A holistic framework for Empowering SME's capacity to increase their energy efficiency

Project: **SMEmPower Efficiency**

Deliverable number: **3.1**

Deliverable Name: **Program Design**

Document Properties	
Dissemination level	Public
Lead beneficiary	Technical University of Cluj-Napoca (UTC)
Prepared by	Technical University of Cluj-Napoca (UTC) - Denisa Stet, Levente Czumbil, Timea Farkas Universitat Politecnica de Valencia (UPV) - Elisa Penalvo Lopez 04/05/2020
Checked by WP leader	Dan Micu (UTC), Andrei Ceclan (UTC) 26/06/2020
Approved by Project Coordinator	30/06/2020
Submission due date	30/06/2020
Actual submission date	01/07/2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 847132.

Document History

Version	Date	Contributor(s)	Description
1.0	04/05/2020	UTC and UPV	Creation of the report
2.0	13/05/2020	Dan Micu, Andrei Ceclan, Elisa Penalvo Lopez	Check and approval of report
3.0	04/06/2020	OEB, ENERGIADA	Document Review
4.0	18/06/2020	Denisa Stet, Levente Czumbil, Timea Farkas (UTC)	Improved draft based on the review
5.0	24/06/2020	AUTH, TEES, SGZ, adelphi, UPV, SERVELECT	Document Review
6.0	25/06/2020	Denisa Stet, Levente Czumbil, Timea Farkas (UTC)	Improved draft based on the review
7.0	29/06/2020	SGZ, OEB	Final comments
8.0	30/06/2020	Grigoris Papagiannis (AUTH)	Final version

List of Acronyms

Acronym	Meaning
AB	Advisory Board
CBA	Cost Benefit Analysis
CHP	Combined Heat and Power
DSM	Demand Side Management
E&T	Education & Training
ECTS	European Credit Transfer and Accumulation System
EE	Energy Efficiency
EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
EPC	Energy Performing Contracting
EQF	European Qualification Framework
ESCO	Energy Service Company
FFL	Future Facing Learning
GHG	Greenhouse Gas Emissions
HVAC	Heating, Ventilation and Air Conditioning
IEC	International Electrotechnical Commission
ICT	Information and Communications Technology
IPMVP	International Performance Measurement and Verification Protocol
IRR	Internal Rate of Return
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LENI	Lighting Energy Numeric Indicator
LLC	Long-life Learning Committee
LLP	Long-life Learning Program
LO	Learning Outcomes
LOS	Letter of Support
LTSP	Learning and Teaching Strategic Plan
LU	Learning Unit
M&T	Monitoring & Targeting
M&V	Measurement & Verification
NEEAP	National Energy Efficiency Action Plan
NPV	Net Present Value
RES	Renewable Energy Sources
UCPD	University Certificate in Professional Development
WACC	Weighted Average Cost of Capital
WP	Work Package

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Executive summary

This Report has been developed through the implementation of the "SMEmPower Efficiency" project, funded by the Horizon 2020 under the Grant Agreement No. 847132/ 2019.

The SMEmPower Efficiency project is based on a holistic framework to "empower" SMEs to undergo energy audits and implement their proposals. An integrated Education & Training (E&T) program is going to support this objective, targeting energy related SME staff.

The report outlines the common E&T program by presenting the description of the whole design and implementation process. Also, the designed learning units (LU) are described in order to correlate them with the project's objectives and targeted learning outcomes.

Following by the context and course description, the accreditation and certification procedures are tailored in each of the partner country.

In the first part of the report, the training methodology is described, including the relation between European Qualification Framework (EQF) Level and ECTS Credits, LU and outcomes, also program content. Taking into consideration the current situation, the training methods are also well shaped.

An evaluation questionnaire is used for identifying the usefulness and applicability of the presented materials, the relevance of the content, and directions for improving and optimizing the course materials.

Another part of the report is focusing on the learning unit's content specifications and highlights the main topics which are going to be developed by the trainers in each country. Therefore, the six learning units are detailed. The first LU covers the *European and national policies and legislation for energy efficiency*, following by a LU dedicated for *Energy Efficiency systems, measures & solutions.* Learning unit 3 focuses on the *Basics of Energy Audits and Surveys & standards* in order to highlight the importance of an Energy Audit in an SME. LU 4 is committed for the M&T and M&V tools, by showing a strong relation with other learning outcomes.

The financing tools and evaluation are described in learning unit 5 followed by the last unit which is dedicated to the *Practical on-site Action.*

A specialized handbook will be developed for the needs of the program, covering all thematic units. The handbook will be translated in all consortium languages (English, Greek, Romanian, Spanish, Italian, German, and Slovenian) and will be available from the web-portal. It will include the necessary theoretical background, working examples, tutorials etc.

More information about the SMEmPower Efficiency project can be found at https://smempower.com/.

1. Introduction

1.1. Purpose of this report

This report deals with the Individual Dimension (suggestively presented in Figure 1) of the SMEmPower Efficiency concept and is dedicated to the design, implementation and evaluation of an Education and Training (E&T) course, mainly targeting the existing or prospective staff of SME's with energy related responsibilities (or acting as Energy Managers).

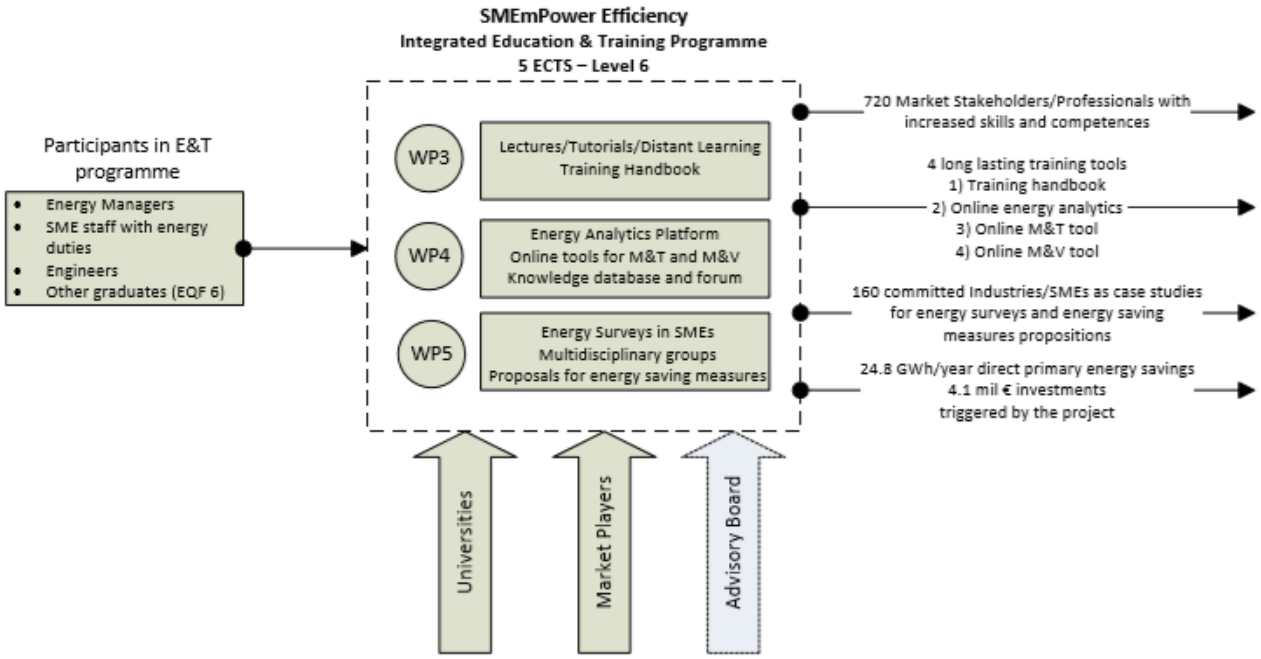


Figure 1. Diagram, presenting the Individual Dimension.

In order to maximize the results in terms of impacts and improvement of organizational innovation in industry and services, the design of the course, the education & training program will be designed having as input the work done in the Framework Analysis package (WP2), where the needs of the SME's in terms of education and training in each country will be taken into consideration.

Previous activities were carried out to identify the current situation and understand the problems and opportunities, to identify current practices, socio-economic and policy barriers, legislative barriers, available certification schemes and training methodologies, potential best practices, needs and financing mechanisms for energy efficiency in SMEs/ industry.

