WP3

D3.3: SEBCOVE's functional and operational specifications

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SMART ELECTRICITY FOR BUILDINGS

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Abstract

The **SEBCoVE Functional and Operational Specifications** report outlines the structural, governance, and quality assurance framework for the **Smart Electricity for Buildings – Centres of Vocational Excellence (SEBCoVE)** initiative. This initiative aims to enhance vocational education and training (VET) by integrating **education, business, and research** to address skill gaps, promote innovation, and support the **green and digital transition** in the **Smart Electricity for Buildings (SEB)** sector.

The document details the **governance structure**, including the **Steering Committee, Operational Management Team, Regional Advisory Boards, and Industry & Academic Council**, ensuring strategic alignment with industry needs. It also defines the **SEBCoVE digital collaboration platform**, which facilitates stakeholder engagement, training delivery, and knowledge-sharing.

A key focus is on **training schemes** aligned with **EQF and ECVET**, featuring **modular learning pathways, stackable micro-credentials, and industry-driven curricula**. The report highlights the **Knowledge Triangle (KT) creation pathways for** fostering cooperation between **VET institutions, companies, and research centers** to enhance workforce development and sectoral competitiveness.

SEBCoVE incorporates a **stakeholder engagement plan**, utilizing a **prioritization matrix** to ensure active participation from **education providers, policymakers, industry leaders, and SMEs**. The initiative follows **ISO 21001 and EQAVET standards** for **quality assurance**, using **PDCA (Plan-Do-Check-Act) cycles, audits, and continuous improvement mechanisms** to maintain high training standards and sustainability.

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**.

Keywords

Centres of Vocational Excellence (CoVEs): Specialized hubs that integrate education, industry, and research to enhance vocational training and develop sector-specific skills.

Smart Electricity for Buildings (SEB): A sector focused on energy-efficient, automated, and sustainable electricity systems within buildings, incorporating IoT, AI, and smart grids.

Knowledge Triangle (KT): A collaborative framework linking education, business, and research to develop industry-relevant skills, foster innovation, and ensure workforce adaptability.

European Qualifications Framework (EQF): A standardized system that aligns qualifications across Europe, ensuring transparency and comparability of skills and competencies.

European Credit System for Vocational Education and Training (ECVET): A framework for credit transfer and accumulation in vocational training, supporting mobility and lifelong learning.

Micro-Credentials: Short, modular learning units that certify specific competencies, often stackable towards a full qualification.

Quality Assurance in VET (EQAVET): A European framework ensuring quality, transparency, and continuous improvement in vocational education systems.

ISO 21001: An international standard for educational organizations, ensuring quality management systems in training institutions.

Plan-Do-Check-Act (PDCA) Cycle: A continuous improvement methodology used in quality management to plan, implement, evaluate, and refine processes.

Skills Ecosystem

Energy Transition: The shift towards sustainable, renewable, and smart energy solutions to reduce carbon footprints in the building sector.

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REVISION HISTORY

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SEBCoVE's Functional and Operational Specifications

Executive Summary

The SEBCoVE Functional and Operational Specifications report outlines the governance, training framework, stakeholder engagement strategies, and quality assurance mechanisms for the Smart Electricity for Buildings – Centres of Vocational Excellence (SEBCoVE) initiative. SEBCoVE is an Erasmus+ project that aims to develop regional vocational excellence hubs to bridge skill gaps, promote innovation, and support the green and digital transition in the Smart Electricity for Buildings (SEB) sector.

Key Components of the SEBCoVE Framework

1. **Governance and Administration**

SEBCoVE operates under a multi-tiered governance structure, including a Steering Committee, Operational Management Team, Regional Advisory Boards, and an Industry & Academic Council representing the Knowledge triangles. This ensures strategic alignment with industry needs, effective decision-making, and quality assurance.

2. **Digital Collaboration Platform**

The SEBCoVE digital platform serves as a hub for stakeholder engagement, training delivery, and knowledge-sharing. It features online learning tools, collaboration spaces, event management functions, and feedback mechanisms to support continuous improvement.

3. **Training Schemes and Course Structures**

SEBCoVE offers modular learning pathways aligned with the European Qualifications Framework (EQF) and the European Credit System for Vocational Education and Training (ECVET). The training programs integrate stackable micro-credentials and focus on digital, green, and entrepreneurial skills. Key professional profiles include

specialists in Smart Electricity for Buildings, Energy Efficiency, Renewable Energy, and Automation Technologies.

4. **Stakeholder Engagement Plan**

A stakeholder prioritization matrix guides the engagement strategy, ensuring active participation from educational institutions, policymakers, industry leaders, and SMEs. SEBCoVE fosters cross-sector collaboration through industry-driven training programs and research partnerships.

5. **Knowledge Triangle Roadmap**

SEBCoVE promotes cooperation between VET institutions, companies, and research centers to enhance workforce development and sectoral competitiveness. The initiative facilitates regional skills hubs, innovation incubators, and international networking to support lifelong learning and upskilling.

6. **Quality Assurance and Sustainability**

SEBCoVE follows ISO 21001 and EQAVET standards for quality assurance, implementing a Plan-Do-Check-Act (PDCA) cycle, periodic audits, and continuous monitoring. The initiative integrates learner satisfaction surveys, graduate employability tracking, and performance indicators to ensure training effectiveness.

