SouthZEB WP6:
Deliverable 6.2: Project Evaluation Report

Prepared for:
Project Officer
EASME

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Co-funded by the Intelligent Energy Europe Programme of the European Union

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Project Data

Project Acronym:	SouthZEB
Full title:	nZEB training in the Southern EU countries Maintaining building traditions
Objective:	Support the building sector intermediate and senior professionals (engineers, architects, municipality employees and decision makers) in the Southern European countries (Greece, Cyprus, Italy and Portugal) to keep up to date with the market progression, notably supporting those professionals in their continuous development, particularly in designing and renovating nearly zero-energy buildings (nZEB). This will be achieved through the design and development of training and assessment programmes for the abovementioned professionals, focusing especially on the transfer of successful practices and knowledge from the front runners to the Southern EU countries.
Contract number:	IEE/13/393
Financing:	Intelligent Energy Europe
Duration:	5th March 2014– 5th March 2017
Project website:	www.southzeb.eu
Coordinator:	Iakovos Kalaitzoglou University of Patras, Greece
Participants:	University of Patras (UPatras), Greece Building Research Establishment Ltd (BRE), United Kingdom University of Minho (UMinho), Portugal Cyprus University of Technology (CUT), Cyprus BEST Institut für berufsbezogene Weiterbildung und Personaltraining GmbH (BEST), Austria Instituto Superior Técnico, Technical University of Lisbon (IST), Portugal Vocational Education Training Center EUROtraining (KEK Eurotraining) (KEK), Greece Distretto Tecnologico Trentino S.c.a.r.l. (DTTN), Italy GARnet Energy Saving Ltd (GARNET), Cyprus

Table of Contents

1. INTRODUCTION

In this report the project SouthZEB, funded by the program Intelligence Energy Europe of the European Union, has been evaluated according to a set of different standards developed within the project.

Based on the Grant Agreement, the partners in each target country were responsible to organize and deliver first the “Train the TrainerWorkshops” in order to train and certify the SouthZEB trainers that have been responsible in delivering the received training to the corresponding SouthZEB trainees. To that context, the corresponding partner in each target country (CUT for Cyprus, KEK for Greece, DTTN for Italy and IST-ID for Portugal) was responsible for organizing the pilot trainer workshop session, where the developed material for each module has been presented to the perspective SouthZEB trainers.

The target number of certified SouthZEB trainers was at least 150 persons: the outcome of the workshops was that 173 participants have been trained and certified “SouthZEB trainers” in total to the four target countries.

The trained and certified SouthZEB trainers delivered the pilot training seminars for the target professionals. The seminars were disseminated appropriately by the corresponding partner in each target country (CUT for Cyprus, KEK for Greece, DTTN for Italy and IST-ID for Portugal), in order to ensure significant participation from outside the consortium as well. The target was to train at least 1.500 professionals in all partner countries and the outcome of the seminars was 1.556 trained and certified professionals “SouthZEB designers” (mainly engineers and architects) in total to the four target countries.

In this framework a continuous quality control and evaluation on all the activities performed within the project has been developed in order to achieve the results, and each partner had to ensure the validity of the trainings performed.

2. EVALUATION METHODS

As defined in the Grant Agreement and in the Annex I of the SouthZEB project, the progress of the project has been monitored since the beginning of it. Different tasks have been achieved during the project in order to ensure the quality and the correct evaluation of the activities.

The evaluation methods adopted have been the following:

- Development of the assessment plan, to provide information on requirements for the execution of the trainings,
- Setup of a focus group, to analyse and understand the market and end-user needs on nZEB buildings,
- Evaluation of the project results through a set of indicators and instruments,
- Evaluation of the workshops, through the development of a set of indicators,
- Evaluation of the project impact via performance indicators,
- Conformity to the national and international directives, to ensure that EU and national directives on nZEB subject are followed.

In this document each aspect will be analysed, and outcomes and results presented.

2.1 THE ASSESSMENT PLAN

A specific deliverable has been prepared by BRE (D6.1), who was the partner responsible for developing the activity foreseen in this specific task.

The Assessment Plan aimed to provide a consistent method of developing the training modules required and also to assist in the delivery of workshops and training material. The necessary information required for workshops, training material and portal realisation have been outlined to ensure that the training met the project objectives. In the preparation of the Assessment Plan a specific instructional design model called “ADDIE” has been used. The acronym stood for the main components of the process that has been followed and comprises the following stages: Assess – Design – Develop – Implement – Evaluate.

The Assessment Plan has been a guidance to be followed in the design and development of the training and aimed to incorporate the appropriate actions and element into training plans, training approaches and evaluation. The guidance helped in providing the trainers to:

- Facilitate, manage the audience, question and give feedback;
- Conduct learner-centred activities that promote retention and transfer of knowledge and skills; and
- Evaluate training and training sessions using the expert advisory board/feedback questionnaires.

In that way, the Assessment Plan has been strictly followed by the partners responsible in organizing and delivering the different training sessions in the target countries.

Portugal

Pilot Training Seminars in Portugal started at the end of January 2016 and ran continuously until the end of June. Nine editions in six different locations in the country were scheduled.

During each edition, the exams of each one of the modules took place in a predefined schedule that, in general, was one week after the seminar. Some repetition Exams took place in July 2016 for the trainees that were not able to participate in the scheduled dates or for those that failed in the first attempt.

The predefined calendar for the seminars was strictly followed and the different modules followed the corresponding Essay Plans. The Trainers delivered the contents of the different seminars in accordance with

their expertise and promoted a fruitful discussion between all the participants. The seminars' content was available in the eLearning platform to all the trainees and additional information was given during the training sessions whenever necessary.

The predefined calendar for the exams was also strictly followed and the trainees were timely informed about their score. When necessary, additional exams were prepared and delivered to the trainees that needed to repeat the exam.

Italy

The Assessment Plan developed within the project provided the structure and the methodology for delivering the courses and seminars in the most effective way.

In Italy the pilot training seminars to train trainers started at the end of December, whereas the pilot training seminars to train trainees started after Spring 2016 and ran continuously until the end of December 2016.

In order to ensure the largest possible participation to the courses, DTTN has been able to receive the endorsement of the Associations of Engineers and Architects. These Associations have a very strong position in Italy among professionals, both engineers and architects.

Eight different sessions have been organized always with Modules 1 and 2 mandatory, the other modules have been chosen in agreement with the participants and their interest. The modules followed the respective Essay Plans procedures. During each edition, the exams of each module took place at the end of each training session, the most efficient way to verify the learning mechanism and the effectiveness of the trainings.

The calendars for the seminars and for the exams were followed with the adjustment requested every time in the different cities. Where and when necessary, additional exams sessions have been organized for trainees who needed to repeat the exam.

The Trainers have delivered the contents of the seminars in accordance with their expertise and knowledge and have been always promoted different discussions between the participants, with inputs and suggestions often appreciated.

It has been communicated to the participants the availability of the presentations in the eLearning platform and each participants has been invited to register on the platform. Always additional information have been given during the training sessions whenever necessary both from the trainers and from DTTN, which was strictly following the right ongoing of the seminars.

Greece

KEK Eurotraining implemented successfully the Pilot Training Seminars in Greece. The assessment and development plan of nZEB project provided a consistent method of developing the training assessment exams required and also the uniform delivery of workshops and training material.

In Greece, seminars were held in the certified educational structures of KEK EUROTRAINING in Athens and assessment exams took place in the fully equipped certifications centres of KEK EUROTRAINING in both Athens and Thessaloniki.

Pilot seminars started on February 22nd 2016 and the last class was concluded on the January 23rd 2017. In total 13 classes were held and 264 professionals participated. The exams were scheduled to take place one week after the finish of each class. Trainees who did not pass the exams the had the opportunity to take them again. (maximum of three times).

The seminars schedule was followed. All ten training modules were available to the interested professionals. KEK trainers, trained and certified during workshops, transferred their knowledge to the professionals. Essays Plans regarding training modules were also followed.

