaptive Learning Frameworks (Microcredentials)

Goal: Offer modular, flexible learning opportunities that adapt to KT feedback and emerging technology trends.

Key Components

Component	Description
Modular Curriculum Design	Create stackable microcredentials (e.g., “Smart Grid Basics,” “IoT in Buildings,” “Energy Data Analytics”) with clear learning outcomes.
Dynamic Curriculum Updating	Review content every 6–12 months based on:
• industry updates	
• new tech/tools	
• feedback insights	
• job market analysis	
Personalized Learning Pathways	Learners select modules aligned with their interests/career goals (with AI-assisted guidance tools where possible).
Credential Recognition Framework	Ensure microcredentials are recognized across KT partners (EQF-aligned, ECVET credit-based, or blockchain-certified).

Continuous Improvement Actions:

- Annual Tech Foresight Report (predicting trends and suggesting new modules)
- KT Curriculum Steering Group (meets twice a year)
- Pilot-testing new microcredentials before rollout

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Conclusion

Chapter 1 has laid out a comprehensive and strategic framework for establishing effective Knowledge Triangles (KTs) within the SEBCoVE initiative. Built around a structured, three-phase approach—Needs Assessment, Collaborative Model Design, and Implementation & Monitoring—the roadmap integrates stakeholder-centered methodologies such as Design Thinking, personas, journey mapping, and engagement matrices. These tools not only identify existing gaps in collaboration among VET, research, and industry but also provide actionable solutions through governance models, incentive structures, and sustainability planning. The roadmap emphasizes continuous improvement, adaptability, and alignment with regional smart specialization strategies. Ultimately, this foundational chapter sets the stage for piloting robust and sustainable KT ecosystems across SEBCoVE regions, supporting both innovation and workforce development in the Smart Electricity for Buildings sector.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Chapter 2: Knowledge Triangle Development in the in partners' regions

Phase 1: Needs assessment for KTs implementation

Current situation

The SEB COVE initiative aims to enhance collaboration between three key stakeholders—**VET providers**, **industry (especially SMEs)**, and **research institutions**—in forming **Knowledge Triangles** that support skills development and innovation in the **Smart Electricity for Buildings** sector. Across all participating regions, there is a **lack of formal structures** connecting these three actors, resulting in fragmented approaches to education, innovation, and industrial growth.

Greece

Crete Region

VET Providers

Crete hosts a mix of public and private VET providers, with emerging interest in green and smart energy sectors. However, training programs are still catching up with the technological and digital demands of smart building applications.

Industry (SMEs)

The industry in Crete is primarily composed of small-scale enterprises. Collaboration with VET providers is occasional and informal, often limited to internships or ad-hoc training.

Policy and Research

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Research activity exists through technical universities and energy research centers, but systematic collaboration with VET and industry is absent. Regional strategies for energy transition are not yet linked to education and training frameworks.

Italy

Regional Model (Veneto, Lombardia, Friuli Venezia Giulia, Piemonte)

Before the SEB COVE initiative, the knowledge triangle dynamic within Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte, concerning the smart electricity for buildings sector, **is characterized by regionally distinct strengths that are not effectively integrated into a collaborative model.**

VET Providers

Each region has distinct VET strengths:

- **Veneto**: Specializes in IeFP upskilling.
- **Lombardia**: Known for the Valditara experimentation model.
- **Friuli Venezia Giulia**: Implements the Green4Academy approach.
- **Piemonte**: Offers IFTS/ITS pathways.

Despite their strengths, these programs operate in silos, limiting cross-regional harmonization and cooperation.

Industry (SMEs)

SMEs across Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte are crucial for innovation and application within the smart electricity for buildings sector.

However, their interaction with regional VET providers often lacks a structured and consistent model for collaboration.

Challenges include:

- Difficulty in communicating specific and evolving skills requirements to VET providers.
- Varying levels of engagement in the design and delivery of training programs.
- A need for a regional model that facilitates effective and efficient industry-VET collaboration.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

While these regional VET strengths are valuable, they operate largely independently, limiting cross-regional knowledge sharing, curriculum harmonization, and the development of comprehensive training solutions.

There's a need to create a cohesive model that leverages these diverse regional VET capabilities to address the broader skills needs of the smart electricity sector across the 4 regions.

Policy and Research

- Regional policies and funding initiatives within Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte influence the VET landscape and support for industry collaboration.
- A key challenge is the absence of a unified regional model that aligns policies and funding mechanisms to promote a coordinated approach to skills development in the smart electricity sector.

SEB COVE's Role in Building a Regional Model

SEB COVE is designed to address the current lack of a cohesive regional model by:

- Creating a platform for collaboration and knowledge exchange between VET providers, industry, and policymakers across the 4 regions.
- Facilitating the integration of regional VET expertise into a comprehensive training ecosystem.
- Promoting industry-driven curriculum development and skills alignment.
- Supporting the development of regional policies and funding mechanisms that foster innovation and growth in the smart electricity sector.

In essence, SEB COVE aims to transform the current situation of fragmented regional efforts into a synergistic regional model that maximizes the potential of Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte to drive excellence in smart electricity for buildings.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

North Macedonia

VET Providers

VET institutions are present but underfunded and lacking updated curricula that address smart technologies. There are few initiatives aimed at building capacity for smart electricity.