By implementing this structured framework, SEBCoVE establishes itself as a scalable, adaptable, and sustainable model for vocational excellence in the Smart Electricity for Buildings sector. The initiative ensures long-term impact, workforce readiness, and innovation, contributing to Europe's green and digital transformation

Introduction

The Smart Electricity for Buildings - Centres of Vocational Excellence (SEBCoVE) project focuses on developing regional vocational excellence hubs in the smart electricity for buildings sector. These hubs aim to support regional smart specialization and establish international knowledge hubs for vocational education and training (VET)

excellence systems. SEBCoVE aspires to be a world-class reference point for upskilling and reskilling professionals engaged in the sector, and serves as a prototype for other Centres of Vocational Excellence (CoVEs) and integrates training schemes, stakeholder collaboration, and quality assurance mechanisms to create a resilient and industry-aligned learning environment.

This document provides a detailed framework of SEBCoVE's functional and operational specifications, covering its organizational structure, training programs, stakeholder engagement strategy, knowledge-sharing mechanisms, and quality assurance protocols. More specifically, is including all the procedures described below:

- Governance and Administration fo SEBCoVE
- The SEBCoVE's platform (organizational framework)
- The specific training schemes for courses expected to be delivered by SEBCoVE during the project, aimed at providing specific knowledge and skills (including digital, green, and entrepreneurial skills) needed in the Smart Electricity for Buildings sector.
- The stakeholder engagement plan
- The knowledge Triangles roadmap
- The quality assurance procedures to be employed by SEBCoVEs (ISO 21001 and EQAVET described in T6.1)

1. Governance and Administration

SEBCoVE operates under a multi-tiered governance and administration structure designed to ensure transparency, efficiency, and alignment with EU vocational education policies. The governance framework ensures effective decision-making, resource management, and accountability in delivering high-quality training programs and vocational excellence initiatives. Key components include:

1.1 Leadership and Coordination

- **SEBCoVE Steering Committee**: Comprising representatives from partner institutions, industry stakeholders, and policymakers, the Steering Committee oversees strategic direction, long-term planning, and high-level decision-making.
- **Operational Management Team**: A dedicated team responsible for day-to-day coordination of SEBCoVE activities, ensuring compliance with project timelines, budget management, and performance monitoring.
- **Regional Advisory Boards**: These boards consist of regional stakeholders, including vocational training providers, companies, and policymakers, providing feedback and insights on local industry needs and policy developments.
- **Industry and Academic Council**: A consultative body that ensures SEBCoVE's curriculum and training programs remain aligned with technological advancements and industry demands.The council is directly represents the **Knowledge triangles** in each region.

1.2 Consortium Structure

SEBCoVE is structured as a partnership between educational institutions, research centers, industry leaders, and policy advisors to foster collaborative innovation in vocational education. The consortium includes:

- **Vocational Education and Training (VET) Providers**: Institutions responsible for curriculum design and delivery.
- **Industry Partners**: Companies and business associations that contribute expertise, apprenticeships, and real-world training opportunities.
- **Research Institutions**: Universities and technology centers involved in applied research and innovation in smart electricity for buildings.
- **Government and Policy Organizations**: Ministries, regulatory bodies, and accreditation agencies ensuring alignment with national and EU educational policies.

- **Social and Environmental Organizations**: Entities promoting sustainability, social inclusion, and green skills development within vocational training.

1.3 Regulatory Compliance and Quality Assurance

- **EU and National Compliance**: SEBCoVE adheres to European and national educational regulations, ensuring programs align with **EQAVET** (European Quality Assurance in Vocational Education and Training) and **ISO 21001** (Educational Organizations Management System).
- **Internal Quality Monitoring**: Regular assessments and performance evaluations conducted by a dedicated Quality Assurance Team.
- **Stakeholder Engagement in Governance** (**Knowledge Triangles**): Key industry representatives, policymakers, and VET providers actively contribute to decision-making processes to maintain relevance and effectiveness of training programs.
- **Periodic Audits and Evaluations**: External and internal audits to measure program impact, sustainability, and adherence to high-quality education standards.

By implementing this structured governance and administration framework, SEBCoVE ensures a dynamic, industry-driven, and policy-aligned approach to vocational excellence in the SEB (Smart Electricity for Buildings sector).

2. The SEBCoVE's platform (organizational framework)

The SEBCoVE digital platform (PED_D2.4) is designed to foster collaboration, community building, and knowledge exchange among regional CoVEs at the international level. It will serve as the primary access point for national practices, cross-country communication, and collaboration among stakeholders, including VET providers, tertiary-level institutions, and chambers of commerce.

Platform Components

- **Public Portal**: A gateway providing comprehensive and easily accessible information about SEBCoVE's objectives, activities, and resources.
- **Collaboration Space**: A secure area for registered users to engage in discussions, share best practices, and participate in training initiatives.
- **User Roles and Permissions**: Users are assigned roles such as Viewer, Editor, Publisher, and Administrator to manage content and maintain quality standards.
- **Networking and Knowledge Sharing**: Tools such as Opigno LMS facilitate online learning, while dedicated forums and feedback loops support continuous improvement.
- **Content Authoring and Publishing**: The platform includes integrated tools for co-creating, publishing, and rating educational materials, supporting SCORM-based content for seamless integration with e-learning systems.
- **Event Management and Crowdsourcing**: Users can propose and manage vocational excellence events, including training sessions, webinars, and conferences.
- **Monitoring and Feedback Mechanisms**: The platform incorporates evaluation tools based on the Kirkpatrick Model to assess learning outcomes and ensure quality improvement.