Additionally, the educational material of all implemented modules was available in digital format videotaped for the absentees and also for the trainees who participated to the seminars via the SouthZEB e-learning platform.

KEK followed every guidance provided by the assessment plan regarding the training approaches and evaluation. Trainers facilitated, managed the audience, questioned and gave feedback. Also, trainers in Greece conducted learner-centred activities that promoted retention and transfer of knowledge and skills and finally trainers evaluated training and training sessions using the expert advisory board/feedback questionnaires. The implementation of the training and assessment exams in Greece and also the nzeb training portal served all learning principles presented in the assessment plan of the project.

Cyprus

Following the content development evaluation (internal and external) of each Module, the “Train the Trainers” Seminars were organized and evaluation questionnaires were given to the participants of each module. The filled questionnaires were gathered and analyzed by CUT (in extension to the analysis made by BEST) and any concerns and suggestions raised by the participants were taken into account for the subsequent preparation/development/presentation of the “Trainees Seminar Series”.

Furthermore, there was a close collaboration with the trainer of each module in order to provide assistance in correcting any mistakes (grammar, spelling or scientific errors) in the power point presentations, as well, as identifying the key points to be highlighted during the training delivery. Moreover, each trainer provided his personal input and provided practical examples and case studies that they confronted throughout their professional career. In addition prof. Eleftheriou was present in all presentations assisting and helping during the presentations by answering questions and giving examples to raised questions.

Evaluation questionnaires were distributed amongst the participants of the “Trainees Seminar Series” and the filled questionnaires were gathered and analyzed by CUT. Also verbal communication between the participants and CUT was established. An effort was made for issues raised through the questionnaires or verbally to be resolved and following training seminars were slightly adjusted in order to better meet the needs of the audience.

2.2 THE FOCUS GROUP

It was foreseen in the Annex I a specific task related to the set up a focus group which included the consortium expert partners form the front-runner countries and the experts from the target country. This focus group was created to understand market and end-user current needs and perspective on nZEB and potential future perspectives. The partners involved in this task have actively contributed in examining and monitoring the motivations of consumers to participate in different nZEB initiatives. The output of this joint work is below reported.

The input of governmental institutions is of major interest for placing philosophies into public opinion, e.g Vienna is front runner since many years in terms of energy saving actions ("Umweltmusterstadt"). National inputs in that sense in every training to strengthen environmental self-identity will be of high imprortance for every partner of the consortium, to enhance motivation for accepting energy saving solutions and political issues in that field. Environmental problems are caused by human behaviour. Therefore, we need to understand which factors influence environmental behaviour.

Recent research on growing environmental self-identity (e.g. Werff, E. V. D., Doctoral thesis, University Groningen, 2013) pointed out, that when people realized they rarely acted environmentally-friendly in the past, their environmental self-identity was weakened and they were less likely to act pro-environmental. However, past behaviour only influenced environmental self-identity when the signalling strength of this behaviour was high, that is, when it concerned a range of rather different behaviours or when the behaviour was difficult and unique.

Taking that into account, the members of the consortium have evaluated the past environmental behaviour and actual environmental self-identity of workshop participants, focused on future advantages (e.g. health care, money savings, reduction of costs, environmental development) when changing personal behaviour to a pro-environmental person, because these advantages can be predicted and estimated for the whole community people who are living their everyday lives.

The partners have given direct information about funding schemes to the participants of the training workshops. These information of funding and national activities in nZEB have been collected when possible in direct cooperation with the government funding institutions and official information platforms. To support this interaction, the promotion of national awards for best practice examples in the field, like the Austrian Green Building Star, could be an attractive possibility to promote active interaction and acceptance in nZEB initiatives.

Implementation of nZEB into national legislation to show national developments and provide examples of nZEB projects can be promoted in different frameworks, e.g. Passivhaus Institute in Italy and Austria. Activities like that will provide a powerful instrument for promotion of passive/active house philosophies in general.

The partners of the consortium have been strongly involved in national activities like mentioned above. Workshop contents will be updated continuously and seminar participants have achieved best results during the training period.

Former studies from Austria (Marktpotenzial und Bekanntheitsgrad des Passivhauses in Österreich, Bundesministerium für Verkehr, Innovation und Technologie 2010) showed that 17% of building owners take care mostly on building costs, but more than 50 % will accept higher costs due to energy saving reasons, when amortization time of costs are of acceptable range of time. In addition, reduction of energy and thermal losses will become evident in terms of budget reasons. These issues are best promoted from the very first beginning of planning and constructing.

Therefore, effects of feedback of money savings and energy reduction will be evaluated in cooperation with nZEB manufactures and scientific institutions to promote the increasing importance of nZEB in public discussion and opinion. One specific goal of this action will be the reduction of so-called late adopters in accepting importance of nZEBs.

The motivation for the implementation of nZEB in the target countries has been risen with “the train the trainers” workshops and trainees Seminars defined within the scope of the project.

The high level of participation of the professionals involved in the trainings were coming from the building process and are architects, engineers and municipal employees, university teachers as well as managers from construction companies. This high number of interested professional can surely promote active participation in current and future nZEB initiatives and funding schemes.

The project also had the support of several municipalities, national and regional energy agencies and professional associations that supported and endorsed the workshops and seminars and the dissemination of the project in the different countries.

The involvement of all these different types of professionals has galvanized the dissemination of the nZEB concept within all levels of the construction market and society. Besides the technical aspects of nZEB building concept, it is also showed that it is attainable to build or retrofit a building towards a nZEB level at reasonable costs when compared to a deemed conventional building. It has also showed that the nZEB buildings will not only be more comfortable and cost effective within their life cycle but also respond to one of the most imperative society problems, the fuel poverty.

Additionally in the current economic and construction market crisis, the differentiation of professionals – the SouthZEB nZEB Designers – and also the buildings – nZEB – will be an advantage and motivate sector professionals and stakeholders to adopt energy-saving solutions and perform retrofitting actions to reach nZEB levels.

2.3 THE EVALUATION OF THE PROJECT RESULTS

The evaluation procedure of the outcomes of the project was initiated from the beginning of the project. The main toolkits used for monitoring the progress of the project and providing comments and proposals were the use of the emails, the implementation of teleconferences through Google Hangouts and the project meetings, which however were already established by the Grant Agreement. The teleconferences were quite essential for solving issues that may have come up, for evaluating the results / documents till then and monitoring the progress of the project according to specific timetables through discussion and more freely than through email exchange.

Besides these, when and where required special toolkits were developed during the evaluations of deliverables in order to provide also solutions. More specifically, through the evaluation of Deliverable D3.1 it became evident that a toolkit was needed in order to provide solutions and this was implemented by the Coordinator through an online questionnaire that was fulfilled by all partners and a relative report displaying the results.

Moreover, the University of Patras developed toolkits for the evaluation of the SouthZEB portal. Initially, a System Integration Testing was developed in order to examine whether all the subsections of the portal were functional. Afterwards, 3rd Design meetings were realized in all target countries in order to examine the ease and usefulness of the SouthZEB portal and its sections through a test developed by the University of Patras entitled “User Acceptance Testing”. The test was based on the functionalities of the portal as specified in the Grant Agreement and the Deliverable D2.3. The results from the testing were provided to the responsible partner to proceed to improvements. The User Acceptance Testing was used at a 2nd stage during the workshops and seminars from the participants of the training procedure in order to examine the various categories of the system users.

Furthermore, evaluation toolkits were developed for the evaluation of the workshops and the seminars. The toolkits were approved by all partners and were used during the training procedure to receive feedback from the participants. They consist of questionnaires, observation procedure and interviews. The questionnaire required fulfilment by the students and the teachers, the observation procedure was implemented by an observer during the course and the interview was implemented on a small percentage of the participants. The feedback received was edited appropriately by BEST, through the use of statistics. Besides that, the University of Patras proceeded in teleconferences with the teachers of the “train the trainer” workshops in order to receive their feedback regarding the organization of the workshops, comments that may have been received by the participants and the quality of the material presented.