Industry (SMEs)

The industrial base is growing slowly in the energy sector. SMEs struggle to find graduates with the right technical skills and are rarely involved in training development.

Policy and Research

While there is government interest in energy modernization, coordination mechanisms between ministries (education, economy, energy) are not yet established to support integrated Knowledge Triangle models.

Spain: Basque Country

VET Providers

The Basque Country has a strong VET tradition and advanced technical institutions, some of which are starting to integrate smart energy concepts. However, these efforts are often isolated and not linked directly with industry or research agendas.

Industry (SMEs)

There is a well-developed industrial base, including companies engaged in energy-efficient technologies. Despite their capabilities, structured partnerships with training centers are not widespread.

Policy and Research

Regional innovation ecosystems are well-developed, but engagement with VET providers remains inconsistent. There is potential for stronger synergies through structured public-private partnerships.

Common Challenges Across All Regions

- **Lack of formal collaboration platforms** among industry, VET, and research.
- **Fragmented curricula** that are not aligned with labor market needs.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

- **Limited SME involvement** in shaping training and research agendas.
- **Policy gaps** in fostering coordinated, sector-specific education strategies.
- **Inconsistent funding mechanisms** to support cross-sector innovation and upskilling.

SEBCoVE's Role in All Regions

SEBCoVE aims to:

- **Build structured Knowledge Triangles** that connect VET, research, and industry actors.
- **Create collaborative platforms** for regional and interregional knowledge sharing.
- **Promote industry-led training design** with research-informed content.
- **Align regional policies and funding** to support skills development in smart electricity.
- **Encourage cross-border collaboration** and transfer of best practices among regions.

Interactive workshops

As part of the *Smart Electricity for Buildings – Centers of Vocational Excellence (SEBCoVE)* initiative, interactive Design Thinking workshops were conducted in four SEBCoVE regions—Italy, Greece (Crete), North Macedonia, and Spain (Basque Country). These workshops gathered stakeholders from **Vocational Education and Training (VET)**, **Industry**, and **Research** institutions to co-create representative personas for each corner of the Knowledge Triangle.

Workshop fascilitators were guided by the **"Annex I: General Guidelines for Facilitators"**, which provided structured questions and activities tailored to each stakeholder group. The goal was to identify challenges, motivations, and collaboration needs, and to translate these into stakeholder personas rooted in local realities.

The **Italian workshops** focused on capturing regional variation in training models and stakeholder collaboration. Participants engaged in storytelling, roundtable discussions, and persona exercises reflecting both policy-driven and practical concerns.

In **Crete Greece**, one workshop was implemented which highlighted local innovation potential alongside limited resources. Facilitators used future-casting and empathy mapping to understand stakeholder pain points and co-create development-oriented personas.

Three workshops were implemented **in North Macedonia** emphasized overcoming systemic barriers and capacity building. Facilitators used problem-solution mapping and interviews to define current gaps in the SEB knowledge ecosystem.

In Spain, the workshop tapped into a high-tech ecosystem with advanced training infrastructure but weak stakeholder integration. Facilitators used journey mapping and round-robin discussions to surface disconnects and future solutions.

Common Findings Across SEBCoVE Countries

- **Fragmentation and Silos:** All regions reported poor integration among the three sectors, limiting collaboration and knowledge flow.
- **Motivation to Innovate:** Each persona demonstrated a clear motivation to innovate within their sphere, but lacked structures or incentives to do so collaboratively.
- **Need for Regional Coordination Mechanisms:** Local and regional platforms that support continuous collaboration are seen as crucial to strengthen the Knowledge Triangle.

Identifying Barriers and Opportunities

- **Lack of alignment between VET curricula and industry needs:** Curricula require continuous updates to remain relevant.
- **Limited research-industry cooperation:** Institutions may lack structured channels for effective knowledge transfer.
- **Regulatory and funding constraints:** Policy and financial limitations hinder sustainable collaboration models.
- **Low awareness and engagement:** Stakeholders may not fully understand the benefits of active participation in KTs.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Personas identified

Following the interactive workshops conducted in the SEBCoVE regions—Italy, Greece (Crete), North Macedonia, and Spain (Basque Country)—tailored stakeholder personas were developed for each country, representing the three corners of the Knowledge Triangle: VET, Industry, and Research.

Greece – Crete Region

VET Persona – The Strategic VET Reformer

Archetype Mix: Forward-Thinking VET Educator + Policy-Aligned VET Administrator

Background: Konstantinos A., VET expert from ECTE with over 30 years of experience in vocational education and project development.

Motivation

- To integrate innovation and research into VET curricula.
- To develop well-rounded electricians prepared for SEB demands at all EQF levels.
- To strengthen cooperation between education, industry, and research.

Challenges

- Gaps between market needs and current VET programs.
- Slow adaptation of training content to technological advancements.
- Fragmented collaboration across sectors.

Needs

- Structured stakeholder dialogue to co-develop SEB training.
- National recognition and funding for curriculum modernization.
- Regional alliances for pilot programs and teacher upskilling.