The outputs of this report will be used as input to other SMEmPower Efficiency project activities as follows:

- The development of the SMEmPower Efficiency web platform & Energy Analytics Tools in WP4, which is going to be used among the trained staff, and it is designed to be the "Call to action" of the courses. Besides the web platform design, Monitoring &Targeting (M&T) and

Measurement & Verification (M&V) tools, a distant learning feature is planned to be involved in WP4, including webinars, case studies from pilot sites.

- The Practical on-site Action detailed in the LU 6 will be in strong correlation with the WP5, which is focusing mainly on the Practical Action in Pilot Sites, involving the establishment of working groups (4-5 trainees and one instructor with experience) and the evaluation of pilot sites.

1.2. Context and Description of the Course

A novel training program will be designed with a common curriculum in 8 countries. The training program will be certified by the participating or associated Universities as life-long learning program with 5 ECTS (of EQF level 6) and/or other certification schemes. The training program will focus on the presentation of the possible energy efficiency measures, in strong relation with energy surveys and technical data in order to quantify the best energy saving possibilities, and by using financial tools, to prove the cost effectiveness of them. The uniqueness of the whole training program is proved by the application of the knowledge, on the pilot sites or in each of the trainee's company.

Apart from existing SME staff, the training program will be open to other interested qualified individuals (holding at least a level-5 EQF degree in relevant disciplines and/or SMEs personnel that deal with energy issues): auditors, consultants and/or possible future SMEs, postgraduate students and ESCO employees. The trained staff (mainly those with Energy Manager responsibilities) will then move on to apply their acquired knowledge to their working environment as case studies. A total number of 20 case studies are foreseen in SME installations per country.

The trainings will go beyond an energy consumption survey (basic energy audit), to effectively implement energy management techniques, instruments and solutions, to achieve energy savings, emissions reduction and welfare. The strategic target is to train SME key staff in a way to be able to use intelligent energy management solutions, design, propose and successfully find pathways to fund intelligent and affordable energy efficient investments, inflict a change in behaviour and gain the support of decision makers.

Although several courses exist in many countries covering energy management in general, they are not attractive to professionals in SME's, either for being too abstract and theoretical, lacking the necessary hands-on practical experience, or because they mainly rely on face-to-face educational activities. Moreover, little focus is given to M&T and M&V tools, which can significantly enhance energy efficiency potential and improve transparency and trust for decision makers. Further on, most such courses are designed at an academic level, without interaction with the actual industry. Finally, attendees do not receive suitable, Europe-wide recognized certification that reflects the workload demanded by them.

In the following, the main steps are going to be presented, which describes the preparation of the program and also the learning process:

• The time invested by SME's staff in education and training is vital and needs to be certified and recognized properly. Therefore, the E&T courses will be designed based on the desired learning outcomes associated with Level 6 of the EQF. The workload demanded by them will be reflected to the ECTS credits awarded in each module of the E&T program. The number of ECTS will be at least 5, but open to adaptation in each country.

• The E&T program will be designed as a two-stage one. The first stage will include lectures and tutorials (some may also be based on distant learning) and the second stage will involve practical action in specific industries or services sector installations.

• The E&T program will be certified by partner Universities (In Germany the universities do not certify their own courses, but external accreditors certify courses/modules the university wants to introduce through their lifelong-learning departments or equivalent bodies). This will provide a recognized structure at the European context, based on the ECTS awarded for each educational activity. The non-University project partners will either use support by local Universities that will certify the E&T program with ECTS and assist in the delivery or follow the approach of ISO 17024 if unforeseen difficulties are encountered.

• The learning process will be enhanced using ICT features. SMEmPower actions that will lead to the creation of the free online energy management platform and portal will provide a unique opportunity for participants to effectively use intelligent energy solutions with embedded M&T and M&V tools and more, exchange ideas and views, access a wide pool of added value information.

• The trainees, after attending lectures and/or other educational activities, will form multidisciplinary groups and work on specific case studies of energy efficiency interventions. The groups will deliver a formal report containing a technical part detailing and justifying the proposed measures and a financial part analysing the returns on the investment through certain indicators (IRR, NPV etc.).

• An appropriate loop will be used in order to upgrade the educational program during the project's work. Therefore, Universities, Market Players, and of course Beneficiaries will provide valuable input in the whole process. An update of the contents will be made at the end of each edition to shape the provided E&T program to the market and stakeholder's requirements.

1.3. Training Target and focus groups

The main idea of the project is to "Empower" the capacity of SMEs to undertake actions leading to reduced energy consumption based on relevant energy audits. Taking into account the above raised points, which describes the preparation and the training process, the actions in SMEmPower Efficiency project can be perceived in 3 dimensions: the individual dimension, the organizational dimension and the institutional dimension.

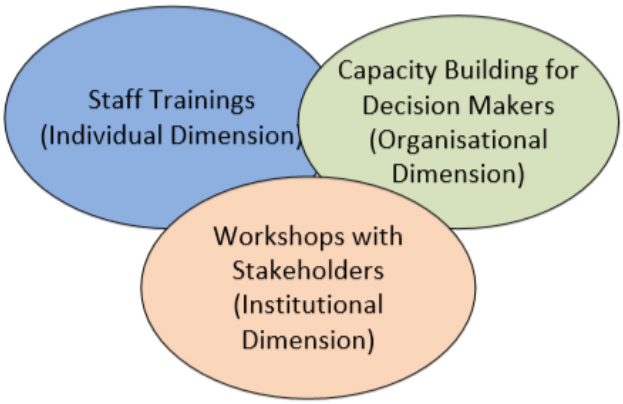


Figure 2. The 3 Dimensions of SMEmPower Efficiency Concept.

The first dimension (i.e. the individual dimension) concerns staff trainings of SMEs, mainly those that deal with energy issues (e.g. energy managers, engineers etc.) and opens also to managerial staff that can take decisions.

Apart from existing SME staff, the training program will be open to other interested qualified individuals (holding at least a level-5 EQF degree in relevant disciplines), who can be possible future SME employees. The trained staff (mainly those with Energy Manager responsibilities) will then move on to apply their acquired knowledge to their working environment as case studies.

A few **pilot installations (at least 20 in each country)** will be selected for the whole project's duration, based on an open **call issued in each country**. SME's that have already offered a Letter of Support (LOS) at proposal stage will have a priority, along with those that their top management is committed to implement the proposed energy conservation measures inside the project's duration. The pilot sites **will benefit from technical support** provided by the working teams and consortium partners, and above all will prepare together and receive reports detailing the **proposed energy saving measures** for their facility **with financial indicators** to enable cross-comparison.

In most of the partner countries (Germany, Romania, Slovenia, Spain, UK), the candidates for the course will be selected from contacted SMEs (during project meetings, from workshop etc.) and those that specifically have signed project participation agreement. Usually, the SME will assign a person, who can attend the lectures and complete the course, since they can then use his/her knowledge to implement some proposed measures in their company. Therefore, such candidates will already have relevant degrees that are somewhat connected to energy management, management of resources or other relevant degrees. Qualification requirements: course can be attended by all candidates in relevant fields (civil, mechanical, electrical, energy etc.), even technicians.

In Greece, the participants to the SMEmpower training program will have to possess an energy management-oriented background and/or relevant training concerning energy management and energy efficiency issues. For example, Engineering and Energy Managers, Facility Managers, Energy Team Leaders, Commissioning Personnel, Energy Team members, Energy Consultants and Senior Technicians could be considered as potential trainees. Moreover, undergraduate students in

engineering and/or energy curriculums could also be considered eligible for the program given that they hold a 5 EQF level.

In Italy and in Cyprus, most SMEs and especially the small ones do not have certified energy managers or expert in energy management (EGE) within their staff. The selected trainees are expected to be employees in charge of energy management in their SME, including the ones without specific qualifications. Priority will be given to graduated candidates with technical backgrounds such as engineers, architects or energy professionals working for SMEs. However, holding an EQTS 6 level qualification will not be compulsory to attend the training course. Candidates will be selected also from graduate students in relevant disciplines, who can be possible future SME employees.

1.4. EQF level expectations

The training course implemented by SMEmPower partner Universities and/or Training Centres in each partner country will be EQF level 6 E&T program with at least 5 ECTS, open to adaptation to the specific requirements of each country

2. Training Methodology

2.1. Overall Objective of the Course

SMEmPower E&T program aims to provide an in-depth multidisciplinary harmonized approach for trainees so they can be prepared to meet the expectations of a growing market.