Last but not least, the members of the Expert Advisory Board provided their review on the deliverables of the project. Initially, they had provided a review regarding the material developed in WP3 (training modules) and at the end of the project they provided a review of all deliverables of the project. It should be stated though that review has been provided only from Mr Giannadakis, Mr Michaelides and Mr Clarke, despite the relevant emails that have been sent to the rest of the members of the EAB.

2.3.1 Evaluation procedure

2.3.1.1 Monitoring and Evaluation via Teleconferences

The Laboratory of Applied Mechanics from University of Patras, which is participating in the SouthZEB project as the Coordinator of the project, has great experience in the monitoring of projects through its participation in several European funded projects. The evaluation of the project outcomes has been initiated from the beginning of the project and several means of communication have been used in order to facilitate this procedure. The main tools that have been used for the communication and the monitoring of the results were the use of the emails and the teleconferences.

The Coordinator had mentioned the implementation of teleconferences through Google Hangouts from the Kick-off meeting in Greece in order to facilitate the problem-solving procedure. This proposal was approved by the rest of the partners, thus a new email account was created for each partner, so that this could be used for the communication and the Google Hangouts. Later though it was preferred to keep the new email account only for the Google Hangouts, whereas for the email exchange the pre-existing email accounts of the partners were used.

The teleconferences were implemented approximately every 15 days (twice per month), besides some periods when project meetings would be shortly implemented or comments from the EASME were expected for the next move to be planned. The Coordinator prepared the Agenda of the meeting, which was sent approximately a week before the scheduled teleconference including the topics to be discussed, which concerned either issues that have come up during the implementation of the project tasks or the scheduling and monitoring of the progress of the tasks in accordance to the timetable set in the Grant Agreement. The partners were then able to propose more topics to be discussed, which then were incorporated in the Agenda and the final Agenda of the teleconference occurred and sent to all partners. At the end of each teleconference it was always discussed the dates for the next teleconference and the availability of the partners was recorded each time. Then, a doodle including all the dates that were recommended and for which the majority of the partners during the teleconference did not pose any argument was sent to all partners to participate in a poll procedure to vote for the dates they would be able to attend. The poll would have been closed after some time and the date and time of the teleconference resulted from the poll procedure.

After the end of each teleconference, the relative minutes were sent the same or the day after to all partners to be informed accordingly.

Furthermore, the progress of the project and its outcomes have been discussed and evaluated during the project meetings. The meetings were established by the Grant Agreement, as well as the location, time period and responsible partner of each meeting. The Agenda was prepared by the Coordinator and approved or appropriately changed by the responsible partner of the meeting. The topics included were the progress of the outcomes/deliverables till the project meeting for evaluation and discussion and problem-solving and also the next steps of the project. The minutes of the meeting were prepared and sent to the partners shortly after the meeting, whereas all partners could have access to the presentations of the partners.

Moreover, the tool of Google Drive was used in order to facilitate the exchange of documents and the gathering of the information. In the Google Drive, the documents were placed according to the Work Package they belong and all partners had access in all folders of the Google Drive with relevant user rights to add/remove and download the documents uploaded. In the Google Drive also the data regarding the teleconferences and the project meetings of the project have been uploaded and more specifically: the doodle results, the Agenda of the teleconference/meeting, the minutes of the teleconference/meetings, the presentations of the partners in the meetings and other information that may have occurred and were specific for the teleconference.

The following figures present what have been presented:

SOUTH ZEB

Co-funded by the Intelligent Energy Europe Programme of the European Union

11/11/2014 11th TCF – AGENDA

0. Scope of Work

The scope of this document is to present the subjects that will be discussed in the 11th tcf for the SZEB project on 11/11/2014 (16:00pm Athens' time) as well as observations concerning the progress of the project.

1. Agenda

- Response from EASME concerning the proposal on the certification of the professionals (if available till then)
- Discussion on the contribution of the front-runner countries in the Work Package 5 (KEK)
- Progress of the Deliverable D7.2 (Work Package 7 – Task 3) (if not completed till then) (KEK)
- Progress of Deliverable D3.1 (Work Package 3 – Task 1) (BRE)
- Progress of the Stage 1 (Full Plan of each course), according to Work Plan of Work Package 3 (BRE) (from presentation in the Vienna meeting)
- Completed Deliverables and pending Deliverables (Work Package 2 – UMINHO / Work Package 6 – Task 1.1 – BRE / Work Package 7 – IST-ID). Placement of completed Deliverables and state of pending Deliverables.
- Determination of next tcf.

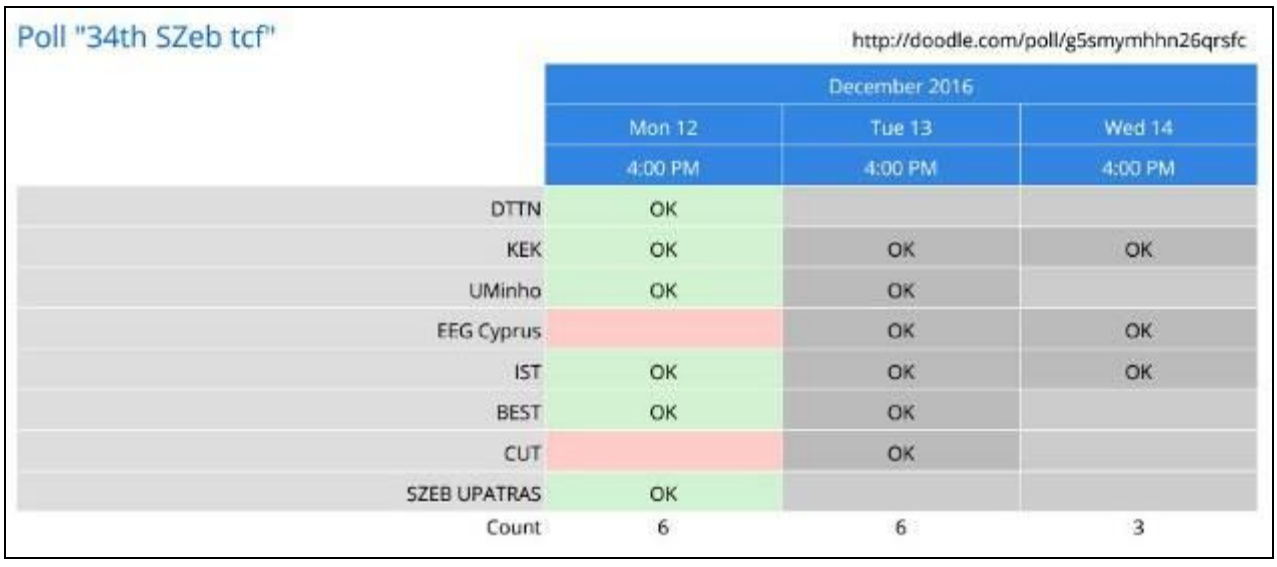
Notes

Consolidated table concerning the deliverables:

S/N	Deliverable	Timeframe acc. Grant Agreement
1	Work Package 7 – Task 3 (KEK)	8th Month (05/11/2014)
2	Work Package 3 – Task 1 (BRE)	10th Month (05/1/2015)
3	Stage 1, Work Plan of Work Package 3 (BRE)	9th Month (05/12/2014)

-end of document-

Figure 1: Example of the Agenda of a teleconference



Poll "34th SZeb tcf"

http://doodle.com/poll/g5smymhhn26qrsfc

	December 2016		
	Mon 12	Tue 13	Wed 14
	4:00 PM	4:00 PM	4:00 PM
DTTN	OK		
KEK	OK	OK	OK
UMinho	OK	OK	
EEG Cyprus		OK	OK
IST	OK	OK	OK
BEST	OK	OK	
CUT		OK	
SZEB UPATRAS	OK		
Count	6	6	3