Research Persona – The Knowledge-Driven Innovator

Archetype Mix: Applied Researcher + Tech-Transfer Specialist

Background: Prof. K. Emmanouel, Dean of Engineering, and A. Spyridon, Director at HMU – both with 25+ years of academic and research experience in electrical engineering.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Motivation

- Transform the university into a center of excellence in smart buildings.
- Bridge academia and the labor market with innovation-based training.
- Deploy applied research in market-ready SEB technologies.

Challenges

- Disconnect between university output and job market requirements.
- Complexity in coordinating with industry and VET.
- Lack of infrastructure and incentives for large-scale tech transfer.

Needs

- Accurate feedback from the industry on skills demands.
- Joint development of training content that incorporates research.
- Multi-sector governance for innovation in training and upskilling.

Industry Persona – The Collaborative Innovation Catalyst

Archetype Mix: Sustainability-Oriented CEO + Skilled Technician

Background:

Georgios T. – President, Technical Chamber of Greece (East Crete).

Minas K – President, Professional Society of Technological Education Engineers.

Eleftherios M. – President, Hellenic Association of Mechanical and Electrical Engineers (East Crete).

Stylianos V. – President, Electrical Installers Association of Heraklion.

Aristotelis T. – Energy Consultant, Grand Alpha Company.

Motivation

Close the gap between engineering education and market demands.

Build an interdisciplinary community of professionals supporting SEB.

Disseminate knowledge and promote applied innovation through local networks.

Challenges

Slow curriculum reform and lack of field-ready graduates.

Limited availability of modular, short-cycle upskilling programs.

Coordination difficulties among stakeholders with diverse objectives.

Needs

Creation of practical, micro-credential-based programs.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Real-time feedback loops between installers, VET trainers, and researchers.

Public-private partnerships to implement SEB projects locally.

Italy

Veneto, Lombardia, Friuli Venezia Giulia, Piemonte

VET Persona – Forward-Thinking VET Educator

Archetype Mix: Forward-Thinking VET Educator + Policy-Aligned VET Administrator

Alias: **Marta V.**

Organization / Role: **Senior VET Trainer, ENAIP NET**

Experience: **12+ years in vocational education (EQF 3–4)**

Field of Expertise: **Smart electricity systems, curriculum design, digital pedagogy**

Background: Marta, a senior VET trainer at ENAIP NET with 12+ years of experience in vocational training, specializing in smart electricity systems, digital learning, and curriculum innovation at EQF 3–4 levels.

Motivation

- Empower learners and modernize training aligned with the smart energy sector.
- Bridge VET and industry through real-world relevance and work-based learning.
- Create inclusive, flexible, and innovation-ready VET programs.

Challenges

- Difficulty in curriculum modernization due to slow regulatory cycles.
- Limited access to modern lab infrastructure and equipment.

VET's under-recognition compared to academic education pathways.

Needs

Industry: Stronger participation in curriculum co-design and apprenticeships.

Research: Pedagogical innovation, tech integration, and early involvement in applied research.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Policy: Long-term funding, validation of micro-credentials, and VET visibility in green transitions.

Ideal Collaboration Model

Public-private partnerships with regional skills alliances, modular curricula, shared platforms for apprenticeships, and teacher exchange programs that foster lifelong learning and sector adaptability.

Industry Persona – The Sustainability-Oriented CEO

Archetype Mix: Sustainability-Oriented CEO

Alias: **Marco R.**

Organization / Role: **CEO of EnerVis Italia**

Experience: **15+ years in energy innovation**

Field of Expertise: **Smart grids, AI-driven energy optimization, renewable integration**

Background: Marco Rinaldi, founder and CEO of EnerVis Italia, a company leading in AI-driven smart energy management, smart grids, and green building solutions, with over 15 years in energy entrepreneurship

Motivation

Drive smart energy solutions aligned with Italy's climate goals and EU Green Deal.

Create a workforce pipeline equipped with emerging digital and green energy skills.

Collaborate cross-sectorally for scaling innovation and sustainability.

Challenges

Regulatory instability and complex permitting hinder long-term planning.

Skill mismatches due to outdated VET programs and lack of AI/IoT integration.

Difficulty in accessing pilot testing environments and EU project partnerships.

Collaboration Needs

VET: Graduates with data-driven energy management skills; dynamic apprenticeships.

Research: Applied, co-developed innovations that are market-ready.

Policy: Simplified incentive structures and access to sustainability grants.

Ideal Collaboration Model

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Collaboration on smart city and energy efficiency pilots, VET-aligned certifications, and innovation hubs linking industry, training, and research for regionally scalable solutions.

Research Persona – The Bridge-Building Tech Transfer Duo

Archetype Mix: Tech-Transfer Specialist + Applied Researcher

Alias: **Dr. Renata M. & Ing. Andrea M., PhD**

Organization / Role: **University Innovation Hub (Applied Researcher & Tech Transfer Specialist)**

Experience: **10+ years in research, commercialization, and SEB ecosystems**

Field of Expertise: **Smart building energy tech, IP commercialization, IoT for energy**

Background: Ing. Andrea M. Tech Transfer Office Manager at a University Innovation Hub, expert in IP management and commercialization of SEB solutions.

Dr. Renata M.: Senior researcher in smart building technologies and IoT-based energy systems.

Motivations & Goals

- Translate research into market-ready smart energy solutions.
- Support startups and vocational ecosystems with scalable innovations.
- Establish open innovation models and regional testbeds.