The decision makers of SMEs need to be convinced of the actual value of energy audits and their implementation. Strategic target of the E&T program is to train SME key staff to use intelligent energy management solutions; to design, propose and successfully find pathways to implement intelligent and affordable energy efficient investments; to facilitate a change in SME staff energy consumption behaviour and obtain the support of decision makers.

The course is 5 ECTS credits, approximately 150 workload hours, including lectures, practice and self-study hours. Once the course is successfully completed, SME's professionals will be recognized with an accredited certification.

SMEmPower courses will offer 3 editions of this professional E&T program with 30 trainees per edition. Thus, a total of 24 courses, 3 in each participant country, will be delivered during the project's duration; accounting for at least 720 trained professionals.

The main topics of the course are:

1. European and national policies and legislation for energy efficiency
2. Energy efficiency systems, measures & solutions – energy management opportunities
3. Basics of Energy Surveys & standards

4. Tools for Monitoring & Managing Energy
5. Financing energy efficiency measures, tools and evaluation
6. Practical on-site Action

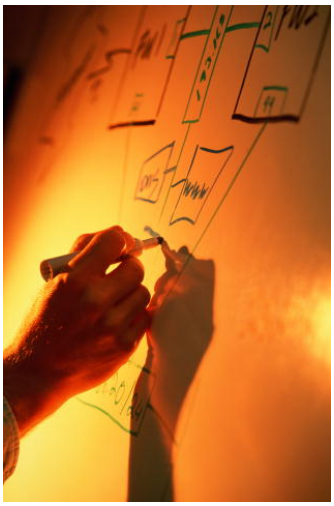
Figure 3. The main topics of the E&T program.

All things considered, the development of E&T program will also take into consideration potential risk and inequalities such as:

- Differences between participants such as: technical profile, practical experience, level of qualification (some of them are already PhD and some of them do not even have a university degree);
- Lack of specific knowledge regarding various industrial technologies and mainly energy efficiency technologies, indicators, software, energy measurement procedures and tools;
- Lack of specific knowledge in economic evaluation of energy efficiency impact;
- Lack of practical training – on-site visits and practical case studies during trainings;
- Lack of specific knowledge in basic energy management and communication/cooperation and how to persuade top management;
- Limited opportunities to upgrade their basic technical profile and information about recent energy legislation, many years after graduation;

2.2. Relation between EQF Level and ECTS Credits in the course

E&T program for energy professionals is implemented under the European Qualification Framework (EQF), based on common learning outcomes of Level 6.



SMEmPower's E&T program includes structured lectures, practical cases and self-study hours.

- Lecture hours refer to the amount of expected schedule hours of staff-student contact through either face-to-face educational activities, distance learning or blended. It is worthwhile mentioning that lecture hours also include assessment hours.
- With regards to practical hours, these include practical sessions which can also be supervised by a technician.
- As for self-study hours, the study of some issues and activities are carried out by the trainees themselves, without direct supervision or attendance in a class.

EQF implementation requires qualifications to be described in terms of learning outcomes (LO) and learning units (LU). LU often structure to compose the basis of ECTS credits and qualifications. Assessment, validation, and recognition processes must also be included, existing national, regional, sectoral, or institutional guidelines should be respected.

Criteria followed for weighting and allocating ECTS credits are:

- The relative importance of learning outcomes which constitute each learning unit;
- The complexity, scope, and volume of learning outcomes in the learning unit;
- The effort necessary for a learner to acquire the knowledge, skills and competence required for the learning unit;
- Similar existing courses among participating countries found during the research conducted in D2.3 Certification schemes/ training methodologies;
- The overall and each learning unit's duration.

The learning units designed for the E&T program, with their methodology and criteria are going to be detailed in the next subchapter *2.3 Learning Outcomes and Learning Units.*

The suggested weighting and allocation of ECTS credits to each learning unit of the E&T program, expressed as relative percentage and integer value, is as follows:

Learning Unit	Description	ECTS weighting factor (%)
LU1	European and national policies and legislation for energy efficiency	**0,5 ECTS (10%)**
LU2	Energy efficiency systems, measures & solutions – energy management opportunities	**1,0 ECTS (20%)**
LU3	Basics of Energy Surveys & standards	**1,0 ECTS (20%)**
LU4	Tools for Monitoring and Managing Energy	**1,0 ECTS (20%)**

LU5	Financing energy efficiency measures, tools and evaluation	**0,5 ECTS (10%)**
LU6	Practical Action	**1,0 ECTS (20%)**
Learning hours	**Total recommended time of 150 h**	**5 ECTS (100%)**

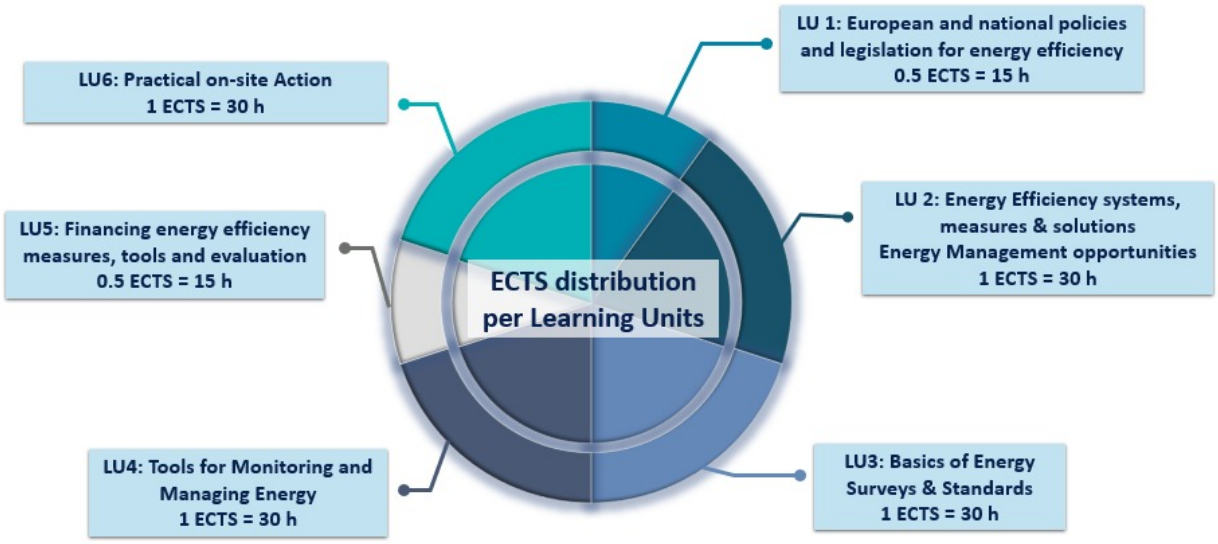


Figure 4. The allocation of ECTS credits to each learning unit.

2.3. Learning Outcomes and Learning Units

2.3.1. Methodology and criteria to define Learning Units and Outcomes

A learning unit is a component of a qualification, consisting of a detailed set of knowledge, skills and competence than can be evaluated, validated, and certified. Learning units enable progressive achievement through transfer and accumulation of learning outcomes defined in knowledge, skills, and competence terms.

The design of learning units is dependent on the training practices, learning arrangements and assessment methods envisaged for its delivery. The SMEmPower learning units' design methodology also considers that educational resources may be delivered in online, blended and/or face-to-face mode.

In addition, according to the ECTS recommendation, it suggests that the description of a learning unit should include the following information:

- The title of the learning unit;
- The title of the qualification to which the learning unit relates;
- The EQF level of the qualification;
- The ECTS points associated with the learning unit;

- The learning outcomes contained in the learning unit;
- The procedures and criteria for assessment of these learning outcomes, the validity in time of the learning unit, where relevant;

Learning units should provide a comprehensive and consistent learning process, responding to the following guidelines:

- Learning units may be completed and assessed, as independently as possible from other units;
- Learning units are based on relevant learning outcomes that can be achieved in a specific time interval;
- Learning units include all necessary learning outcomes to cover the objectives of the learning units;
- Learning outcomes are designed to be assessable.

2.3.2. E&T program content

The contents of the E&T program are based on the desired learning outcomes identified in previous work packages and are common to all partner countries. However, the specifics of each national context will be adapted by each partner during the delivery.