Figure 2: Example of poll results for 34th SZEB teleconference

Name	Owner	Last modified	File size
00.Grant Agreement	me	8 Aug 2014 me	–
01.Template Documents	me	13 May 2014 me	–
02.LOGOS	me	15 May 2014 Karin Kronika	–
03.Meetings & TCF's	me	8 Aug 2014 me	–
04.WP1	me	6 Jun 2014 me	–
05.WP2	me	19 Jun 2014 me	–
06.Experts Advisory Board	me	19 Jun 2015 me	–
07.Design Mtgs	me	6 Jun 2014 me	–
08.Finance	me	8 Aug 2014 me	–
09.WP7	IST - UL	6 Nov 2014 me	–
10.Deliverables	me	8 Aug 2014 me	–
11.WP5	Polyvios CUT	8 Sep 2014 Polyvios CUT	–
12.StakeHolders Meeting - Brussels - 2014.11.13	me	17 Nov 2014 me	–
13.WP3	Polyvios CUT	19 May 2015 Karin Kronika	–
14.WP6	me	5 Jan 2015 me	–
15. WP4-SouhZEB portal development	me	15 Feb 2017 me	–
16. Request for Amendment	me	13 Jul 2016 me	–
17. Together Project	Akis Kalaitzoglou	12 Dec 2016 Akis Kalaitzoglou	–

Figure 3: View of the Google Drive and the relative folders

During the teleconferences and the project meetings the documents/deliverables prepared were discussed, whereas the Coordinator would highlight any comments regarding the quality of the deliverable. Moreover, the documents prepared by the partners were always presented at first to be reviewed by all partners and then the final document would occur, adapting appropriately the relevant comments.

2.3.1.2 Evaluation of deliverables through the development of special toolkits

The reviewing procedure of the deliverables also included toolkits developed especially for some occasions. More specifically, during the reviewing procedure of the Deliverable D3.1 some issues were indicated, which could not be solved during the relevant teleconference. Deliverable D3.1 is of high importance, since it would present the training and certification framework of the SouthZEB project. The issues mentioned in the deliverable refer to the eligibility criteria for the trainees and trainers to join the SouthZEB scheme, the need for Continuous Professional Development (CPD) and the status of the project after its completion. Therefore, the Coordinator created a relevant toolkit, i.e. a questionnaire to be fulfilled online by all partners providing their response on the comments occurred. Afterwards, these questions have been summoned and edited properly using statistical methods and the relevant report with results was created by the Coordinator and sent to all partners. Also, these results were incorporated in the Deliverable D3.1 and have been used as a reference for other issues that came up later during the implementation of the project.

Relevant photo of the report is presented as follows:

Question 1

In this question, the participants UPATRAS, BRE, CUT and GARNET voted for "YES", whereas the participants DTTN, UMINHO, IST-ID and BEST voted for "No". Therefore it was decided that this equality could be resolved by a slightly different approach, so that a final decision could be taken. The choice "No" was converted to "Yes" for a time period of 10 years, which means that the CPD should be applicable every 10 years (which in fact is a long period for a professional who is active in this specific field to update his knowledge and thus this choice equals to "No"). According to this, the following diagram occurred, where the Gravity Center of the voting is presented.

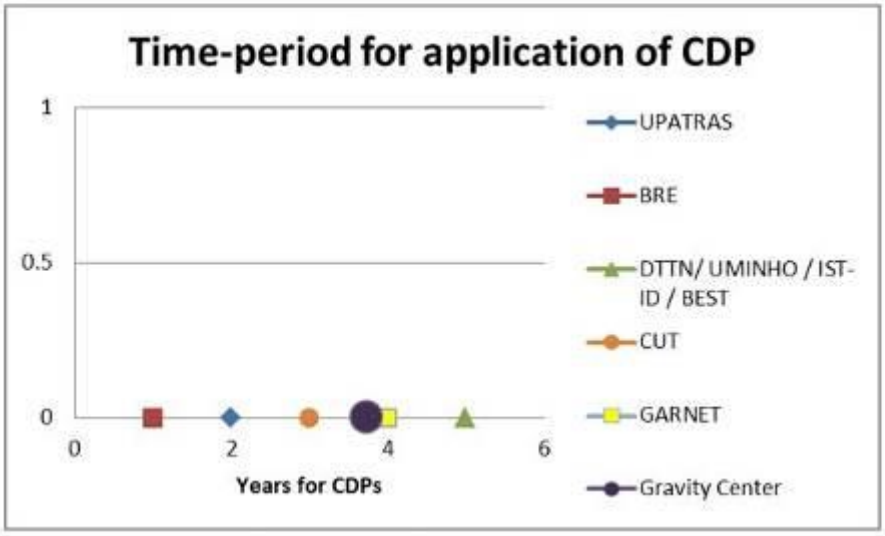


Figure 1: Time of period for the application of CDP

The scale in the x-axis is presented as follows:

X – axis	
Years for CPD	**Scale**
Every year	1
Every 3 years	2

Figure 4: Example of the report prepared based on the answers of the questionnaire

2.3.1.3 Evaluation of the SouthZEB portal

In Work Package 4, the SouthZEB portal have been developed, incorporating the sections as mentioned in the Grant Agreement and more specifically the E-learning section, the nZEB simulation and design tools section, the forum and the funding scheme section. The University of Patras had developed proper toolkits in order to evaluate the easiness and usefulness of the developed system, as well as the integration of the subsections in one system.

For the evaluation of the integration of the sections in one system a questionnaire based on relevant testing of the SouthZEB portal was created entitled SIT (System Integration Testing). The System Integration Testing is testing conducted by persons in order to test the application / software. These persons, who have been testing functionality as it has been delivered, are usually prepared to see the application function as a whole integrated solution. SIT is often more technical and more prepared and it is testing designed and executed by testers who usually are more familiar with the types of defects the software is more prone to. The main goal of SIT testing is to test the automation of aggregated components and the dependencies that exist between them. In a complex environment, this is a tedious task, as there is a number of components

and dependencies. SIT testing ensures that it follows the dependencies available in a sequence, thereby simplifying the task.

Initially, the requirements for the SouthZEB portal were set in the Deliverable D2.3. The Deliverable contained the necessary contextual and technological requirements for the successful development, running and maintenance of the portal. In the E-learning section it is mentioned that it should be comprised of the material developed for the 10 training modules (slides) provided in a specific format including information regarding the structure of each course. To access the E-learning portal and the material uploaded, registration is required via an online account form. Moreover, different user accounts are mentioned in order to have different user rights. Besides E-learning platform, the rest of the sections are also presented in the Deliverable.

This test was developed by University of Patras to verify whether the portal would comply with the minimum requirements that had been set according to the Deliverable D2.3 and the Grant Agreement. Moreover, through this test the integration of all sections in one portal and their proper functionality would be validated and steps for improvement would be mentioned after the indication of the defects of the system.

The SIT consisted of two main steps:

1. Checklist
    a. Before the initiation of the test, the System Integrator should confirm that all components of the portal have been integrated in the SouthZEB portal. When the checklist is fulfilled, the test can begin. In case of some components not being integrated, modifications shall be done before the test begins.
2. Tests
    a. Tests of the portal in real environment (in case the portal has been developed in test environment).
    b. If possible, load test should be performed. The load test refers to the testing of the system under real conditions in order to check the real user interaction.

The testing procedure has been realized by BEST, as the Work Package leader of the Work Package 4, under which the SouthZEB portal was developed. The responsible for the development of the SouthZEB portal was KEK. Based on the timetable of the Grant Agreement the SouthZEB portal and the relevant Deliverable should have been prepared till the 18th Month, i.e. till early September 2015. The SIT was decided by BEST to be executed early July in order to have enough time for improvements and reach the deadline set in the Grant Agreement. However, there was a delay recorded in the development of the portal, thus the SIT was realized although the portal did not include yet some of its functionalities. The results from the SIT were comments mainly related to the user rights and the unavailability of some sections. Therefore, it was mentioned by the Coordinator to perform the specific test after the SouthZEB portal has been completed, however this was not acceptable by BEST due to the late completeness of the portal. Thus, it was suggested to communicate BEST and KEK and solve any issues remaining. KEK had implemented the necessary improvements and the SouthZEB portal was fully functional soon and relative instructions were provided in the format of a video tutorial in order to assist the partners in the use of the SouthZEB portal. It is mentioned that the SIT test had been performed also by CUT, however on the level of the national coordinator.