By integrating these functionalities, the SEBCoVE platform ensures an interconnected digital ecosystem that enhances stakeholder engagement, supports best-practice exchange, and facilitates professional development within the Smart Electricity for Buildings sector.

3. Training Schemes and Course Structures

SEBCoVE’s training schemes are designed to address skills gaps and enhance workforce readiness in the SEB sector. The training structure includes:

3.1 Professional Profiles & Modular Learning Approach

Training is structured around a stackable micro-credential framework aligned with the **European Qualifications Framework (EQF)** and **ECVET**.
SEBCoVE's training is based on skills gaps analysis on consideration of the strategic development of this sector in the involved project areas.
The training programs will base on the definition of the learning outcomes and related knowledge, skills, and competences. They will have a modular approach including units, each addressing a specific learning outcome. Being more specific will oblige all VET providers to implement those courses which do reflect what emerged from the analysis carried out. The key professional profiles as emerged are subjected to updates **especially the EQF level** reflecting industry and VET demands through feedback from the Knowledge Triangles (KTs). The current professional profiles which are serving as a reference base include:

- Specialist in Smart Electricity for Buildings (EQF Level 6)
- Digitalization and Automation Technologies Specialist (EQF Level 5)
- BAS Installer and Technician (EQF Level 4)
- Renewable Energy Systems Installer (EQF Level 5)
- Renewable Energy Storage Systems Installer (EQF Level 5)
- EV Charging Systems Specialist (EQF Level 5)
- Energy Data Analyst (EQF Level 6)
- Smart Grid Specialist (EQF Level 6)
- Electricity Markets Specialist (EQF Level 6)
- Buildings Energy Efficiency Auditor (EQF Level 5)
- Sustainability Manager (EQF Level 6)
- Cross-Disciplinary and Soft Skills Specialist (EQF Level 5)

The micro credentials settings are subject to updates getting feedback from the members industry representatives, training and research institutes comprising the **Knowledge Triangles**.

3.2 Learning Pathways and Pedagogical Approach

- **Blended Learning**: A combination of online and in-person training ensures flexibility and accessibility.
- **Practical Training**: Hands-on workshops and internships with industry partners provide real-world experience.
- **Green and Digital Skills**: A strong emphasis on sustainability, IoT, AI, and energy-efficient solutions within the curriculum.
- **Lifelong Learning**: Modular courses and continuous learning options support career advancement and adaptability to industry changes.

4. Stakeholder Engagement Plan

Stakeholder collaboration is central to SEBCoVE's mission. The stakeholder mapping process effectively identified and categorized key stakeholders, aiding in engagement and communication strategies. The use of a stakeholder influence/interest matrix provided a clear framework for prioritizing engagement efforts, ensuring that key stakeholders were appropriately managed.

The **Stakeholders Mapping and Skills Ecosystem Creation** framework analytically presented in the PED_D2.1 document, establishes:

4.1 Stakeholder Mapping for SEBCoVE

A key element of the project's success is a **comprehensive stakeholder mapping process**, which identifies, categorizes, and prioritizes stakeholders to ensure effective engagement and sustainable collaboration.

Stakeholder Identification and Categorization

The stakeholder mapping process was initiated through a **systematic identification** of key actors relevant to the SEBCoVE project across multiple regions, including **Greece, Spain, Italy, North Macedonia, Portugal, Germany, and the Netherlands**. These stakeholders were grouped into three main categories:

1. **Primary Stakeholders (Directly Affected)**:
    - **Educational Institutions**: Universities, vocational schools, training centers, and laboratory facilities.
    - **Industry Professionals**: Electricians, professional associations, and experts actively engaged in smart electricity applications.
2. **Secondary Stakeholders (Indirectly Affected)**:
    - **Industry and Business Entities**: Companies involved in smart electricity for buildings.
    - **Local Communities**: Residents, community organizations, and other societal actors benefiting from improved vocational education and workforce development.
3. **Key Influencers (Authority and Decision-Makers)**:
    - **Government and Regulatory Bodies**: Local, regional, and national government agencies shaping vocational training policies.
    - **Accreditation and Certification Bodies**: Organizations ensuring compliance with European and national qualifications frameworks.
    - **Research Institutes and Innovation Hubs**: Laboratories and research centers driving innovation in smart electricity technologies.

Stakeholder Prioritization and Engagement Strategies

The prioritization process classified stakeholders based on their **level of influence and interest** in SEBCoVE, leading to **tailored engagement strategies**:

- **Manage Closely**: High-interest, high-influence stakeholders such as **education providers, policymakers, and industry leaders** require continuous engagement.
- **Keep Satisfied**: High-influence, low-interest stakeholders (e.g., chambers of commerce) receive periodic updates and involvement in key decisions.
- **Keep Informed**: High-interest, low-influence stakeholders (e.g., local businesses and community organizations) benefit from consistent communication.

- **Monitor**: Low-interest, low-influence stakeholders remain passively engaged with updates on major developments.