Challenges

- Limited pilot infrastructures and disconnection from VET ecosystems.
- IP protection vs. collaborative innovation dilemmas.
- Academia-industry misalignment on goals, timelines, and communication.

Collaboration Needs

- **VET:** Up-to-date VET curricula and skilled technical implementers.
- **Industry:** Engagement in living labs, field-testing, and open innovation.
- **Policy:** Structural support for tech transfer, funding for industrialization, and flexible licensing.

Ideal Collaboration Model

Living labs and PPPs for demonstration projects, regional tech clusters with VET integration, and co-design of training modules based on emerging research findings.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

North Macedonia

VET Persona – The Struggling but Committed Educator

Archetype: Forward-Thinking VET Educator

- **Background**: Teacher at a state-run VET institution in Skopje.
- **Motivation**: Aims to modernize courses despite limited resources.
- **Challenges**: Outdated labs, minimal support, and no access to smart grid tools.
- **Needs**: External partnerships, EU project involvement, and teacher upskilling programs.

Industry Persona – The Eager but Undersupported Technician

- **Archetype**: Skilled Technician
- **Background**: Works for an energy service SME in Bitola.
- **Motivation**: Wants to understand smart metering and energy automation.
- **Challenges**: No formal training options in emerging tech.
- **Needs**: Access to flexible, practical VET courses and links to research demos.

Research Persona – The Energy Policy Intermediary

- **Archetype**: Applied Researcher
- **Background**: Policy advisor collaborating with universities on energy reforms.
- **Motivation**: Seeks to embed energy modernization into education and workforce systems.
- **Challenges**: Ministries operate in silos; lacks education-sector integration.
- **Needs**: An inter-ministerial platform for Knowledge Triangle coordination.

Spain – Basque Country

VET Persona – The Technically Advanced but Isolated Instructor

Archetype: *Forward-Thinking VET Educator*

Background: Teacher at a top Basque VET institution with advanced infrastructure.

Motivation: Integrates smart energy labs but seeks real-world collaboration.

Challenges: Operates independently from local industry/research bodies.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Needs: Interoperable platforms and incentives to co-create training with SMEs and researchers.

Industry Persona – The Innovation-Driven SME Leader

Archetype: Sustainability-Oriented CEO

- **Background**: Founder of a mid-size company providing IoT solutions for building energy efficiency.
- **Motivation**: Interested in shaping the next generation of skilled workers.
- **Challenges**: No consistent dialogue with VET providers; unsure how to engage.
- **Needs**: Co-design apprenticeships and rapid training cycles aligned to R&D.

Research Persona – The Strategic Ecosystem Integrator

Archetype: Tech-Transfer Specialist

- **Background**: Manager of a technology park supporting SEB startups.
- **Motivation**: Wants to turn regional innovation into scalable solutions.
- **Challenges**: VET integration remains peripheral in the innovation ecosystem.
- **Needs**: Regional PPP (public-private partnership) mechanisms including VET institutions.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Engagement Matrices, **Collaboration Canvases**, and **Journey Maps,**

Getting feedback from the interactive workshops, the workshop facilitators using the General guidelines and templates (annex i), mapped identified personas, onto **Engagement Matrices**, **Collaboration Canvases**, and **Journey Maps,** which will be used as a tracking tool the whole duration of the project and beyond.

1. **Engagement Matrix for Knowledge Triangle in partners:** Evaluates current vs. desired collaboration levels and key actions regions (using templates from annex iii).

Country	Sector	Current Level of Engagement	Desired Level of Engagement	Key Actions for Improvement
Italy	VET Provider	Medium	High	Establish joint curriculum development meetings.Facilitate Interactive Events. Streamline Partnership Processes. Focus on Long-Term Planning. Develop shared industry pilot projects Expand apprenticeships and work-based learning Valditara (Valditara Experimentation). Friuli Venezia Giulia: The Green4Academy approach (likely focusing on green skills and sustainability in the electricity sector). Piemonte: Specialization in IFTS/ITS (Higher Technical Education and Training/Higher Technical Institutes). Lombardia & Veneto: Experience in Micro-credential experimentation
Italy	Industry Partner	High	High	Expand apprenticeships and work-based learning programs, strengthen collaboration with VET providers and research institutions, create industry-driven pilot projects
Italy	Research Institution	Low	Medium	Enhancing research, VET and industries collaboration requires joint projects, innovation hubs, and stronger industry partnerships. Modernizing curricula with cutting-edge research and digital tools ensures workforce readiness.

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Greece (Crete)	VET Provider (ECTE)	High	High	Establish joint curriculum development meetings
Greece (Crete)	**Research Institution (HMU)**	High	High	Develop shared industry pilot projects
Greece (Crete)				Expand apprenticeships and work-based learning
Greece (Crete)	**Industry Partner (Technical Chamber)**	Low	Medium	Expand apprenticeships and work-based learning
Greece (Crete)	**Industry Partner (Scientific Society Technological Education)**	Medium	High	
Greece (Crete)	Industry Partner (Hellenic Association of Graduated Mechanical and Electrical Engineers)	Low	Medium	Expand apprenticeships and work-based learning
Greece (Crete)	Industry Partner (Association of Electrical Installers)	High	High	Expand apprenticeships and market-based learning
Greece (Crete)	Industry Partner (Grand Alpha Company)	Medium	High	Expand apprenticeships and work-based learning
North Macedonia	VET Provider	Low	Medium	Join EU-funded capacity-building initiatives
North Macedonia	Industry Partner	Low	Medium	Participate in pilot training schemes
North Macedonia	Research Institution	Low	Medium	Form inter-ministry working group
Spain (Basque Country)	VET Provider	Medium	High	Integrate industry case studies in curricula

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Spain (Basque Country)	Industry Partner	Medium	High	Co-fund innovation apprenticeships
Spain (Basque Country)	Research Institution	Low	High	Facilitate VET-research innovation labs

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

2. **Collaboration Canvas:** Outlines what each sector offers, needs, their barriers, and opportunities (using templates from annex iii).