In Appendix A the SIT test is presented, as well as the results from the test from BEST and CUT.

Besides the SIT testing the Coordinator prepared the User Acceptance Testing in order the users of the SouthZEB portal to evaluate it. User acceptance testing (UAT) is the last phase of the portal testing process. During UAT, actual users test the portal to make sure it can handle required tasks in real-world scenarios, according to specifications. UAT is one of the final and critical procedures that must occur before the newly developed portal is rolled out to the market. Thus, UAT is also known as beta testing, application testing or end user testing. Based on relative research, perceived usefulness and received ease of use have been identified as important user acceptance criteria. Perceived usefulness is defined as “the degree to which an individual believed that using a particular system would enhance his or her job performance.” Perceived

ease of use is defined as “the degree to which an individual believes that using a particular system would be free of physical and mental effort.” Perceived usefulness concerns the expected overall impact of system use on job performance (process and outcome), thus the performance impacts concerning ease of use are a logical subset of those comprising usefulness. Making a system easier to use, all else held constant, should make the system more useful. In order to evaluate the aforementioned, the UAT test was developed from University of Patras.

The UAT test would be used in 2 stages:

- 1st stage: after the completion of the integration of SouthZEB portal and during the 3rd design meeting
- 2nd stage: during or after the completion of the workshops and / or the seminars to evaluate multi-level users

The participants would be either students or teachers. Moreover, the persons who would act as National Coordinators in each country would perform usability tests, as well as the administrator and the master administrator.

The UAT test is presented in Appendix B.

The UAT test was used by the focus group in each target country during the 3rd design meeting in order to evaluate the ease and usefulness of the portal. It is mentioned that the results from the SIT were taken into account for the improvement of the portal, before this was displayed to the focus groups. The 3rd design meetings were executed in each target country during August – September 2015, and the tests were sent to the University of Patras in order to prepare the relevant report. The report was based on the incoming tests received:

- From DTTN (for Italy): on the 31st of August and the 2nd of September
- From KEK (for Greece): on the 11th of September
- From IST-ID (for Portugal): on the 18th of September
- From CUT (for Cyprus): on the 23rd of September

The report prepared gathered and pointed out the main results/ comments of the majority of the tests received. The main results (“Overview”) of the report are presented in Appendix C. The report was then sent to BEST, as the Work Package leader of WP4, who then forwarded it to KEK in order to proceed to relative improvements.

Based on relative email exchange, the Coordinator had informed the partners responsible for the implementation of the trainings in the target countries to proceed to 2nd stage of evaluation during or after the workshops, in order to consider the multiple user categories. Results have been received from Portugal and Italy, from which an overview is displayed as follows, which comprise the majority of the comments received:

	Student’s Testing
1	Not able to proceed to tests in Forum section -> not fully functional
2	Not able to find the complaints’ section
3	The link for the nZEB simulation tools is not operational
4	No quizzes have been uploaded in order to test this functionality
5	Not able to monitor the performance in the E-learning platform
	Teacher’s Testing
1	Not able to proceed to tests in Forum section -> not fully operational
2	Not able to find the complaints’ section
3	Not able to assign a quiz to students in E-learning platform
4	Difficulty in monitoring the performance of the students in E-learning platform
5	Not able to edit the credentials of the students
	National Coordinator’s Testing
1	Not able to see the nZEB simulation tools section
2	Not able to find the complaints’ section

3	In the E-learning platform it was possible to modify the credentials of all users, even of administrator's and master administrator's

Table 1: Overview of the comments received by the UAT - 2nd stage from Portugal

Besides the aforementioned, the majority of the comments stated that the portal was easy to be used, however there are many functionalities not working, although the procedures of having access to the training modules was very easy. It was recommended to improve the translation in some sections, to fix the user rights and the rights of the "Guest", to improve the procedure in the monitoring of the progress of the students and to create a subsection in the Funding opportunities section to group the expired funding schemes. It should be mentioned that the tests were executed on 2015, during the workshops in Portugal.

However, it seems that in Italy there were difficulties in the use of the SouthZEB portal. The table following presents the main issues addressed in the UAT testing, which mainly resulted in the inability of using the portal.

	Student's Testing
1	Not possible to enter the menu and to register and no answers came for the registration after submitting the request
	Teacher's Testing
1	Difficulty in entering the E-learning platform & internal error in registration
	National Coordinator's Testing
1	Able to enter the menus but not possible to perform any other testing & not easy to operate in the forum

Table 2: Overview of the comments received by the UAT - 2nd stage from Italy

The results from the UAT tests and the main comments received were notified to KEK in order to proceed to proper modifications / corrections in its use. It should also be mentioned that KEK had sent specific guidelines and useful material to all partners to enable the use of the SouthZEB portal.

2.3.2 Evaluation of the workshops / seminars

2.3.2.1 Workshops

Regarding the evaluation of the workshops and seminars, the University of Patras is responsible for developing various toolkits for this purpose (as per the Grant Agreement - Work Package 5 – Task 3). The evaluation of the training procedure from the participants referred not only to the quality of the training modules, but also to the facilities of the partner, the organization of the workshops/seminars and the ability of the teachers to provide adequately the training to the participants. For this purpose the following toolkits were developed:

- Questionnaire. The questionnaire was addressed to the students and also to the teachers. It included open questions, questions that a grade should be assigned and free space for additional comments. For the teachers, 4 questions should be answered.
- Observation. The meaning of the observation is to evaluate the whole course from an outsider's side, from a person who observes the course and neither he participates in this nor the course is addressed to him. This also consisted of 8 questions that were appropriately fulfilled by the observer.
- Interview. The interview is another mean of evaluating the workshops / seminars in a less strict and formalized way. It was recommended to implement the interview procedure to approximately 10% of the participants of workshops and seminars. The approximate time for this procedure was considered to be 2-3 minutes, whereas some questions were drafted to assist this procedure.

The aforementioned evaluation procedures are presented in Appendix D.

It is mentioned that the aforementioned toolkits were initially presented to the partners in the Rovereto meeting, where comments were received and improvements were performed till its final format.

Initially, the evaluation for each training module was performed for the train the trainers workshops. The certified trainers were 173 as a total and more specifically in Italy 93 trainers were certified, in Portugal 34, in Greece 27 and in Cyprus 16. The evaluations received were 1401 (evaluations were not received from all certified trainers in Cyprus and in Portugal). The evaluation then proceeded per target country, since the way the course was being provided and the teacher of each course varied from country to country, therefore it was not possible to compile the comments received as a whole.

BEST had implemented a report on the evaluations received per target country, whereas the first analysis of data was presented in the meeting in Edinburgh, UK, where through discussion among the partners and comments received improvements were made in order to provide the final format of the report.

Besides the evaluation of the workshops from the students – imminent certified trainers, teleconferences with the teachers of the workshops were organized by the University of Patras in order to receive their view in terms of quality of the modules, the organization of the workshops and other aspects. The Coordinator asked from the responsible partners for the training procedure to provide him the contact details of the teachers in order to proceed accordingly. It should be mentioned though that not all of the teachers had answered in the invitation for the teleconference. This procedure lasted for 2 months, from March 2016 till May 2016. The topics of the Agenda were the following:

1. Main comments received (negative / positive).
2. Level of participation from participants during the workshop.
3. Level of satisfaction from the participants.
4. Personal view - Quality of the module's (-s') content & in general quality of the workshops (technical resources etc).
5. Personal view – suggestions for improvements.