Key Findings and Strategic Implications

- The **stakeholder mapping matrix** provides a structured approach to integrating stakeholders into SEBCoVE's **skills ecosystems and vocational excellence hubs**.
- The **dynamic nature** of the mapping allows for continuous updates, ensuring **adaptability** to emerging trends and new stakeholders.
- Effective **communication and collaboration** strategies enhance **project sustainability** and ensure that vocational training remains aligned with **regional workforce needs and industry innovations**.

This structured stakeholder mapping ensures that SEBCoVE effectively mobilizes key actors, aligns vocational training with labor market needs, and establishes **a resilient skills ecosystem** for the smart electricity secto

4.2 Stakeholder Engagement in SEBCoVE

Effective stakeholder engagement is a fundamental component of this initiative, ensuring that vocational education and training (VET) systems remain **aligned with industry needs**, **adaptive to technological advancements**, and **capable of fostering collaboration among key actors**.

Stakeholder Engagement Strategy

Stakeholder engagement in SEBCoVE follows a **structured approach** based on **prioritization and tailored engagement strategies**. The project classifies stakeholders using an **influence-interest matrix**, ensuring that each group is approached with the most effective communication and collaboration strategy.

Engagement Approaches

SEBCoVE's **stakeholder engagement framework** consists of four key approaches:

1. **Manage Closely (High Influence, High Interest)**
    - **Stakeholders**: Key industry partners, policy makers, vocational education providers, and research institutions.
    - **Engagement Strategy**:
        - Frequent communication via meetings, workshops, and advisory committees.
        - Active involvement in curriculum development and strategic planning.
        - Establishment of collaborative working groups to influence project direction.
2. **Keep Satisfied (High Influence, Low Interest)**
    - **Stakeholders**: Chambers of commerce, regulatory bodies, and large corporations.
    - **Engagement Strategy**:
        - Periodic updates via reports, newsletters, and formal events.
        - Targeted engagement on **specific regulatory or policy-related issues**.
        - Encouragement of strategic partnerships where relevant.
3. **Keep Informed (Low Influence, High Interest)**
    - **Stakeholders**: SMEs, professional training organizations, electricians' associations, and community representatives.
    - **Engagement Strategy**:
        - Regular updates through webinars, newsletters, and digital platforms.
        - Creation of information sessions and training materials.
        - Encouragement of feedback mechanisms and participation in non-decision-making roles.
4. **Monitor (Low Influence, Low Interest)**
    - **Stakeholders**: Indirectly related industry players, research observers, and other CoVE projects.

- **Engagement Strategy**:
  - Passive engagement through public reports and general dissemination activities.
  - Monitoring their evolving interest and potential shifts in influence over time.

Implementation and Sustainability

- **Ongoing engagement**: SEBCoVE ensures stakeholder engagement is **continuous** rather than a one-time activity.
- **Feedback loops**: Regular assessment of engagement effectiveness helps refine strategies.
- **Collaboration networks**: Encouraging **cross-border knowledge sharing** between stakeholders enhances project impact and sustainability.

By implementing a **targeted and dynamic stakeholder engagement strategy**, SEBCoVE effectively mobilizes key actors to contribute to **vocational excellence** in smart electricity for buildings. The project ensures that its activities are **aligned with regional and industry needs**, fostering **long-term partnerships** and a **sustainable skills ecosystem** for the future.

5. Knowledge Triangles Roadmap

The **SEBCoVE Knowledge Triangles Roadmap (PED_D3.1)** outlines the mechanisms for linking education, business, and research to drive innovation and continuous improvement. This roadmap plays a pivotal role in ensuring that SEBCoVE aligns vocational education with industry needs, fosters technological advancement, and facilitates knowledge exchange between various stakeholders.

5.1 Knowledge Transfer and Skills Ecosystem

- **Regional Skills Hubs**: Establishing dedicated skills hubs within each SEBCoVE region to act as knowledge centers that connect VET institutions, companies, and research organizations.
- **Cross-Sector Collaboration**: Strengthening partnerships between academia and industry to facilitate the co-design of training programs, apprenticeships, and innovation-driven projects.
- **Innovation Incubators**: Setting up research and innovation incubators to explore new trends in Smart Electricity for Buildings, including AI, IoT, and sustainable energy management.

5.2 Governance Framework

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

5.3 Implementation Strategies

- **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.

5.4 Evaluation and Continuous Improvement

- **Performance Indicators**: Establishing KPIs to measure the effectiveness of the Knowledge Triangle approach in terms of employability rates, skill acquisition, and innovation outputs.
- **Stakeholder Feedback Mechanisms**: Implementing structured feedback loops to collect insights from students, trainers, and industry partners to improve training programs and curriculum design.
- **Adaptive Learning Frameworks**: Introducing modular and flexible learning pathways (microcredentials) that evolve in response to technological advancements and market demands.
- **Impact Assessment Reports**: Publishing periodic reports to track progress, document success stories, and refine strategies for future implementation.

By implementing this comprehensive Knowledge Triangles Roadmap, SEBCoVE ensures that its training ecosystem remains dynamic, industry-driven, and responsive to the evolving needs of the Smart Electricity for Buildings sector. Through strong collaboration, innovation, and strategic governance, SEBCoVE aims to create a sustainable vocational excellence model that can be replicated across Europe and beyond.