It is envisaged that dedicated units will deal with:

- European and national policies and legislation regarding energy efficiency and management in SME's, industry, and services sectors, presented in a critical view;
- Intelligent and innovative energy solutions provided in a meaningful way for different types of SME's (e.g. from already traditional variable speed control in pumps and fans to quantification of advanced speed/torque control for different equipment, waste heat recovery etc.);
- Advance and effective tools, techniques, and concepts in Monitoring & Targeting (M&T) and Measurement & Verification (M&V), according to IPMVP for Energy Savings and Renewable Energy;
- Incorporation of local renewable energy sources in the industrial/ SME environment;
- EPC mechanisms and financial institutions/ tools and indicators, relation with ESCOs, decision triggering through combination of M&T&V reports and preparation of energy strategies;
- Financial evaluation on energy efficiency investments, cost-benefit analysis and life cycle cost analysis, as important tools for energy audits and surveys.

The above topics will provide the trainees with the necessary technical and financial background to carry out the case study in a specific installation and prepare a high-quality report.

2.3.3. Learning units

Learning units are based on the learning outcomes. Below, the learning outcomes have been grouped into learning units.

SMEmPower's learning units include:

- **LU1:** European and national policies and legislation for energy efficiency
- **LU2:** Energy Efficiency systems, measures & solutions – Energy Management opportunities
- **LU3:** Basics of Energy Surveys & standards
- **LU4:** Tools for Monitoring and Managing Energy
- **LU5:** Financing Energy Efficiency measures, tools and evaluation
- **LU6:** Practical on-site Action

The learning outcomes of the SMEmPower's E&T program are listed in Table 1.

Table 1: Learning outcomes of the E&T program.

LEARNING UNIT 1
• Introduction: energy efficiency basics, what is energy, measurement units etc.; • European and National legislation on energy efficiency and corresponding targets; • Support Schemes or any other national instruments supported by the public authorities or other organisations/donors; • Other legislation and policies related and/or are interconnected with energy efficiency.
LEARNING UNIT 2
• Identify and describe building energy efficiency related aspects; • Describe and analyse Passive design strategies (envelope, orientation, shading, solar protection and gain); • Describe and analyse energy systems (primary energy, energy conversion, renewable, co-generation); • Conceptually describe the different building systems on the market; • Conceptually describe the different renewable energy sources and systems on the market; • GHG Emissions reduction and other pollutants and waste management practices.
LEARNING UNIT 3
• What to expect from an energy audit; • Energy audit and management standards (e.g. EN16247, ISO50001 etc.); • How to be prepared for a successful energy audit; • How to perform an energy audit; • Understand the energy evaluation method for carrying out in-house preliminary energy audits; • Energy & Production data collection and basic energy analytics; • Evaluation of energy savings. Fundaments.
LEARNING UNIT 4
• Tools for energy monitoring and measurement; • Day by day in-house energy consumption/generation analysis; • How to identify EE and RES opportunities using the M&T and M&V tools; • How to evaluate energy savings after implementing EE and RES.
LEARNING UNIT 5
• How to implement energy efficiency measures and evaluated the results; • How to implement an energy performance contract; • How to perform a Cost Benefit Analysis – CBA;

• How to perform a Life Cycle Assessment – LCA; • How to analyse the opportunity of accessing financial schemes for energy efficiency.
LEARNING UNIT 6
• Practical Action - Application of the knowledge obtained through LU1 ÷ LU5 on real case studies at different SMEs (where the trainees are employed).

In case of LU1, each country partner will provide information about incentive and support schemes as they are commonly only available in the local language. Each country course will diverge in this regard as the schemes and administrative processes underlying them will vary from country to country.

Related to LU2, other particular learning outcomes that should be mentioned are:

- Renewable Energy and/or Cogeneration Solutions:
  - Good understanding of renewable energy technologies, storage systems, distribution grids;
  - Knowledge of typical schemes, principle of operation and operating conditions of main cogeneration technologies;
  - Regulatory frameworks for renewable energy sources and cogeneration;
  - Expertise to identify opportunities and barriers to use of renewable energy sources and/or cogeneration;
  - Undertaking a basic renewable energy and/or cogeneration feasibility study;

- Intelligent Lightning Solutions:
  - Measurement and calculation of Lighting Energy Numeric Indicator LENI, according to EN 15193;
  - Choosing best electric lighting solutions using Dialux Evo, importance of the control systems and of daylight; Survey of existing lighting solutions: illuminance, uniformity, colour temperature and rendering and conformity with EN 124646 and EN 1838;
  - Lighting and wellbeing;
  - Hazardous lamps disposal. Use of circular economy concept for lighting.

The deployment of different RES and other technologies can vary between partner countries because of different techno-economic and social barriers, and each one can focus more on technologies that are used more in their country; as a primary focus (there is opportunity for flexibility). An example: Slovenia focuses a lot on heat pumps, cogeneration and building renovation, while other countries may focus on different technologies such as solar power, wind power etc. since those technologies may be more popular for use there.

2.4. Training Methods

The SMEmPower course will be taught through a mix of face-to-face and online teaching methods or purely online if necessary. The outbreak of the Coronavirus has accelerated the shift to online teaching methods on which it will be relied more heavily than originally intended, this is a positive outcome as online teaching can reduce costs (time, physical resources) while also increasing outreach.

The most commonly used online teaching platforms are Zoom, Clickmeeting, and Microsoft Teams. Selection between these will vary depending on the SMEmPower E&T program implementing institution. All the platforms allow interactive teaching through the ability to ask questions and form breakout rooms where group discussions can take place. For the duration of the course the participants will have access to the academic and IT resource of the educational institution

Trainers and trainees can use available distant learning resources at the Universities to exchange useful information and training material, create databases, facilitate courses' organization, and provide feedback regarding the learning outcomes. Moodle is a free and open-source system used for e-learning projects both in educational and in a professional environment and provides all the above-mentioned features. It will be also incorporated in the web portal. For Learning Unit 5, embedded tools in the free online energy management platform and portal will be used, to implement Cost-Benefit Analysis and Life Cycle Assessment.

The SMEmPower E&T program will be featured as follows:

❖ The decision makers of the SMEs need to be convinced of the actual value of energy audits and their implementation and need concrete proof of that. So, the E&T program will be designed as a **two-stage** one:

1. The first stage will include **lectures and tutorials** (either through face-to-face, distance or combined educational activities). E&T program will **focus on financial and technical data** required to prove that specific measures are cost-effective.

2. The second stage will involve **practical action** in specific industries or services sector installations. At this stage, the trained staff will move on to **apply their acquired knowledge to their working environment as case studies**. A total number of 20 case studies in SME installations per country are foreseen (at least 160 pilot sites in all countries). The trainings will go beyond the energy audit, to effectively implement energy management techniques, instruments, and solutions, to achieve energy savings, CO_2 emissions reduction and welfare.

❖ The E&T program will be **certified by partner Universities and Training Centres**, through their lifelong-learning departments or equivalent bodies, providing a recognized structure at the European context, based on the ECTS awarded for each educational activity.

❖ The **content and training material** will be **common to all partner countries**. However, slight deviations between countries will be possible. It will contribute to establish a **pan-European course**, with the possibility to invite instructors from other countries to deliver the lectures, even by distance learning. This will enable **cross-country cooperation** and utilization of acquired credits, through agreed sustainability plans, and employing the models of EUREM and CEM energy management programs.

❖ A specialized **handbook** will be developed for the needs of the program, **covering all thematic units,** and including the necessary theoretical background, working examples, tutorials etc.

- The handbook will be **translated** in 7 languages, which correspond to the national languages of the SMEmPower partner countries (English, Greek, Romanian, Spanish, Italian, German, and Slovenian),
- It will be **available from the web-portal**,
- The aim is to develop a **contemporary and advanced training material** that will be available indefinitely after the end of the project to all interested professionals.

❖ The learning process will be enhanced by the use of ICT features. In particular, through the creation of the **free online SMEmPower energy management platform and portal**, participants will be given a unique opportunity to effectively use intelligent energy solutions with embedded **M&T and M&V tools**. It will allow users to actively **apply their own energy management data**; enable **international cooperation and communication between participants**, exchanging ideas and views; disseminate pilot actions; and **access** a wide pool of added **value information**, in the frame of Industry 4.0 digitalization:

- The SMEmPower Efficiency Platform will be **used for distant learning**, which will include a selection of suitable webinars, case studies and working examples with the M&T and M&V tools.
- All **training material, news and information** about the on-going process will be updated and included in the online web portal, throughout the duration of the project.
- The two specialized tools on Monitoring & Targeting (M&T) and Measurement & Verification (M&V) will be available from the web platform to **quantify energy and monetary savings**, apply **financial indicators** to assess the opportunity of investments, perform **sensitivity analysis** on proposed solutions and persistence of savings, based on energy analytics.