An overview of the comments received is presented as follows, whereas the minutes from the teleconferences are attached with this report.

From Cyprus, it was possible to proceed to a teleconference with Mr Papadopoulos, Ms Cocco, Mr Diab and Mr Michaelides and record their view on the aforementioned issues. Mr Papadopoulos was responsible for delivering Modules 4 and 7, Ms Cocco for Module 2, Mr Diab for Module 9 and Mr Michaelides for Module 1. The main comments for improvement referred to the limitation of time and the dublicates of sections that existed in other Modules too. All of the teachers consider the Modules to be of high quality and quite comprehensive, whereas the students – imminent certified trainers displayed great interest during the course.

From Greece, it was possible to proceed to a teleconference with Mr Kontadakis, who was responsible for delivering Modules 4, 6 and 8, however after proper arrangements and communication with KEK, Mr Kontadakis was able to provide relative feedback for all Modules. The main comments received were the limited time especially for Modules 1 and 2, whereas for Modules 3, 5 and 8 it was mentioned that a greater relation to Greece should be provided. In general though positive comments were received and the participation of the students was high in Modules with practical exercises especially. Regarding the quality of the Modules is was stated that in general this was considered to be adequate for all Modules, whereas the organization of the workshops was satisfactory.

From Italy, it was possible to proceed to a teleconference with Mr Rossini, who was responsible for delivering 4 Modules, however was informed for the rest of the modules and was eligible in providing relevant comments for the rest of the Modules. The main comments received referred to the fact that the majority of the modules were interesting though difficult to understand and in some Modules the technologies mentioned were found to be far from the present day. Regarding Module 5 it was stated that the teacher received many negative comments, due to the fact that he was not prepared to deliver it. The participation of the students was high in all modules and the modules were considered very satisfactory. Regarding the quality of the Modules it was mentioned that it was high, however the time was limited thus it was not possible sometimes to provide all the information included in the presentations adequately.

From Portugal, it was possible to proceed to a teleconference with Mr Mateus, who was responsible for delivering Module 6, whereas written answers were also received by Mr Sinclair, who delivered Modules 3 and 7. The main comments regarding Module 6 was the limited time, although the students were interested in it. The quality of the module was considered to be high. Regarding Modules 3 and 7 it was mentioned that in general the participation would be greater if there were practical sessions also, whereas the limited time was also stated. The quality of the modules and the organization of the workshop was considered to be good.

2.3.2.2 Seminars

For the evaluation of the pilot training sessions the same evaluation toolkits were implemented. A relevant report providing statistically the data received by the trainees through the evaluation toolkits is provided by BEST. The data is presented per target country, since the evaluation was implemented to the teachers of the courses and the organization of the seminars, which differs from country to country.

It should be mentioned that questionnaires were not received from all trainees. The total number of the certified trainees achieved in all countries was 1556.

2.3.2.3 Evaluation of the project outcomes from the members of the EAB

From the initiation of the project, a relevant procedure began in order to establish the members of the Expert Advisory Board (EAB) of the project. The members of the EAB are experts in the field of the nZEBs and shall provide their valuable help in the evaluation of the deliverables prepared during the project. The members were initially proposed by the partners of the consortium and then a voting procedure followed, in which all members of the consortium participated and from which 5 members occurred on July 2014. The members of the EAB are the following:

- Giannadakis Athanasios
- Helder Gonçalves
- Eduardo Maldonado
- Joseph Andrew Clarke
- Ioannis Michaelides

During the development of the training modules, it was proposed by the Work Package leader and accepted by all partners the members of the EAB to review the modules and provide relevant comments in order to improve their quality before the initiation of the trainings. During the meeting in Rovereto, a timetable was set in which the partners were the internal reviewers of the modules and the members of the EAB were the external reviewers of the modules. The modules were distributed per partner and per member of the EAB and the following table occurred:

		Review process	
Module	**Partner**	**Internal Reviewer**	**External Reviewer**
1	CUT	Uminho	Mr Gianadakis
2	DTTN	CUT	Mr Gianadakis
3	BRE	DTTN	Mr Goncalves
4	Uminho	BRE	Mr Michaelides
5	BRE	GARNET	Mr Goncalves
6	IST-ID	UPATRAS	Joe Clarke
7	BRE	IST	Joe Clarke
8	UMinho	KEK	Mr Michaelides
9	GARNET	BEST	Mr Gianadakis
10	BRE	BEST	Mr Maldonado

Table 3: Distribution of modules per internal and external reviewers

Besides the review received at that time, at early 2016 the Coordinator send them an email informing them on the progress of the project and asking for their review on the deliverables till then, which is an outcome for the Evaluation of the project. The communication with the members of the EAB continued through the months, whereas no responses were received. The deadline for the review was extended as a result of the extension of the project. The reviews from Mr Giannadakis and Mr Michaelides were received on January 2017, whereas the review from Mr Clarke was received on February 2017.

Referring to Mr Giannadakis' review it should be mentioned that the review referred to all deliverables provided from February 2016. The main comments stated that the quality of the material developed for the training modules was high, however an essay might be necessary in order the students to comprehend better the contents of the training modules. It is stated that although the information at the beginning of the modules may seem basic, it is essential taking into account the different background of the students. Also, the assessment tests were found to be adequate. Regarding the Work Package 2 it is mentioned that the deliverables are consistent and well-established. The portal is found to be quite satisfactory and user-friendly, however the constant update of the funding section is mentioned.

Referring to Mr Michaelides' review it is mentioned that the project was successful in meeting its main objective to develop the training modules focusing on the needs of the professionals in Southern Europe. It is stated that the presentations of each training module were well organized and the quantity of slides was adequate for the time provided, whereas the quality of the content is high. The local context of the presentations is mentioned, as well as the practical aspects of the presentations and overall the presentations are considered to be more than appropriate for the purpose proposed. Concerning the rest of the deliverables, the uniformity and structure are considered appropriate. Moreover, it is stated that they provide concrete conclusions concerning the subject analysed. Regarding the website, it is mentioned that it is well structured and consistent in terms of style structure, however it is mentioned that the "News" section

should be updated. Concerning the SouthZEB portal it is stated that it is well-structured and very useful to the professionals.

Referring to Mr Clarke's review, it is mentioned in general that the material developed provides the impression of a substantial body of high quality work that will have a noticeable impact on practitioner capability and challenge readiness. In overall, the project met its objectives and represents a valuable contribution to the field. Regarding the deliverables in Work Package 2 it is mentioned that the review material is in general of high quality and it provides insight in the views of the project partners (D2.2). For the Deliverables in Work Package 3, it is mentioned that the contents of the modules prepared are well-conceived, structured and likely to be impactful in practice. Referring to the portal it is stated that it seems to be well progressed and the operational status of the website was confirmed. The assessment plan in Work Package 6 was considered to be significant in highlighting learning principles and key requirements. Last but not least, regarding the Deliverable D7.2 the approaches mentioned for the dissemination channels seem to be appropriate and thorough.

The reviews are provided in Appendix E.

2.4 THE EVALUATION OF THE WORKSHOPS

The objective of this evaluation report drafted by BEST is to compile and present the results of the evaluations made by the Cypriot, Greek, Italian and Portuguese participants involved in the 10 “train the trainer workshops” (WP5, T1), following the common evaluation procedure and toolkits developed by UPATRAS (WP5, T3; see Appendix F), specifically:

- Participants’ Evaluation Questionnaire – set of 17 closed questions to collect the formal feedback about the various pedagogical and logistic aspects of the workshops;
- Trainers’ Evaluation Questionnaire – set of four open questions aiming to summarise the informal feedback collected during the workshops;
- Teachers’ Interview Questions – to approximately 10% of the total number of trainers to collect further comments to four open questions;
- Observers’ Report - set of 12 open guided questions aiming to collect the external overview of specific modules delivery;
- Teleconference meeting – carried out with the responsible person of each module following a guide of five open questions, in order to get feedback on the quality of the workshops.