Country	Sector	What We Offer	What We Need	Barriers	Opportunities
Italy	VET Provider	Qualifications to EQF 3 and EQF 4. Upskilling, reskilling programmes. Expert professional teachers	Industry-aligned curricula, updated equipment.	Outdated equipment	Joint training programs
Italy	Industry Partner	Practical application	Skilled workforce	Lack of technical expertise	Work-based learning
Italy	Research Institution	Cutting-edge innovation	Real-world testing	Limited funding	Industry-funded R&D projects
Greece (Crete)	VET Provider	Skilled graduates	Industry-aligned curricula	Outdated equipment	Joint training programs
Greece (Crete)	Research Institution	Cutting-edge innovation	Real-world testing	Limited funding	Industry-funded R&D projects
Greece (Crete)	Industry Partner (Technical Chamber)	Skilled workforce	Advanced Electricians on SEB sector	Lack of expertised educators	Innovated learner-center methods
Greece (Crete)	Industry Partner (Scientific Society Technological Education)	Skilled workforce	Advanced Electricians on SEB sector	Lack of expertised educators	Innovated learner-center methods
Greece (Crete)	Industry Partner (Hellenic Association of Graduated Mechanical and Electrical Engineers)	Skilled workforce	Advanced Electricians on SEB sector	Lack of expertised educators	Innovated learner-center methods
Greece (Crete)	Industry Partner (Association of Electrical Installers)	Practical application	Skilled workforce	Lack of technical expertise	Work-based learning

Greece (Crete)	Industry Partner (Grand Alpha Company)	Practical application	Skilled workforce	Lack of technical expertise	Work-based learning
North Macedonia	VET Provider	Advanced training programs	Updated equipment and industry feedback	Fragmented curricula or limited modernization	Joint programs and EU co-funded upgrades
North Macedonia	Industry Partner	Real-world project applications	Skilled, job-ready graduates	Lack of curriculum influence	Influence on training content
North Macedonia	Research Institution	Innovative R&D and testing	Access to pilot environments	Insufficient engagement with SMEs/VET	Commercialization through KT engagement
Spain (Basque Country)	VET Provider	Advanced training programs	Updated equipment and industry feedback	Fragmented curricula or limited modernization	Joint programs and EU co-funded upgrades
Spain (Basque Country)	Industry Partner	Real-world project applications	Skilled, job-ready graduates	Lack of curriculum influence	Influence on training content
Spain (Basque Country)	Research Institution	Innovative R&D and testing	Access to pilot environments	Insufficient engagement with SMEs/VET	Commercialization through KT engagement

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

2. **Persona Journey Map**: Tracks progress from initial awareness to sustained collaboration, identifying challenges and action steps (using templates from annex iii).

Country	Stage	Current Situation	Barriers	Desired Future	Actions Needed
Italy	Awareness	Limited interaction between sectors	No structured collaboration	Regular engagement and joint projects	Establish networking events, workshops, and seminars involving VET providers, industry, and policymakers.
Italy	Collaboration	Informal partnerships exist	Lack of funding and policy support	Institutionalized long-term cooperation	Sign Memorandums of Understanding (MoUs), create joint training programs, and establish collaborative platforms.
Italy	Sustainability	Initial projects piloted	Need for long-term commitment	Continuous knowledge exchange	Create governance models, secure long-term funding plans, and establish communities of practice.
Greece (Crete)	Awareness	Limited interaction between sectors	No structured collaboration	Regular engagement and joint projects	Establish networking events
Greece (Crete)	Collaboration	Informal partnerships exist	Lack of funding and policy support	Institutionalized long-term cooperation	Sign MoUs and create joint training programs
Greece (Crete)	Sustainability	Initial projects piloted	Need for long-term commitment	Continuous knowledge exchange	Create governance models and funding plans
North Macedonia	Awareness	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Set up regional stakeholder roundtables

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

North Macedonia	Collaboration	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Sign MoUs with VET and research institutions
North Macedonia	Sustainability	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Embed pilot projects in VET-industry programs
Spain (Basque Country)	Awareness	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Set up regional stakeholder roundtables
Spain (Basque Country)	Collaboration	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Sign MoUs with VET and research institutions
Spain (Basque Country)	Sustainability	Limited cross-sector interaction	No structured collaboration or funding	Ongoing cooperation and co-designed solutions	Embed pilot projects in VET-industry programs

Erasmus + EU Solidarity Corps
101144027-SEBCoVE ERASMUS-EDU-2023-PEX-COVE

Co-funded by the European Union

Formalised Collaborations and Transition into Piloting

Following the design and regional adaptation of the SEBCoVE Knowledge Triangle (KT) framework, the project has successfully entered the **implementation phase**, starting with the **formalisation of collaborations**. Guided by the Memorandum of Understanding (MoU) template provided in *Annex IV*, stakeholders in each country have established formal commitments to jointly advance innovation, training, and research in the Smart Electricity for Buildings (SEB) sector. The MoU has served as a practical instrument to define common objectives, collaborative areas, and governance roles across VET providers, research institutions, industry, and policy actors.