❖ The SMEmPower Platform and portal will allow supporting the interaction of the virtual energy professional's community, e.g. through **sharing and answering questions and doubts** about subjects discussed during the E&T course.

❖ The trainees, after attending lectures and/ or other educational activities, will form **multidisciplinary groups. Each working group will work on an SME pilot installation**, interacting with operating personnel and decision makers. The groups will perform energy saving potential validations by conducting energy surveys; using the M&T and M&V tools; the knowledge acquired and other training material; using existing **energy audits** where applicable; **plans and on-site evaluations**; and will also **provide technical support** in Energy Management ISO 50001 implementation, always having the close support of the project partners.

❖ The groups will **deliver a formal report** containing a **technical part** detailing and justifying the proposed measures **and a financial part** analysing the returns on the investment through certain indicators (IRR, NPV, etc).

❖ The expected **results** from the previous practical action will be **a detailed report** from each team, which should be evidence-based reflected by the effective **application of M&T and M&V tools on each pilot site**, with a higher degree of decision triggering and efficiency implementation. The group work will include technical guidelines for **M&T, M&V** so as to effectively trigger and put in evidence of **energy savings** from organizational activities **and investment-based solutions,** establish Plan-Do-Check-Act strategies, to ensure long term results.

- The reports will contain the necessary financial data, **investment indicators (NPV, IRR, etc.)** and financing options, in order for the top management and board to be able to select the best proposed measures. The novelty and innovation of the proposed methodology is that the educational activities will include real **interaction with the final decision makers**, who will also have their say in the assessment of the performance of the groups.
- As mentioned before, the **contents** of the E&T program must **guarantee** the trainees the necessary technical and financial background to allow them to continue to the case study in a specific installation and **prepare a high-quality report** with support from trainers.

❖ A loop procedure will be applied in order to continuously **improve the educational program** during the project's work. In this process, Universities, market players and of course Beneficiaries will provide valuable input. **Updating of the contents** will be made at the end of each edition.

Finally, the **course will be assessed** in two approaches. On the one hand, trainees will fill out an evaluation questionnaire at the end of the lecturing period to **evaluate the course content and teaching method**. On the other hand, project partners will also analyse the **potential improvements** for posterior editions according to the valuable contributions of the universities, market players and, of course, beneficiaries. This will provide a continuous course improvement approach, guaranteeing its effectiveness in the marketplace.

At the end of each course edition, the contents of the **training handbook will be reviewed and updated**, taking into account the feedback from the participants. The final version will include all instructor presentations and case studies group reports.

2.5. Assessment Methods

The achievement of the required learning outcomes will be assessed by **both an evaluation procedure** at the end of the first stage (lectures and tutorials) **and** the evaluation and **presentation of group reports**. Course **certification** awarded with 5 ECTS credits will only be provided to trainees passing both evaluations:

- Theoretical knowledge of the first stage will be evaluated combining either short-answer questions, multiple choice questions or/and open-ended questions, one evaluation per learning unit.

- Practical learning will be assessed with the delivery of the high-quality practical report and its presentation.

Both the theoretical knowledge evaluation and the practical assessment will be designed accordingly to the diverse background of the participants (i.e. technicians, engineers, economists, etc.) with a special focus on the practical knowledge obtained by the attendees.

Table 2: Summarization of Assessment Methods for each LU of the E&T program.

LEARNING UNIT 1
• Evaluation of attendee prior knowledge and self-study. • Discussion on the impact of different European and National policies.
LEARNING UNIT 2
• Analysis of different Energy Efficiency Solution. • Working group discussion of the appropriate Energy Efficiency solutions for different case studies.
LEARNING UNIT 3
• Theoretical evaluation of the obtained knowledge. • Perform energy surveys for specific case studies.
LEARNING UNIT 4
• Discussions on different available M&T and M&V tools. • Practical use of the presented M&T and M&V tools using attendees' own data.
LEARNING UNIT 5
• Theoretical evaluation of the obtained knowledge. • Computer assisted practice hours on different case studies to evaluate CBAs and LCAs in working groups.
LEARNING UNIT 6
• Presentation of working group's formal report regarding their own case study.

2.6. Prerequisites

Prerequisites are any prior knowledge, skills or understanding that the learner is required to have before attending the E&T program. Based on the content of the learning units, the basic prerequisite for a trainee to meet before undertaking the E&T program is set as:

- Holding at least a level 5 EQF – Vocation training degree or university degree related to either energy or engineering.
- Belonging to the staff of an SME (to be an Engineer, Architect, Energy or Management Professional, a Qualified Technician or the person that is in charge with energy issues within the SME).

As stated above, apart from existing SME staff, the training program will be open to other interested qualified individuals: auditors, consultants, managers or anyone who want to gain further qualifications and could be a future SME employee.

Table 3: Summarization of Prerequisites for each LU of the E&T program.

LEARNING UNIT 1
• Identification and distribution of minimum bibliography for self-study related to European and national policies, respectively legislation for energy efficiency.
LEARNING UNIT 2
• Identification and synthesis of main existing energy consuming equipment in participating SMEs. • Recognition and distribution of minimum bibliography for self- study (technical prospectus/catalogue for energy efficiency equipment and technologies and other documents related to energy efficiency solutions).
LEARNING UNIT 3
• Recognition and distribution of minimum bibliography for self-study related to energy surveys and standards.
LEARNING UNIT 4
• Preparation of short reports on existing energy measurement equipment in course participants own installations.
LEARNING UNIT 5
• Basic understanding of economic principles and financing schemes.
LEARNING UNIT 6
• All the previous learning unit.

2.7. Feedback questionnaire

A loop will be utilized in order to continuously improve the educational program during the project's work. In this process, Universities, market players and of course attendees will provide valuable inputs. Updating of the contents will be made at the end of each edition.

One of the SMEmPower Efficiency project main objective is to develop a contemporary and advanced training material that will be available indefinitely after the end of the project to all interested professionals. At the end of each course edition, also the contents of the handbook will be reviewed and updated, considering the feedback from the participants. For this purpose, a feedback questionnaire will be applied to all participants in the training course. The proposed questionnaire (presented in Annex 1) can be adapted by each E&T program provider so that it can be applied for each LU separately or for the whole program.

The questionnaire will use both open and closed questions to collect information, in order to gather especially qualitative data.

The issues on which the participants' opinion is requested are:

- E&T Program content (objectives, topic, relevance and usefulness of the information provided by the program etc.);
- Program materials and teaching techniques (clearness of the materials, up to date of the used references, teaching techniques and used methods etc.);

- Program instructors (level of expertise, teaching ability and his interaction with the participant etc.);
- Quality of delivery (quality of the location and the used infrastructures);
- Improvements suggested by the participants.

The main objectives pursued by the implementation of the questionnaire are:

- The usefulness and applicability of the presented information;
- Up to date and relevance of the content;
- Directions for improving and optimizing course materials.

3. Learning Units' Content specifications

3.1. Learning Unit 1. European and national policies and legislation for energy efficiency

Content description

European and national policies regarding energy efficiency and management in SME's, industry and services sectors, presented in a critical view, with a focus on the legal requirements and opportunities for SMEs.

➢ **Basic knowledge about EU, and specific to partner countries, energy efficiency legislation and future development:**

- EED (2012/27/EU) and national legislation transposing EED;
- Assess progress made by Member States according to NEEAP;
- Market surveillance of Energy Labelling and Eco-design product requirements;
- The 2030 target/ Climate and Energy framework; NECPs
- Challenges of designing and delivering effective SME energy policy.
- Overview of EU and national targets, the trajectory of primary and final energy consumption in the EU and the member states; the contribution of SMEs to energy consumption; energy saving potential of SMEs.