6. Quality Assurance Procedures

Ensuring high-quality standards in SEBCoVE's operations is critical for sustaining excellence in vocational education. SEBCoVE follows internationally recognized frameworks such as **ISO 21001** and **EQAVET** to maintain quality assurance in its training programs, stakeholder engagement, and knowledge-sharing processes.

6.1 Quality Assurance Framework

SEBCoVE’s Quality Assurance Framework is based on international best practices and tailored to the needs of the vocational education sector, ensuring continuous improvement and alignment with industry standards.

ISO 21001 Implementation

ISO 21001:2018 is an internationally recognized standard designed to provide a structured framework for educational organizations (EO), so as to be able to enhance their effectiveness and subsequently learner satisfaction. It emphasizes a systematic approach to managing educational processes, ensuring that organizations meet the diverse needs of learners, faculty, and other stakeholders.

More specifically, the standard applies to organizations involved in providing educational products and services in various levels and it is based on the following principles:

- **Learner-Centric Approach**: Focuses on tailoring educational services to meet individual learning needs and also actively engaging learners in the learning activities.
- **Strategic Alignment**: Ensures that organization’s vision, mission, and objectives are aligned thus providing high quality results.
- **Enhanced Stakeholder Satisfaction**: Addresses expectations of learners, educators, employers and regulatory bodies.

- **Data-Driven Decision-Making**: Encourages organizations to use performance indicators for continuous improvement.
- **Inclusivity and Accessibility**: Promotes equitable access to education, particularly for special needs learners.
- **Sustainable Development in Education**: Supports lifelong learning and professional development.

The standard is structured around fundamental management principles to ensure effectiveness and sustainability. First of all, the EO should have a clear **focus on educational outcomes**, ensuring that learning objectives are clear, measurable, and achievable. Also, the standard sets a straightforward requirement for **leadership commitment**, thus demanding from organizational leaders to play an active role in governance and continuous improvement. Furthermore, the **engagement of educators and staff** fosters a collaborative working and learning environment among key personnel.

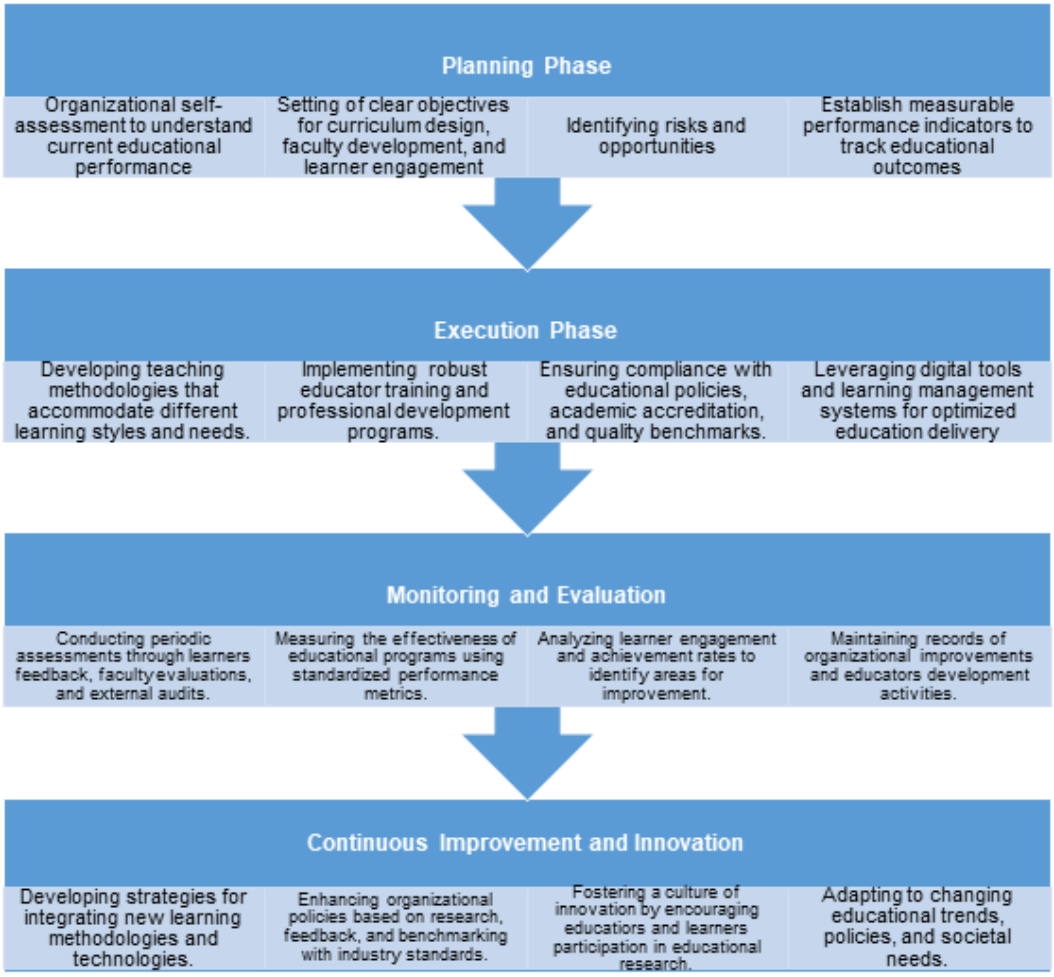
A **process-oriented approach**, which establishes standardized methods for curriculum development, delivery, and assessment is the heart of the whole system in combination with a **continuous improvement culture**, which based on feedback mechanisms for iterative enhancements to educational programs and the system.