As of this stage, **three Knowledge Triangles in North Macedonia** and **one in the Crete region of Greece** have officially entered the **pilot implementation phase**. These pilot KTs are actively engaging in co-creating curricula, designing work-based learning pathways, and exploring joint research applications aligned with SEB sectoral needs. In parallel, **Knowledge Triangles in Italy** (across the Veneto, Lombardia, Friuli Venezia Giulia, and Piemonte regions) and the **Basque Country in Spain** have completed their preparatory steps and are now **ready to initiate pilot activities**. Their entry into the piloting phase is expected imminently, backed by strong stakeholder alignment, institutional readiness, and strategic support from SEBCoVE partners. This evolving momentum signals a critical shift from planning to action and confirms the feasibility of the KT roadmap across diverse regional contexts.

Conclusion

Chapter 2 has documented the progressive implementation of the SEBCoVE Knowledge Triangle roadmap across the four participating countries, from initial needs assessment to structured stakeholder engagement and collaboration planning. Notably, the roadmap has moved from theory into practice: **pilot Knowledge Triangles have been launched in North Macedonia and Greece**, with Italy and the Basque Country demonstrating full readiness to follow. This confirms the adaptability

and relevance of the roadmap framework in a variety of institutional and policy environments.

The formalisation of KT partnerships through signed Memoranda of Understanding, combined with strong co-creation processes and regional alignment, has laid the foundation for dynamic pilot activities. The project is now entering a decisive phase where real-world collaboration will drive innovation in training, research, and applied solutions for the Smart Electricity for Buildings sector. These early implementations not only validate the roadmap's approach but also position SEBCoVE to scale and sustain its model, fostering long-term impact across European regions.

ANNEXES

Annex i: General Guidelines for Facilitators

- **Encourage storytelling**: Ask participants to **share real-life experiences** rather than just giving short answers.
- **Use open-ended questions**: This allows participants to elaborate and provide valuable insights.
- **Facilitate group discussions**: Some questions can be **answered in small groups** to compare different perspectives.
- **Summarize key takeaways**: At the end of each session, **highlight common themes and personas** emerging from discussions.

Questions for VET Participants (Educators, Trainers, Administrators)

Objective: Understand the role of VET in the Smart Electricity for Buildings (SEB) sector and how educators/trainers interact with research and industry.

A. Identifying Background & Professional Role

1. Can you introduce yourself and share a bit about your **experience in vocational training** related to smart electricity?
2. What **types of students** do you typically train (age, background, career aspirations)?
3. How does your institution currently **prepare students for careers in SEB**?

B. Motivations & Vision

4. What **drives you** to work in vocational education for SEB?
5. What skills and knowledge do you think **VET graduates must have** to be competitive in this industry?
6. If you could **redesign vocational training**, what would you change?

C. Challenges & Barriers

7. What are the biggest **gaps between VET and industry expectations**?

8. What are the main **barriers to collaboration** between VET, research, and industry?
9. How does your institution stay updated with **emerging technologies and industry trends**?

D. Collaboration & Engagement

10. Have you previously worked with **researchers or industry professionals**? What was that experience like?
11. What kind of **support or partnerships** would help make VET more relevant to industry needs?
12. How can we **bridge the gap between VET, research, and industry** to create a better workforce?

E. Persona Development Exercise

Ask participants to describe a "typical" educator or VET administrator persona based on their experience. Example prompt:

"Imagine a VET educator who is passionate about integrating smart electricity innovations into their curriculum. What are their **main challenges, motivations, and needs**?"

Questions for Research Institution Participants

Objective: Identify the role of research institutions in advancing SEB and their connection to industry and education.

A. Understanding Research & Academic Role

1. What is your **field of expertise** in Smart Electricity for Buildings?
2. How does your research contribute to **solving industry challenges**?
3. Do you work on **applied research**, or is your work more **theoretical**?

B. Motivation & Future Outlook

4. What aspects of **SEB research excite you the most**?
5. How do you think research can make **the biggest impact on industry and vocational training**?
6. In an ideal world, how should **research findings be transferred** to businesses and training programs?

C. Challenges in Research-Industry-VET Collaboration

7. What are the biggest **barriers to collaborating with companies** in the SEB sector?
8. How easy is it to **integrate research findings into VET training programs**?
9. What obstacles prevent researchers from engaging in **real-world industry projects**?

D. Collaboration & Engagement Strategies

10. Have you partnered with **companies or VET institutions** before? What worked well, and what didn't?
11. How can vocational training centers make better use of **research-driven insights**?
12. What could **industry do differently** to collaborate more effectively with researchers?