➢ **Effects of the Energy Efficiency Directive (2012/27/EU) on SMEs:**

- Which aspects of the EED are the most relevant for SMEs (audits, heating, cooling)
- Analysis of the enabling frameworks for increasing energy efficiency in SMEs provided by national and local governments.
- Energy efficiency obligations as they relate to SMEs; smart metering, audits, performance optimization
- Examples of best practice of the energy/financial savings-achieved through EE measure implementation with help of support schemes.
- EU/national/regional support/incentive programs for SMEs: non-financial assistance; financing programs (will be location dependent);
- Finding and understanding national support programs for EE in SMEs; eligibility; obligations;

- Making use of schemes (in practice) which reduce financial effort of SMEs in implementation of energy audits, drafting energy efficiency master plans, equipment acquisitions etc.
- Identification of SMEs common needs and barriers (those stemming from regulatory sources) in energy management and energy auditing (level and structure of energy consumption);

➢ **New provisions under the 2018 amending Directive ((EU) 2018/2002): (Transposition by October 2020)**

- What changes?
- New targets
- New metering and billing provisions
- Energy audit obligation and what it could mean for your SME

➢ **Overview of specific energy management system options for SMEs within the existing regulatory framework**

- Energy management system requirements (standards) in national context
- Certification methods and requirements (if applicable)

Overall Learning Objective

➢ Create a specific understanding of impact and possible actions of SMEs related to European and National energy efficiency policy and legislation.
➢ Understand the obligations, and opportunities of SMEs under current legal frameworks relating to energy efficiency.

Prerequisites

➢ Identification and distribution of minimum bibliography for self-study.

Assessment Method

➢ Evaluation of attendee prior knowledge and self-study.
➢ Discussion on the impact of different European and National policies.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*
0,5 ECTS	**6** (including 4 for testing impact of self-study)	**4** (in eco design)	**5**	**15**

3.2. Learning Unit 2. Energy Efficiency systems, measures & solutions – Energy Management opportunities

Content Description
➢ **Standard, intelligent, and innovative energy solutions provided in a meaningful way for different types of SME's.** The unit should include the following: ▪ Introduction on Building efficiency aspects; ▪ Passive design (envelope, orientation, shading, solar protection and gain); ▪ Energy systems introduction (primary energy, energy conversion, renewable, micro co-generation); ▪ Overview of heating/cooling technologies; ▪ Overview of water heating; ▪ Overview ventilation systems, and heat recovery; ▪ Control technology; ▪ Knowledge of hydraulic balancing; ▪ Lighting systems, automations, electrical motors etc.; ▪ Renewable energy sources o Wind; o Solar electric; o Solar thermal; o Biomass; o Hydrogen; o Aerogenerator (HP); o Geothermal.
Overall Learning Objective
➢ It gives the fundamentals of energy conversion processes from fossils or renewable sources to thermal or/and mechanical energy; ➢ Create the competency to identify energy efficiency solutions and handle their implementation.
Prerequisites
➢ Identification and synthesis of main existing energy consuming equipment in participating SMEs
Assessment Method
➢ Analysis of different Energy Efficiency Solution. ➢ Working group discussion of the appropriate Energy Efficiency solutions for different case studies.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*

1,0 ECTS	**16** (including 4 for testing impact of self-study)	**6** (proposal preparation for new EE or RES equipment for own installations)	**8** (study of technical prospectus/catalogues)	**30**

3.3. Learning Unit 3. Basics of Energy Surveys & standards

Content description
➢ **This learning unit (LU) describes the actual energy audit and management standards in Europe, together with the procedure for energy audits in the different sectors (residential, services, industry), including the fundaments of energy assessment and energy saving evaluation, based on the following content:** ▪ Introduction ▪ Energy audit and management standards (National and European) ▪ Contents and methodology for developing an energy audit. ▪ Energy Audit equipment ▪ Energy consumption Assessment (electrical and thermal) and Demand Side Management strategies ▪ Energy savings measures and evaluation ▪ Practical case studies.
Overall Learning Objective
➢ Energy audit and management standards. ➢ Necessary knowledge for preliminary in-house energy evaluation. ➢ Methodology for developing energy audits. ➢ Basic of energy consumption measurement and equipment ➢ How to use real energy data base to fundament energy demand forecast and contractual options with utility companies in order to avoid various possible penalties and supplementary cost. ➢ Understanding the potential of energy audits, benefits on the economic and environmental aspects.
Prerequisites
➢ Theoretical evaluation of the obtained knowledge. ➢ Perform energy surveys for specific case studies.
Assessment Method
➢ Impact testing for self-study – short seminars and discussions on case studies in working groups -practice hours.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*
1,0 ECTS	**10** (including 4 for testing impact of self-study)	**10** (including in presenting various energy measurement equipment)	**10**	**30**

3.4. Learning Unit 4. Tools for Monitoring and Managing Energy

Content Description
➢ **Advance and effective tools, techniques, and concepts in monitoring & targeting (M&T) and measurement & verification (M&V), according to IPMVP for Energy Savings and Renewable Energy:** ▪ Energy measurements; ▪ Concept and basic knowledge on M&T; ▪ Tools for M&T: presentation and demonstration (or case study); ▪ Concept and basic knowledge on M&V; ▪ Tools for M&V: presentation and demonstration (or case study); ▪ General presentation of IPMVP; international experience.
Overall Learning Objective
➢ Introduction and acquaintance with energy performance concepts and tools
Prerequisites
➢ Preparation of short reports on existing energy measurement equipment in course participants own installations.
Assessment Method
➢ Discussions on different available M&T and M&V tools. ➢ Practical use of the presented M&T and M&V tools using attendees' own data.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*
1,0 ECTS	**10** (including 4 for testing impact of self-study)	**10** (computer simulation and testing of M&T and M&V tools)	**10** (proposal preparation for improvement of energy management in own company)	**30**

3.5. Learning Unit 5. Financing Energy Efficiency measures, tools and evaluation

Content Description

❖ Basic elements of economic analysis: Capital investment characteristics, sources of funds, tax considerations, depreciation, time value of money, simple and compound interest, cash flows and uniform series, present and annual worth, discount rate, MARR, internal rate of return, payback period, net present value, return on investment, sensitivity analysis.

❖ Financing energy projects: Loan, bond, retained earnings, sell stock, capital and true lease, energy performance contracts, WACC, the role of ESCOs, risk assessment matrix, examples

❖ EPC mechanisms and financial institutions/tools and indicators, relation with ESCOs, decision triggering through combination of M&T&V reports and preparation of energy strategies.

❖ Financial evaluation on energy efficiency investments, cost-benefit analysis and life cycle cost analysis, as important tools for energy audits and surveys.

Overall Learning Objective

- Understand the basics of an economic analysis of energy projects;
- Be able to evaluate an energy efficiency investment using standard metrics;
- Distinguish between different options for financing energy project;
- Understand how performance contracts work and when they can be beneficial for an SME
- Competence to perform a cost-benefit analysis and life cycle assessment on EE and RES solutions.

Prerequisites

- Basic understanding of economic principles and financing schemes.

Assessment Method

- Theoretical evaluation of the obtained knowledge.
- Computer assisted practice hours on different case studies to evaluate CBAs and LCAs in working groups.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*
0,5 ECTS	**6** (including 4 for testing impact of self-study)	**4** (in eco design)	**5**	**15**

3.6. Learning Unit 6. Practical on-site Action

Content Description
➢ The attendee's technical professionals invited with their decision makers, possible in their SME environment will perform their in-house energy evaluation, going through the above modules. ➢ The attendees can create a project assignment (based on the mentioned energy evaluation) which can serve as a part of the course evaluation.
Overall Learning Objective
➢ To effectively apply the knowledge and instruments from the E&T program.
Prerequisites
➢ All the above presented learning modules.
Assessment Method
➢ Presentation of working group's formal report regarding their own case study.

ECTS credits	*Lecture Hours*	*Practice Hours*	*Self-Study Hours*	*Total Hours*
1,0 ECTS	**10** (including 8 for testing impact of self-study)	**10** (in-house SME evaluations)	**10** (energy efficiency action plan preparation for their own company)	**30**

4. Accreditation/ Certification procedures in each country

In this section an overview is made regarding the main steps that are undertaken in each SMEmPower partner country / partner institution in order to obtain the required minimum 5 ETCS level 6 EQF accreditation/certification at both National and European level for the proposed E&T program.