Last but not least educational organizations are required:

- to guarantee a high level of **transparency and accountability** through the implementation of policies for open communication and ethical decision-making.
- to adopt **risk-based thinking** by constantly identifying potential risks and opportunities to optimize institutional performance.
- to actively promote **social responsibility and accessibility** via a net of fair and inclusive educational practices for diverse learners.

The implementation process of ISO 21001:2018 follows a structured Plan-Do-Check-Act (PDCA) methodology tailored to the educational environment, presented in the following diagram.

A key aspect of SEBCoVE's **ISO 21001 quality management framework** is the **integration of the Knowledge Triangle model**, which links **education, business, and research** to ensure **industry-driven curriculum development, applied learning, and continuous innovation**. The **operation of Knowledge Triangles** is embedded within the **strategic alignment, stakeholder engagement, and continuous improvement mechanisms** of ISO 21001. This approach strengthens collaboration between **VET institutions, industry partners, and research centers**, ensuring that training programs remain relevant, adaptable, and aligned with labor market demands. By incorporating the **Knowledge Triangle governance model** into the **ISO 21001 framework**, SEBCoVE ensures that its training ecosystem fosters **applied research, industry-driven upskilling, and innovation in the Smart Electricity for Buildings sector**.



As it is clearly understood implementing ISO 21001:2018 requires a strategic and well-structured approach. The followed roadmap provides a comprehensive guide to the design and implementation of Management System for Educational Organizations (EOMS) that aligns with the principles and requirements of the standard.

The roadmap is divided into five key phases:

1. **Preliminary Assessment and Planning**
2. **System Design and Development**
3. **Implementation and Execution**
4. **Performance Evaluation and Auditing**
5. **Continuous Improvement and Innovation**

In the first phase (Preliminary Assessment and Planning) the initial step is the execution of a detailed gap analysis to assess the current state of the educational organization against ISO 21001 requirements. This involves the review of existing policies, procedures, and frameworks, the identification of gaps between current practices and ISO 21001 requirements and finally the analysis of internal and external factors that influence educational quality.

Following this the organization should clearly define its mission, vision, and strategic goals, the scope of the EOMS and finally to identify key stakeholders, including students, faculty, regulatory bodies, and community partners.

The first phase requires the engagement of senior management in the initiative, so as to ensure leadership buy-in and commitment to resource allocation, and the development of a comprehensive implementation plan which have clear milestones, timelines, resource requirements and responsibilities.

In the second phase (System Design and Development) the organization develops a policy that aligns with ISO 21001 principles and communicate the policy to all stakeholders. Based on the policy the organization identifies core educational processes such as curriculum development, student assessment, faculty training and support services and develops standardized procedures for instructional design, learning assessments, and faculty recruitment.

Key step of this phase is the identification of risks that could impact learning outcomes (e.g., technological disruptions, faculty shortages, regulatory changes) and the development of risk management plan. Finally, the organization must ensure adequate resources for personnel, technology, infrastructure, and training and establish a budget for ongoing system improvements and training programs.

In the third phase (Implementation and Execution) the organization deploys the EOMS Framework by rolling out policies and procedures, training staff and providing educators with the necessary tools and resources to implement new procedures. Data collection and documentation is vital component of this phase alongside the implementation of strategies for accommodating learners with disabilities and special

needs and creating an inclusive learning environment that supports diverse learner groups.

In the fourth phase (Performance Evaluation and Auditing) the organization defines KPIs related to learning outcomes, student engagement, faculty performance, and institutional efficiency, conducts regular assessments to measure performance against predefined goals and identifies areas for improvement based on data analytics.

This phase through a program of internal audits prepares the organization for third-party certification by accredited auditors.

In the fifth phase (Continuous Improvement and Innovation) the organization is set to implement corrective and preventive actions by addressing non-conformities identified during audits and assessments and fostering a culture of accountability and excellence.

The organization is now ready to start a continuous improvement journey through the adoption of technological advancements, the enhancement of staff professional development and the periodic review and update of policies and procedures.

EQAVET Implementation

The EQAVET framework, which stands for European Quality Assurance in Vocational Education and Training, is a reference framework developed by the European Union to enhance the quality of vocational education and training (VET) systems across member states. The framework provides a set of common principles and criteria to guide the design, implementation, and evaluation of quality assurance systems in VET.