E. Persona Development Exercise

Ask participants to describe a "typical" researcher persona based on their experiences. Example prompt:

"Imagine a researcher working on the next generation of energy-efficient smart buildings. What are their **challenges, motivations, and ideal collaborations**?"

Questions for Industry Participants (Companies, SMEs, Startups, Technicians)

Objective: Understand industry needs, challenges, and how companies engage with VET and research institutions.

A. Business & Industry Background

1. Can you share a bit about your company and its **role in Smart Electricity for Buildings**?
2. What kinds of **technologies or services** does your company focus on?
3. How do you currently **train your workforce** in new SEB technologies?

B. Industry Needs & Workforce Development

4. What **skills are most important** for electricians and technicians in SEB?
5. What are the biggest **skill gaps** you see in graduates from VET programs?

6. If you could create a **custom training program**, what would it include?

C. Challenges in Industry-Academia Collaboration

7. What are the biggest **barriers preventing companies** from engaging with VET and research institutions?
8. Do you have **access to applied research or emerging technologies** from universities?
9. What prevents companies from **investing in employee training or apprenticeships**?

D. Collaboration & Future Vision

10. Have you ever worked with **VET institutions or universities**? What was your experience?
11. What kind of **incentives** would encourage your company to invest more in training partnerships?
12. How can research institutions better **support your innovation and R&D needs**?

E. Persona Development Exercise

Ask participants to describe a “typical” industry persona based on their experiences. Example prompt:

"Imagine a small business owner running an energy solutions company. What are their **challenges, goals, and ideal collaborations**?"

Facilitator Wrap-Up: Creating a Knowledge Triangle Persona Map

At the end of the session, facilitators should: **Summarize** the common themes and challenges across all three sectors.

- ✓ **Map out** the typical personas emerging from discussions.
- ✓ **Identify key pain points** that prevent collaboration.
- ✓ **Highlight opportunities** for **stronger engagement models** between VET, research, and industry.

Would you like any additional **workshop tools (e.g., templates, visual frameworks, interactive exercises)** to support the facilitation process?

Annex ii: Stakeholder Persona Template

This template helps participants define personas for VET, Research, and Industry stakeholders.

General Information:

- Name / Alias:
- Organization / Role:
- Years of Experience:
- Field of Expertise:
- Key Responsibilities:

Motivations & Goals:

- What drives this person in their field?
- What are their top three priorities for innovation and collaboration?
- How do they view the role of their sector in the SEB ecosystem?

Challenges & Barriers:

- What are the main difficulties they face in their profession?
- What barriers exist to cross-sector collaboration?
- What are their concerns about working with other Knowledge Triangle members?

Collaboration & Future Vision:

- What do they need from the other two sectors (VET, Research, Industry)?
- What forms of collaboration do they prefer?
- What would an ideal partnership look like for them?

Annex iii: Knowledge Triangle Archetypes

These archetypes help structure stakeholder personas in VET, Research, and Industry.

VET Sector Archetypes

1. **The Forward-Thinking VET Educator** – Passionate about modernizing vocational training, ensuring students are job-ready in SEB technologies.
2. **The Policy-Aligned VET Administrator** – Focuses on aligning VET curricula with national and EU policies, securing funding, and ensuring compliance.

Research Institution Archetypes

3. **The Applied Researcher** – Engages in hands-on research, aiming to bridge the gap between academia and industry through practical innovations.
4. **The Tech-Transfer Specialist** – Focuses on commercializing university research and ensuring new SEB technologies reach the market.

Industry Sector Archetypes

5. **The Sustainability-Oriented CEO** – An entrepreneur driving innovation in smart energy solutions and seeking well-trained VET graduates.
6. **The Skilled Technician** – An experienced electrician eager to upskill and apply new smart energy technologies in real-world settings.

Annex iv: Tools Knowledge Triangle Engagement Matrix

Implementation & Usage

The following templates digitized for Google Docs or any other application and Notion for workshop facilitation.

Facilitators can use them for live engagement tracking and collaboration mapping.

Participants can fill in templates individually or in group exercises to encourage discussion.

Knowledge Triangle Engagement Matrix

A structured framework for mapping current and desired engagement levels.

Sector	Current Level of Engagement (Low, Medium, High)	Desired Level of Engagement	Key Actions for Improvement
VET Provider	Medium	High	Establish joint curriculum development meetings
Research Institution	Low	Medium	Develop shared industry pilot projects
Industry Partner	High	High	Expand apprenticeships and work-based learning

---

Collaboration Canvas

A visual framework to identify sector contributions and needs.

Sector	What We Offer	What We Need	Barriers	Opportunities
VET	Skilled graduates	Industry-aligned curricula	Outdated equipment	Joint training programs
Research	Cutting-edge innovation	Real-world testing	Limited funding	Industry-funded R&D projects

Industry	Practical application	Skilled workforce	Lack of technical expertise	Work-based learning

Persona Journey Map

A structured table to track the development of collaboration over time.

Stage	Current Situation	Barriers	Desired Future	Actions Needed
Awareness	Limited interaction between sectors	No structured collaboration	Regular engagement and joint projects	Establish networking events
Collaboration	Informal partnerships exist	Lack of funding and policy support	Institutionalized long-term cooperation	Sign MoUs and create joint training programs
Sustainability	Initial projects piloted	Need for long-term commitment	Continuous knowledge exchange	Create governance models and funding plans

Future Scenario Building Board

A brainstorming exercise to envision the ideal Knowledge Triangle for SEB in 2030.