A total of 173 participants attended the workshops organised in these countries, 96 in Italy, 34 in Portugal, 27 in Greece and 16 in Cyprus. The number of trainees varied from module to module, with exception of Italy. Regarding to the number of evaluations received, only in Greece and Italy all participants evaluated the respective workshops; in Cyprus and Portugal some trainees didn’t provide their evaluations.

	CYPRUS (*/)**	**GREECE (*/**)**	**ITALY (*/**)**	**PORTUGAL (*/**)**
Module 1	15/16	27/27	96/96	28/34
Module 2	11/15	27/27	96/96	22/34
Module 3	10/14	15/15	96/96	11/22
Module 4	11/15	13/13	96/96	15/26
Module 5	8/14	9/9	96/96	18/26
Module 6	10/12	14/14	96/96	13/21
Module 7	9/12	19/19	96/96	13/23
Module 8	9/11	19/19	96/96	20/32
Module 9	9/11	19/19	96/96	12/19
Module 10	8/13	9/16	96/96	18/22

*Nr of evaluations received
**Nr of participants

The present report is based on received evaluations and presents in each section the average results per country and per modules. At the end, conclusions are drafted, and key recommendations for improvement of each module provided.

Cyprus

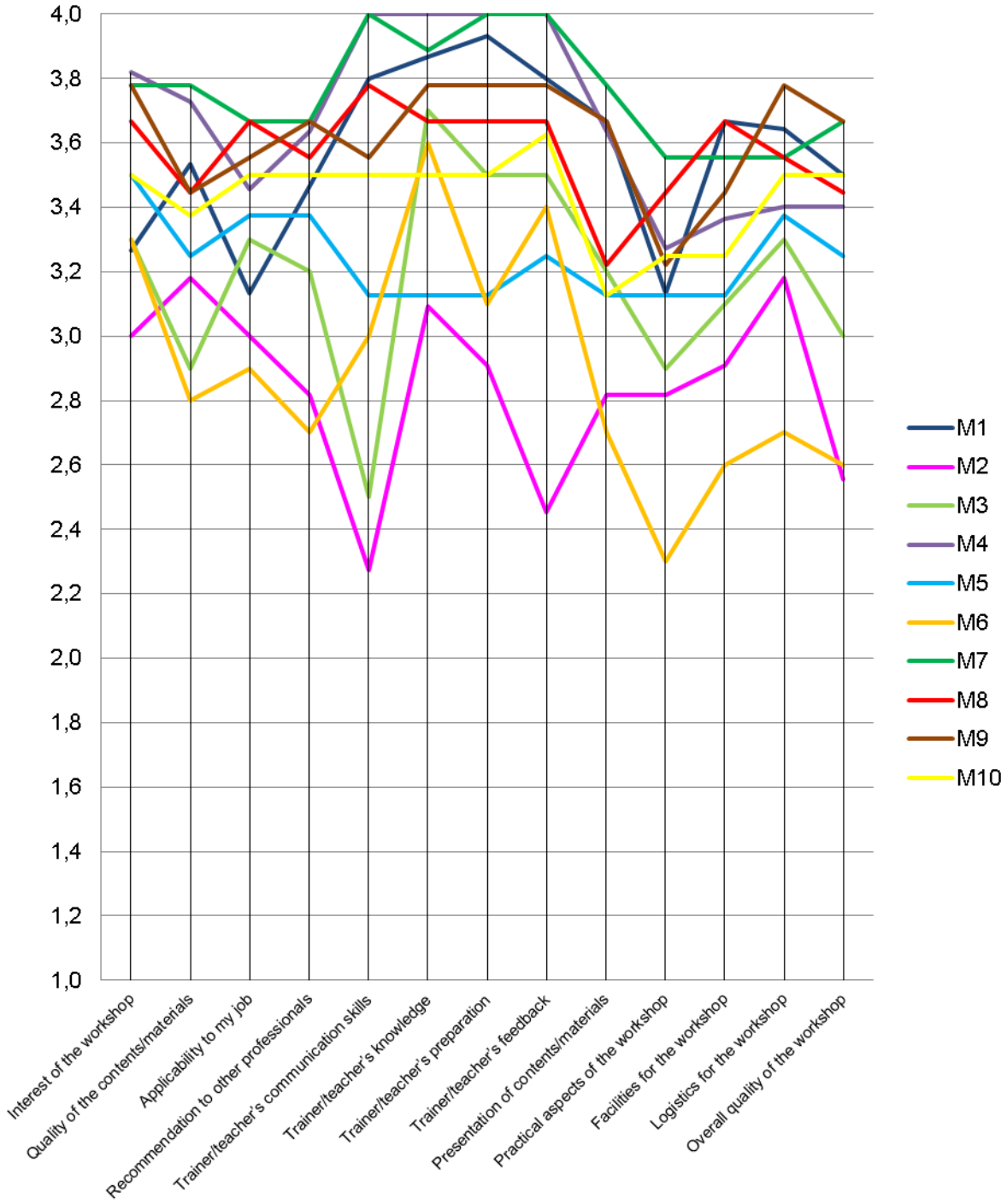


Figure 1: Cyprus – trainees' evaluation: questions 1-13

In some workshops, the level of teacher´s knowledge was well evaluated although their communications skills were low-moderate.

The workshops show high levels in the first 4 points of evaluation, not lower than 2.6

M6 shows the largest spread in evaluation from 2.2 to 3.6

The lowest value of 2.1 occurred two times in all modules, but the highest of 4.0 four times. On the other hand M5 shows very continuous value distribution, 3.5 to 3.1 over all issues.

Three times a very significant decrease of usability was observed for modules M1, M3, M6.

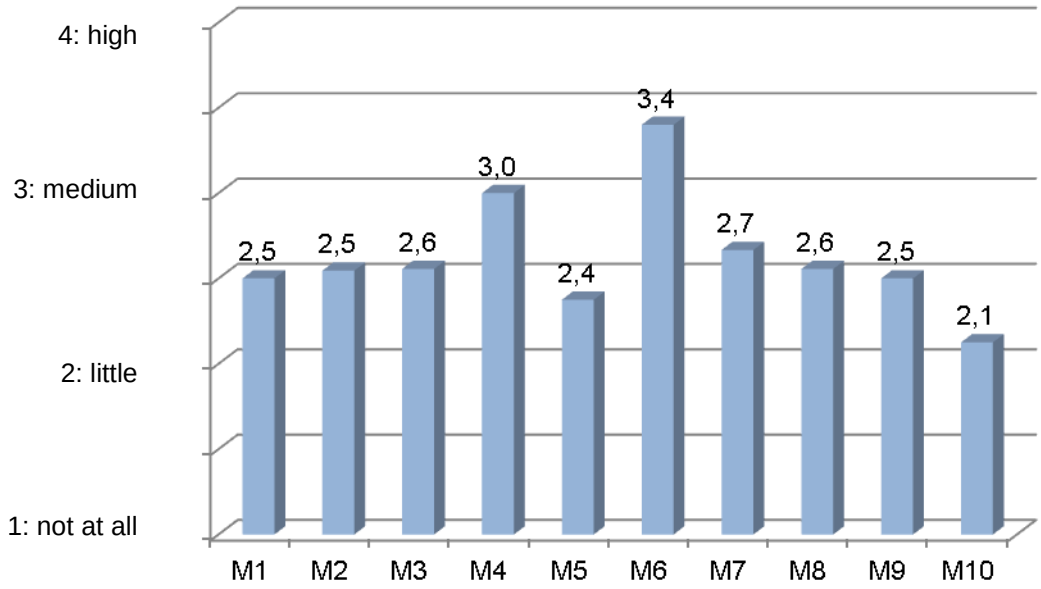


Figure 2: Cyprus – trainees' evaluation: difficulty level of the workshop

The spread of the evaluation data regarding difficulty levels is low from 2.1 to 2.5, except M4 and M6, from which one can expect, that this is dependent on the former qualification and experience of the trainees.