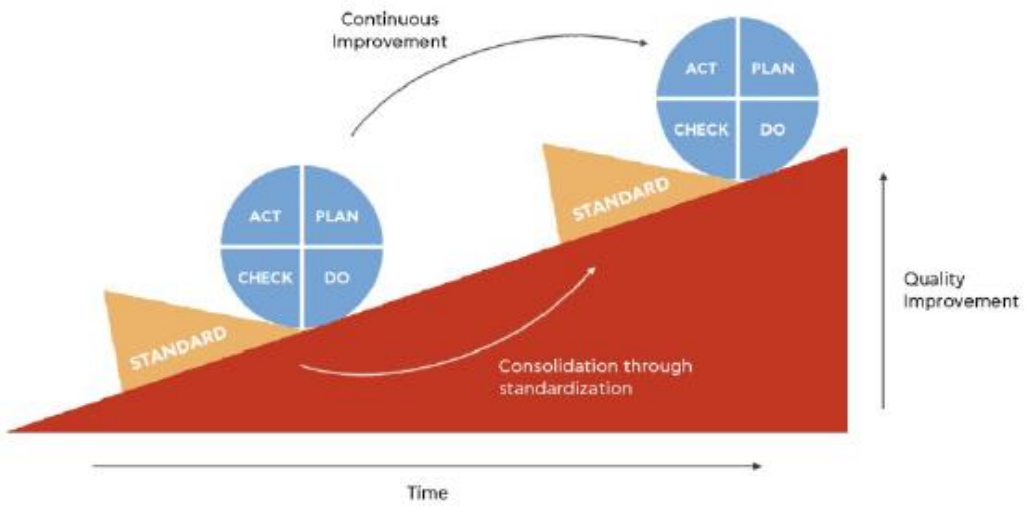
The goal of the EQAVET framework applied in SEBCoVE training will be implement in parallel with **ISO 21001**, as they serve complementary but distinct functions, to ensure quality assurance and continuous improvement in pilot training offerings, by using the

same quality action pattern for quality assurance and quality improvement, based on the PDCA cycle (Plan-Do-Check-Act), and supported by common quality criteria, indicative descriptors and a coherent set of quality indicators.

The quality pattern for the action of EQAVET is comprised of the following components:
(a) the EQAVET PDCA quality cycle for quality assurance and improvement in VET;
(b) quality criteria and indicative descriptors;
(c) a set of coherent quality indicators.

(a) The quality Cycle in EQAVET

The PDCA (Plan-Do-Check-Act) cycle is a fundamental quality management and continuous improvement methodology utilized within the EQAVET framework to enhance the quality of vocational education and training (VET) systems. The PDCA cycle involves a systematic and iterative process of planning, implementing, monitoring, and adjusting activities to achieve and sustain quality. The "**planning**" stage is where the cycle starts. This entails deciding on an objective or purpose, developing a theory, specifying success criteria, and executing a strategy. The "**Do"** stage, which involves carrying out the plan's components, comes after these actions. The Study step follows, in which results are tracked to evaluate the viability of the strategy for indications of success and advancement as well as for issues and potential areas for development. The **Act** stage completes the cycle by combining the knowledge gained from the entire process, allowing for the modification of objectives, alteration of approaches, or even complete rephrasing of theories. Training organizations continually perform these four processes as part of an endless cycle of continuous improvement.



PDCA Deming (PDCA) cycle, Cedefop, Figure 1

More specifically, the contribution of each of the four phases of the PDCA quality cycle to the EQAVET framework (figure 2), is:

Plan (P): VET (training) providers identify and define the objectives, goals, and processes that are crucial for the quality of their vocational education and training programs. This includes setting specific targets, outlining the scope of quality assurance activities, and determining the resources required.

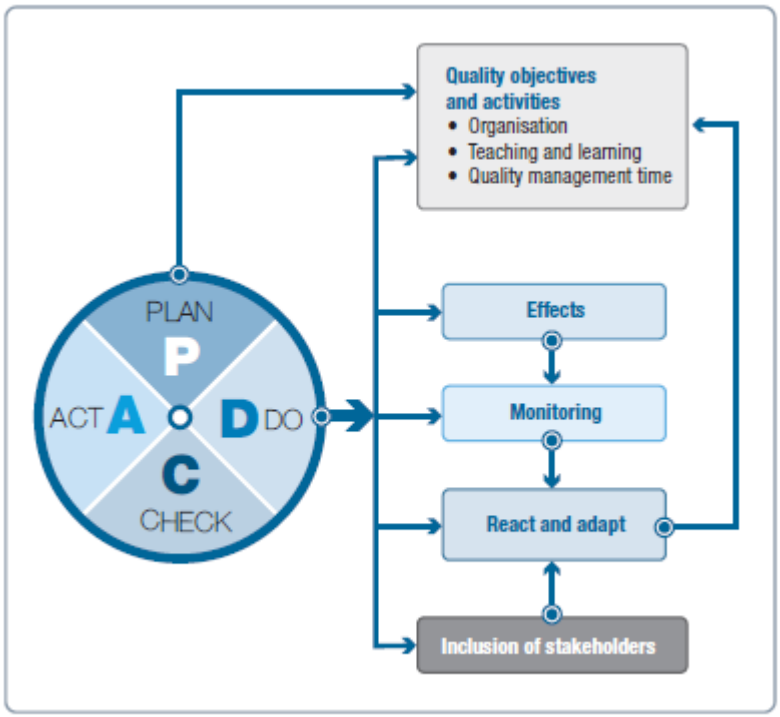
Within EQAVET, planning involves considering factors such as learning outcomes, stakeholder expectations, and the alignment of VET programs with the needs of the labor market. Institutions develop strategies and action plans to meet quality standards and continuously improve their offerings.

Do (D): The phase involves the implementation of the plans developed in the previous step. VET providers execute the strategies and carry out the planned activities to deliver educational programs and services. This phase is where the actual teaching, learning, and assessment take place.

In the context of EQAVET, the implementation phase focuses on executing the designed curriculum, engaging with stakeholders, providing support services to learners, and ensuring that the teaching and learning processes align with the established quality standards.