- → How will VET, Research, and Industry interact in 2030?
- → What new technologies or policies will shape Smart Electricity for Buildings?
- → What partnerships will exist to ensure continuous knowledge transfer?
- → What key milestones need to be achieved in the next 5 years?

Annex v: Memorandum of Understanding template

MEMORANDUM OF UNDERSTANDING (MoU) FOR COLLABORATION
BETWEEN
SEBCoVE PROJECT PARTNERS AND
…….…
TO ESTABLISH KNOWLEDGE TRIANGLES (KTs)
FOR SMART ELECTRICITY FOR BUILDINGS (SEBs)

Preamble:

This Memorandum of Understanding (MoU) is made and entered into by and between the undersigned **SEBCoVE Project Partners** and **…… ……** hereinafter referred to as "the Parties." The purpose of this MoU is to establish a framework for collaboration in creating **Knowledge Triangles (KTs)** as part of the innovation-driven **SEBCoVE Excellence Centers** focused on advancing **Smart Electricity for Buildings (SEBs).**

Article 1 - Background & Purpose

The transition towards sustainable energy systems requires a synergy between academia, industry, and policymakers. The SEBCoVE (Smart Electricity for Buildings Center of Vocational Excellence) initiative aims to bridge this gap by fostering collaborative efforts between HEIs and project partners to create **Knowledge Triangles** that enhance research, innovation, and training in SEBs.

Article 2 - Objectives

The key objectives of this MoU include:

a) Establishing a **Knowledge Triangles (KTs)** as part of the **SEBCoVE Excellence Centers** to support innovation in SEBs.
b) Strengthening **academia-industry-training and policy collaboration** for applied research and real-world implementations.
c) Enhancing the **transfer of knowledge and technology** to improve energy efficiency in buildings.
d) Developing **joint research, training, and mobility programs** for students, researchers, and professionals.
e) Facilitating access to funding opportunities, including Erasmus+, Horizon Europe, and regional funding programs.

Article 3 - Scope of Collaboration

The Parties agree to cooperate in the following areas:

a) **Research & Innovation**: Joint projects, technology development, and knowledge sharing in SEBs.
b) **Education & Training**: Development of curriculum, short courses, and certifications.
c) **Industrial Partnerships**: Engagement with energy companies, smart grid providers, and regulatory bodies.
d) **Policy & Regulation**: Recommendations for sustainable energy policies in building infrastructure.
e) **Technology Transfer**: Patents, prototypes, and commercialization of innovations in SEBs.

Article 4 - Roles & Responsibilities

Academic and research institutes will develop new knowledge, technologies, and methodologies that can be transferred to training institutes and industry.
Industry partners will Identify and provide skills and competences gaps and provides practical applications for research and training to align research and training with industry needs and trends.

a) **Training institutes will s**erve as an intermediary, equipping learners with the necessary knowledge and skills to apply research outcomes in real-world industrial settings.
b) **Policy stakeholders** will act as associate members of the KTS supporting by establishing regulatory frameworks and policy alignment for the widespread adoption of SEB solutions.

Article 5 - Governance & Implementation

a) A **Joint Steering Committee (JSC)** shall be formed to oversee the implementation of this MoU, including representatives from HEIs, industry partners, and policymakers. members of the KT
b) The JSC shall establish **working groups** to focus on specific areas such as research, training, and policy development.
c) An annual **SEB Innovation Forum** shall be organized to review progress, share best practices, and set future goals.

Article 6 - Funding & Sustainability

a) The Parties shall explore various **funding mechanisms** including European grants (Erasmus+, Horizon Europe, etc.), public-private partnerships, and industry investments.

b) Each partner shall commit to contributing **resources (financial or in-kind)** to support the sustainability of the Knowledge Triangles.

Article 7 – Public Statements

The Parties recognize the value of positive publicity. However, they agree that no Party shall make any public statement, press release, or disclosure regarding the proposals, intentions, or contents of this Memorandum of Understanding unless mutually agreed upon and coordinated with the Partners in advance.

Article 8 – Duration & Termination

a) This MoU shall remain in effect for an initial period of **five (5) years** from the date of signing, with the possibility of renewal upon mutual agreement.
b) Any Party may terminate its participation by providing a written notice **at least one month** in advance.

Article 9 - General Provisions

a) This MoU is **non-binding** and does not create any financial obligations. It serves as a declaration of intent to collaborate.
b) Any disputes arising from this MoU shall be resolved through mutual discussion.

Article 10 - Signatures

By signing below, the Parties acknowledge their commitment to fostering collaboration in establishing Knowledge Triangles for Smart Electricity for Buildings.

For SEBCoVE Project Partners	**For the …….**
[Name]	**[Name]**
[Position]	[Position]
[Institution/Organization]	[Institution]
[Signature & Date]	[Signature & Date]

GERMANY

GREECE

ITALY

NETHERLANDS

NORTH MACEDONIA

PORTUGAL

SPAIN

Co-funded by
the European Union

101144027 — SEBCoVE — ERASMUS-EDU-2023-PEX-COVE

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

SEBCoVE.eu

LinkedIn

Facebook