Cyprus
In Cyprus, the training course for "Energy Managers" will be offered as an elective post-graduate course within the Department of Mechanical and Manufacturing Engineering of the University of Cyprus (the largest public university in Cyprus). All post-graduate courses offered by the Department of Mechanical and Manufacturing Engineering are already accredited and therefore only the internal approval from the University bodies will be required for the "Energy Managers" training course. The planned procedure to start the proposed course in January 2021 is the following:

1) Approval by the Department of Mechanical Engineering *(completed)*.
2) All departments of the Faculty of Engineering (i.e. Departments of Architecture, Electrical & Civil engineering) should be informed about the course, so that students from all departments of the Faculty will be able to enrol *(completed)*.
3) Approval by the University committee of external affairs *(July 2020)*.
4) Approval by the Rector's council *(July 2020)*.
5) Implementation in collaboration with the committee of Academic Affairs and Student Welfare Service.

Certification Decision

The decision on certification is taken by an appropriately accredited certification body. Appropriate accreditation includes accreditation from a member of the European Co-operation for Accreditation (EA) or a signatory of the International Accreditation Forum (IAF) Multilateral Recognition Agreement to:

- EN ISO/IEC 17024 Conformity assessment – General requirements for bodies operating certification of persons.

In addition, the scope of accreditation should include the training and/or certification of SMEmPower successful candidates.

Training organisations appropriately accredited to EN ISO/IEC 17024 may award their own certificates directly to candidates who successfully complete the SMEmPower training course.

If the training organisation is not accredited it should be 'recognised' by the appropriate national body responsible for the regulation of qualifications and certification may be awarded by an independent ISO/IEC 17024 or EN 45011 accredited certification body to candidates successfully completing the SMEmPower training course. In such cases the certification body will require evidence that the candidate has completed and passed the SMEmPower training course.

Greece

In Greece, the SMEmPower training program will be organized by both Aristotle University of Thessaloniki (AUTH) and University of Western Macedonia (UOWM) in a close collaboration between the two SMEmPower partners.

Accreditation at Aristotle University of Thessaloniki (AUTH)

At AUTH, each training program, regardless of the duration and the context in which it is submitted, is evaluated in terms of its feasibility and educational adequacy. The approval process follows the following steps:

- Submission of a proposal for the implementation of a training program (submitted electronically through the KEDIVIM website);

- Evaluation of the proposal by external reviewers selected from the register of KEDIVIM evaluators;
- Documented approval or rejection of the proposal or its amendment in accordance with the AUTH KEDIVIM Council's recommendations, which are based on the evaluators' suggestions.

After the approval of the proposal and before the start of the implementation of the program, a detailed file of the educational program is required to be submitted to the Secretariat Office of KEDIVIM, on the basis of which its implementation will be monitored. The envelope should contain a detailed schedule (lesson title, teaching space, hours and days, trainers) as well as all the educational material.

Accreditation at University of Western Macedonia (UOWM)

At UOWM, the approval of the projects and educational programs is carried out by the Council of the Centre (UOWM-KEDIVIM) after evaluation. The evaluation criteria are:

1) The completeness of the submitted proposal based on the submission process;
2) The scientific relevance of Academic Supervisors;
3) The educational completeness of the curriculum plans;
4) The correspondence of the submitted proposal with the mission and prestige of the University, and
5) The viability of the program.

The Council may request clarifications in a proposal if it deems that the above criteria are not met. During the evaluation procedure the Council also has the ability to turn to experts for final configuration of its judgment. The decision of the Council is sent to the Rector's Council for approval and after its approval it is notified to the Research Committee for further management. Once a program is approved, the Scientific and the Academic Supervisor must ensure the terms of application of the program, as described in the approved proposal. All approved programs are made public at the official site of the Centre.

Germany

As there is not any German University in the SMEmPower consortium, adelphi (the German partner) will be working with a subcontracted service provider which specialises in developing E&T programs and implementing these into the course catalogues of learning institutions.

Any course, to be offered at a German higher-learning institution needs to be externally accredited by an officially recognised accreditation agency. Generally, this is done for entire courses, but specific modules are also sometimes looked at to probe their quality and practical relevance. This accreditation is done by an evaluation of the module handbook which will need to cover all relevant information – such as the literature basis, the learning outcomes, the workload, the assessment methods etc. – as well as the capacity of the institution to adequately convey the course or module given their resources. Generally, the accreditation process will take 6-9 months

(but may be less because we are only having one module accredited). The accreditation of courses and modules is only valid for a limited period of five years and must be reaccredited thereafter.

adelphi will work closely with the subcontractor and the targeted higher learning institutions to make sure the SMEmPower training course meets the expectations and requirements of the institutions. The aim is to offer the course as an elective so that anyone taking an energy focused course (energy efficiency, renewable energies, energy management etc.) can choose to round off their skills with the practical skills offered by the SMEmPower module. Furthermore, the SMEmPower consortium wants to assure that the course can be taken as a 'certificate' module so that external candidates can attend without having to be enrolled in a full or part-time study course.

Italy

In Italy, the partner in charge for the training course is ENERGIADA. ENERGIADA will deliver the training course aiming to include the participation of national and local associations/institutions working within the energy efficiency sector. Selected trainers will deliver the learning units, bringing in this way extra value to the training course and providing the opportunities of more links and networking to the attendants.

Not being a University or an accredited body, the certification and accreditation process in Italy will be done in conjunction with the one by the UPV partner in Spain, benefitting of the interchangeability of the ECTS among EU countries. According to this, the training course will be accredited by the Long-life Learning Committee (LLC) that manages the process for accrediting new courses within the Long-Life Learning Program (LLP). Briefly the process for the accreditation consists in:

- Electronic submission to the LLC of the training program and materials with all the details;
- The LLC will start the approval procedure which might require some adjustment for the final approval;
- Once approved by the LLC, the Long-Life Learning Secretariat requests detailed information to register the course within the Long-Life Learning Platform (PoliformaT);
- Information and relevant course materials are uploaded in the Long-Life Learning Platform (PoliformaT), as well as the training tasks to be accomplished by the participants;
- Once delivered the first edition of the course, the Scientific Committee of the Institute for Energy engineering and the LLC re-evaluate the performance and success of the course and provides suggestions for the following editions.

Students interested in having the 5 ECTS will receive them upon request to ENERGIADA that will liaise with UPV to get the final certification.

In addition to this certification, another one will be available for participants, delivered by ENERGIADA in conjunction with UPV on behalf of SMEmPower Efficiency. The certification will specify the training topics, the workload, and the evaluation for the attendee.

Romania

In Romania, the SMEmPower's Energy Efficiency training course will be provided by The Technical University of Cluj-Napoca (TUCN) in close collaboration with SERVELECT, through Life-Long Learning Centre (LLC) of TUCN.

The main accreditation steps for a new E&T program through the LLC of TUCN are the following:

1) Approval of the Life-Long Learning Department of TUCN;
2) Approval of the Academic Council for Education of TUCN;
3) Approval of the University Senate as a Life-Long E&T program provided by TUCN;
4) E&T program approval and accreditation by the Ministry of Education.

For a new E&T program proposed by a public technical university with a provided establishment of a permanent nature, to be accepted and accredited by the Ministry of Education the following documentation is required:

- Document accrediting the right of use: ownership, lease, transfer of use and usufruct of the centre, facilities, equipment, workshops or practice fields of the centre or entity (with a minimum duration of one year), indicating the temporary and hourly availability of the centre;
- Power of attorney attesting to the powers of representation of the signatory of the request to act on behalf of the requesting entity;
- Identification National Identity Document of the person acting on behalf of the legal entity applicant (in the case of not granting authorization application);
- The proposed curricula for the E&T proposed courses;
- The academic staff with CVs to be involved in the E&T courses.

Slovenia

In order to provide the SMEmPower's Energy Efficiency course in Slovenia, the Chamber of Commerce and Industry of Stajerska (SGZ – the Slovenian consortium partner) will work in close collaboration with the University of Ljubljana, Faculty of Mechanical Engineering (the subcontractor that will provide the training courses).

The specific accreditation process for an E&T program in a Slovenian University is as follows:

1) The responsible persons at the subcontractor (University of Ljubljana, Faculty of Mechanical Engineering) prepares the Application for the accreditation of the proposed E&T program:
2) The Application for the accreditation of the E&T program is presented and analysed at the Senate of the University (in our case the Senate of the University of Ljubljana);
3) Upon successful evaluation of the Application the proposed E&T program is accredited by the Senate of the University (i.e. University of Ljubljana).

Spain

In Spain, order to provide the SMEmPower's Energy Efficiency training program will be provided by Universitat Politècnica de València (UPV) through its Life-Long Learning Program (LLP).