Check (C): The phase involves the systematic monitoring and evaluation of the implemented processes and outcomes. VET providers collect data and assess the results against predetermined benchmarks and quality indicators. This phase aims to determine whether the objectives are being met and to identify areas for improvement.
Within EQAVET, checking involves evaluating the effectiveness of the VET system through key performance indicators, learner outcomes, and stakeholder feedback. This phase provides valuable insights into the strengths and weaknesses of the system.
Act (A): Based on the findings from the Check phase, the Act phase involves taking corrective actions and making improvements to enhance the quality of the VET system. This may involve adjusting processes, revising strategies, or implementing new initiatives to address identified areas for enhancement.
In the context of EQAVET, the Act phase emphasizes continuous improvement. Institutions use the feedback and data gathered during the Check phase to make informed decisions, refine their practices, and ensure that the VET system remains responsive to the evolving needs of learners and the labor market.

Figure 2: The PDCA quality cycle in the context of the EQAVET framework



Source: Cedefop.

(b) The EQAVET indicative descriptors

The EQAVET Framework includes indicative descriptors which help VET providers to analyse their approach to quality assurance and gauge how much progress has been made in improving the quality of provision.

Descriptors are statements that describe the expected characteristics or outcomes of a particular quality element within a VET system. Descriptors provide qualitative information about the features that contribute to the quality of the system.

Nature

The Descriptors are abstract and descriptive. They articulate the qualities, features, or outcomes that should be present for a particular element of the VET system to be considered of high quality.

Measurement

The descriptors are not typically measured directly but are used to interpret the results of indicator assessments. They provide context for understanding whether the observed characteristics align with the expected qualities.

(c) The use of the EQAVET indicators

Indicators are specific, measurable criteria or variables that provide evidence of the quality of a particular aspect of VET. They are quantitative or qualitative measures used to assess the performance or characteristics of a system or process.

Nature

The indicators are concrete and tangible. They are often numerical or observable measures that can be used to assess the performance or effectiveness of a specific aspect of the VET system.

Measurement

The indicators are often subject to measurement, allowing for the collection of data to assess the performance of the VET system. They can be quantitative or qualitative, depending on the nature of the criteria being measured.

References

EQAVET framework - Employment, Social Affairs & Inclusion - European Commission https://ec.europa.eu/social/main.jsp?catId=1546&langId=en

EQAVET quality assurance cycle, European Commission, Employment, Social Affairs & Inclusion https://ec.europa.eu/social/main.jsp?catId=1546&langId=en

EQAVET webinar - Creating a quality culture in VET - Trends and developments in quality assurance for VET providers https://tinyurl.com/yrat2et2

6.2 Monitoring and Evaluation

- **Internal and External Audits**: Regular internal reviews and external evaluations are conducted to assess the effectiveness of SEBCoVE's initiatives.
- **Performance Measurement Indicators**:
  - Learner satisfaction rates
  - Graduate employability and skill acquisition
  - Industry and stakeholder feedback
  - Effectiveness of training methodologies

- **Feedback Mechanisms**:
    - Surveys and structured interviews with trainees, educators, and industry partners.
    - Online feedback collection via the SEBCoVE digital platform.
    - Periodic review meetings with the Steering Committee and Advisory Boards.

6.3 Training and Certification Standards

- **Accreditation of Training Modules**: All training courses comply with ECVET and EQF standards for credit transfer and recognition across EU countries.
- **Trainer Qualification Framework**: Educators and trainers undergo continuous professional development (CPD) programs to maintain up-to-date skills and teaching methodologies.
- **Micro-Credentials and Digital Badges**: SEBCoVE integrates micro-credentials for learners to ensure recognition of skills acquired through training programs.

6.4 Continuous Improvement Strategies

- **Stakeholder Participation in Quality Processes**: Regular workshops and consultations with industry experts, policymakers, and educators to refine training methodologies.
- **Innovation in Teaching and Learning**:
    - Adoption of digital learning tools, simulations, and AI-driven personalized learning pathways.
    - Implementation of smart labs and real-world project-based learning approaches.
- **Benchmarking Against Best Practices**: Collaboration with international vocational education centers to share knowledge and integrate emerging trends in smart electricity for buildings.

6.5 Sustainability and Long-Term Impact Assessment

- **Longitudinal Tracking of Graduates**: Monitoring alumni career paths to assess the impact of SEBCoVE training programs on professional development.
- **Sustainability Audits**: Ensuring long-term viability of training programs through policy integration and financial planning.
- **Institutional Learning Culture**: Encouraging continuous feedback loops and adaptation to technological advancements and labor market needs.

By integrating these quality assurance measures, SEBCoVE ensures that its training ecosystem remains robust, transparent, and responsive to the evolving demands of the Smart Electricity for Buildings sector. These procedures facilitate a structured approach to maintaining educational excellence while fostering trust and collaboration among all stakeholders involved.

7. Conclusion

SEBCoVE is designed as a **best-practice model** for CoVEs in the SEB sector. By integrating structured training schemes, robust stakeholder engagement, and stringent quality assurance, SEBCoVE aims to foster a skilled workforce that supports Europe's green and digital transitions. The framework outlined in this document ensures sustainability, scalability, and adaptability, positioning SEBCoVE as a leader in vocational excellence and workforce development.

This document will be continuously updated to incorporate new developments and emerging trends in the SEB sector, ensuring ongoing relevance and impact.

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