The proposed SMEmPower E&T program will be accredited by the Life-Long Learning Committee (LLC) of Universitat Politècnica de València. This Committee is responsible for guaranteeing the educational standards of the proposed courses, from an administrative and scientific point of view.

The main stages of the accreditation process are:

1) Preparation of the new course documentation by the promotor;
2) The course documentation is evaluated by the Scientific Committee at the Institute for Energy Engineering for its first approval;
3) New course application is submitted electronically to the LLC by means of a dedicated platform. This involves the following information:
    - **a.** Basic Data:
        i. Course title;
        ii. Dates;
        iii. Detailed program of the course;
        iv. Course objectives;
        v. Access requirements and previous required knowledge (what kind of experience and expertise the professionals applying to the course should have before the course);
        vi. Course methodology and ECTS credits;
        vii. Targeted trainees;
        viii. Key words.
    - **b.** Responsible Personnel:
        i. Director and Course entity promoting the course;
        ii. Coordinator;
        iii. Secretariat.
    - **c.** Certification Method;
    - **d.** Teaching Method;
    - **e.** Evaluation and Assessment Method;
    - **f.** Instructors Information and CVs.
    - **g.** Economic and Financial Analysis.
    - **h.** Sustainable Model.
4) Once the course documentation and the course application form are submitted via the electronic platform, LLC studies its approval or rejection. LLC may also require additional modifications based on the experts' analysis and recommendations.

5) In case it is rejected, additional documentation and information is normally required by the LLC. In this case, the professor promoting the course may consider initiate the process again once the recommended modifications are implemented.

6) Once the course is approved by the LLC, Long-Life Learning Secretariat requests detailed information of the above subjects in order to register the course within the Long-Life Learning Platform (PoliformaT).

7) Then, instructors upload the course information and relevant course materials in the Long-Life Learning Platform (PoliformaT), as well as the training tasks. Training tasks refer to the activities that need to be accomplished by the professionals taking the course and will be evaluated by the instructors (ex. Course project, exams, etc).

8) Finalized the first edition of the course, Scientific Committee of the Institute for Energy engineering and the LLC re-evaluate the performance and success of the course and provides a series of useful comments for the next edition.

Finally, course is advertised by means of the University communication channels to Professional Engineers and Architects Associations, other professional associations of interest and society, in general.

UK

In UK, there are some specific requirements that the courses need to comply in order to be accredited at Teesside University (TEES), such as the number of credits (two credits are equivalent to one ECTS), inclusion of Future Facing Learning (FFL), and be driven by the Learning and Teaching Strategic Plan (LTSP). It also needs to build on the Academic Enhancement Framework (AEF), which provides a mechanism through which Course Teams can engage meaningfully with Future Facing Learning and other key strategic themes relating to the student experience.

In this context, the TEES partner has two options:

1) University Certificate in Professional Development – UCPD; which accounts for 20 credits at any level 4, 5 or 6. The above awards should have a clear vocational focus upon personal professional development within one academic subject area or field of study or two appropriately linked subject areas or fields of study. That is the main reason why we believe that this is an adequate candidate for the new program. The above awards should have a clear vocational focus upon personal professional development within one academic subject area or field of study or two appropriately linked subject areas or fields of study. That is the main reason why we believe that this is an adequate candidate for the new program. The concern with this alternative is the number of credits needed for the accreditation.

2) To award a Non-Standard Module; 10 credits is the minimum module size available, at any level (3, 4, 5, 6, or post-graduate). The use of a 10-credit module is only permitted in exceptional circumstances, e.g. in relation to a specific requirement of a Professional, Statutory or Regulatory Body [PSRB]. This is the case for the SMEmPower Efficiency project.

Regarding the time constrains and the need to provide a valid certification as completion of the learning units in which the course consists, the second alternative has been chosen, not discarding ulterior development of a full UCPD at the University level (20 credits). A Certificate of Credit will be issued for each participant passing the module.

Upon completion of the SMEmPower training course all attendees from all partner countries that will pass the specific assessments will receive a SMEmPower Certificate that will include the following information:

- Name of the certificated attendee;
- Name of the training provider organisation/certification body that issued the certificate;
- Detailed modules and learning hours;
- The SMEmPower logo and funding body.

5. Concluding remarks

The presented Report is based on the E&T program of the SMEmPower including the design, implementation and evaluation of an Education and Training (E&T) course.

Based on previously identified situation in each of the partner countries, described mainly in *D2.3 Certification Schemes/ training methodologies*, the report aims to present the training methodologies in correlation with opportunities and potential best practices.

A novel training program will be designed in each partner country with a common curriculum and the training program will be certified by the methodology presented by each partner country. The E&T program is designed by two-stage: the first one includes lectures and tutorials and the second one involves practical action, as the trained staff will apply their acquired knowledge to their working environment as case studies or any other case studies prepared by the trainers.

The course is open for all the interested qualified individuals especially energy related SME staff. The training is going to present the best methods in order to quantify the possible savings and to successfully find pathways to fund affordable energy efficiency solutions/investments.

Even though there are many other dedicated courses, SMEmPower Efficiency aims to combat the barrier between the theoretical knowledge and hands-on practical experience, “empowering” the staff of the SMEs to improve trust and transparency.

The main topics of the course are the following:

1. European and national policies and legislation for energy efficiency
2. Energy efficiency systems, measures & solutions – energy management opportunities
3. Basics of Energy Surveys & standards
4. Tools for Monitoring & Managing Energy
5. Financing energy efficiency measures, tools and evaluation

6. Practical on-site Action

Each learning outcomes of the SMEmPower's E&T program were presented in the report.

In addition, 4 long lasting training tools will be developed, a) an advanced training handbook in 7 languages, b) A web platform for energy analytics, c) a tool for Monitoring & Targeting, and d) a tool for Measurement & Verification.

The present report provides a wide description of the program design as well as the certification methodology, to provide the basis for the development a specific educational course for SMEs capable to fill the gap in the actual energy efficiency context.

The E&T program will continue to be offered for at least 5 years after the end of the project based on concrete sustainability plans including the share of the training courses in national networks.

The above activities will bring significant and validated energy savings in SMEs and establish suitable energy culture.

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Annex 1. LEARNING UNIT FEEDBACK QUESTIONAIRE

Learning Unit No. <*X*>	*<Name of the LU>*
Training date	
Trainer's name	
Country	

By completing this form, you will help us to continuously improve our performance. Please indicate your assessment against each question on a scale of: 1=poor; 2=satisfactory; 3=good; 4=very good; 5=excellent.

Program content

How clearly were the training objectives stated?	
How well did the training meet the stated objectives?	
How well the received information covers the topic of the proposed learning unit?	
How do you rate the utility of practical examples (relevance of studied cases)?	
How do you rate the value of the training to you and your business/company (the information received can be transformed into concrete measures, necessary for your company)?	
How do you rate the relevance of the subjects covered to your professional needs?	
What is your overall assessment of the training?	

Course materials and teaching techniques

How clear were the materials used during the training?	
How do you rate the up to date of the used references?	
How do you rate the teaching techniques and methods used?	
How the interaction between the participants was encouraged?	

Course instructor

How knowledgeable was the trainer about the topics covered?	
How well did the trainer present the materials?	
How well did the trainer interact with the participants and respond to their questions?	
What is your overall assessment of instructor <*name of the instructor*>?	

Quality of delivery

What is your overall assessment of the technical side of the presentation (location, room, visual presentation of materials)?	

What is your overall assessment of the technical side of the presentation (quality of sound, camera, visual presentation of materials)? *In case that the course will be delivered face-to-face*	
What is your overall assessment regarding the course registration procedures and requirements?	

What did you think of the duration of the training (too short, too long, just right) and of the length of the break between both sessions? Please explain.

What were the 3 most valuable things you gained from participating in the training?

Where there any areas / aspects of the training that should be improved or were unclear to you? Please explain.

Please suggest any topics that you would consider valuable for future online trainings.

How did you find out about this course?

1. I was contacted by the project team
2. Internet (please indicate the source):
3. Elsewhere. Please indicate the source: _____

Comments

Additional information

Sex: 1. Male 2. Female

Age: ____

Level of studies: 1. High School 2.Vocational Training 3.Bachelor's degree 4.Master 5.PhD

Profession: _____

Role in the company: _____

Company' field of activity: _____