M4 and M6 seem to be more difficult to the trainees, M4 (thermal comfort) and M6 (software implementation) seem to be more difficult for trainees with more technical background.

The other modules are evaluated with very similar values of about 2.5 in average, which clearly concludes a very homogeneous level of quality in training, content and presentation.

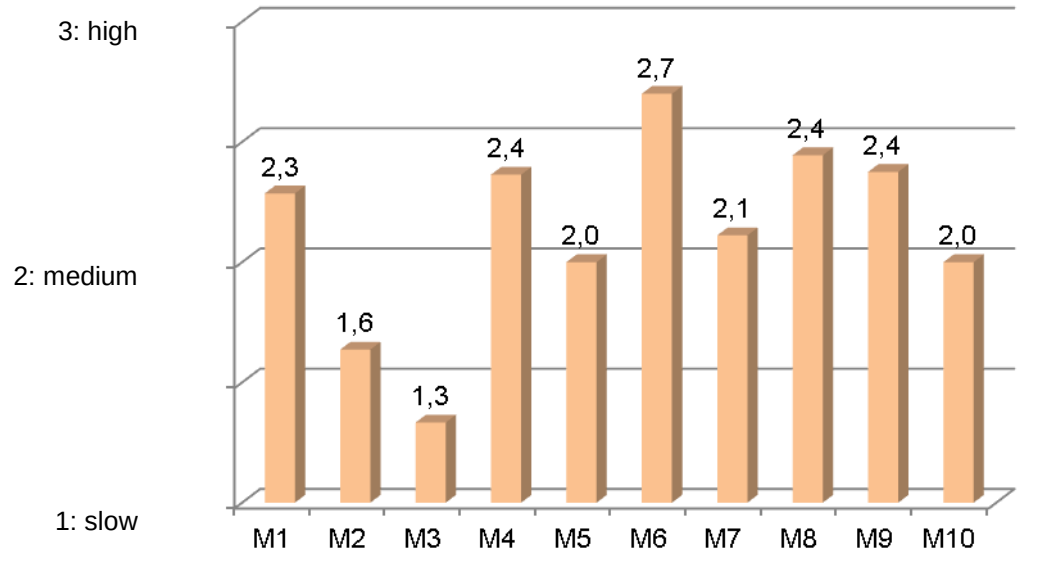


Figure 3: Cyprus – trainees' evaluation: pace of the workshop

It can be observed that the highest value of pace evaluation 2.7 occurred at the software dominated M6, probably due to high input and content. Time management for this module should be evaluated in coming projects.

M3 on the other hand is valuated with 1.3. This can be explained due to practice of written examples of u-values, which needs more time and explanation. Also M2 shows a very low value of 1.6, other modules are located at the average value of 2, so pace management is found to be medium.

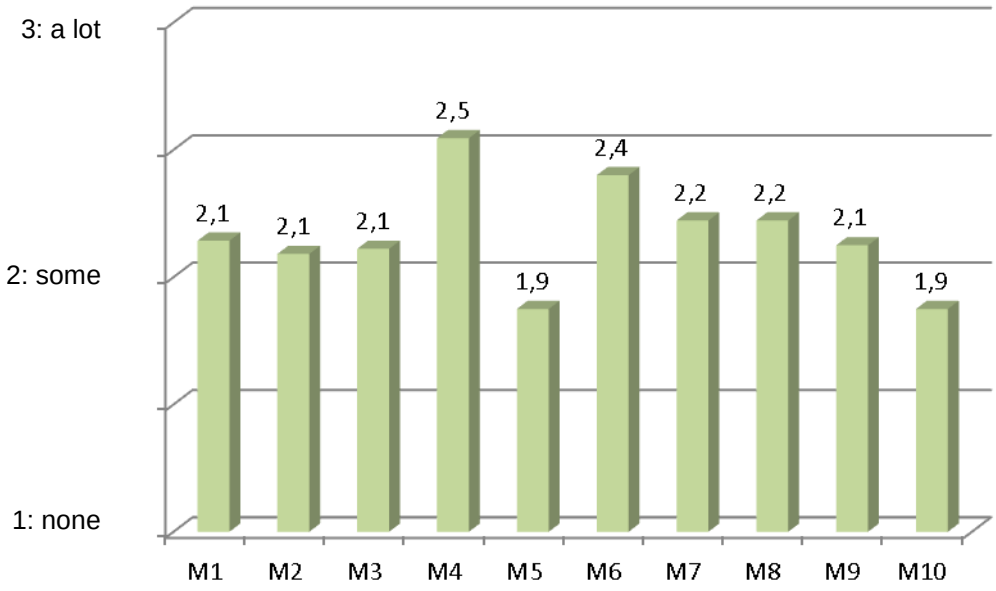


Figure 4: Cyprus – trainees' evaluation: new knowledge gained with the workshop

Corresponding to the analysis of difficulty levels M4 and M6 display the highest values of new knowledge gained. In combination of both analysed issues it may be assumed that new knowledge was given to the trainees despite the higher difficulty level.

But overall some new knowledge was gained with a very homogeneous distribution.

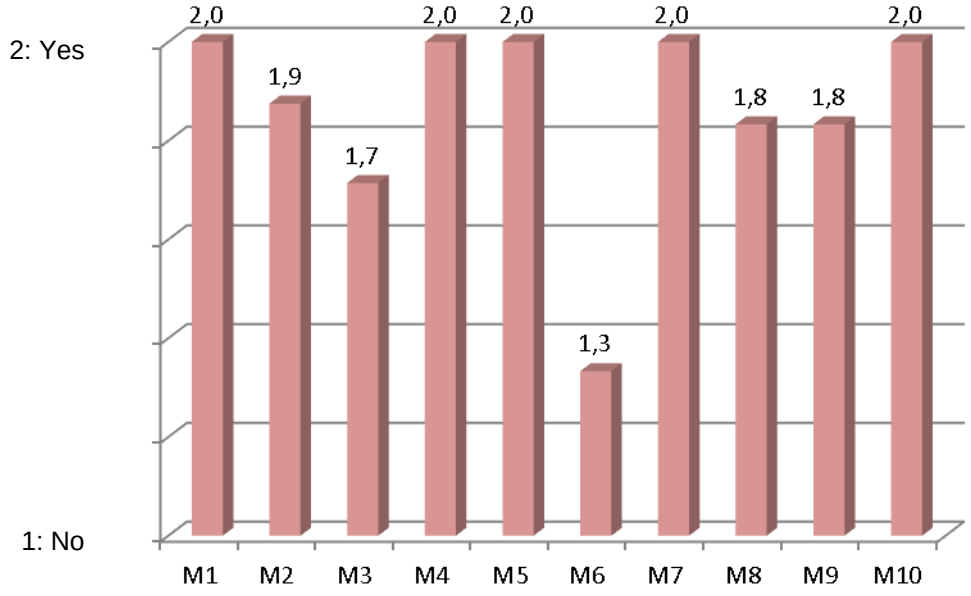


Figure 5: Cyprus – trainees' evaluation: satisfaction with the workshop

Satisfaction with the modules was high over all, but the outstanding low value for M6 needs more clarification. One can assume, that M6 needs more time for education and/or explanation looking on the results of gained new knowledge.

It seems clear, that the implementation of new software tools (like M6) needs extensive for explanation and practice with exercising examples.

	Most valuable aspects	Least valuable aspects	Unclear aspects	Improvement aspects	Not covered aspects
M1	Discussion and exchange of experiences between architects, engineers etc.	Assessment	None	Interview instead of assessment; Less information about directives and national legislation	None
M2	Discussion with professionals about the local climate adaptation strategy	None	None	Some practical application	None
M3	NDA	NDA	NDA	NDA	NDA
M4	Multidisciplinary background of the students	Details about national regulations	None	Team-working exercise at the beginning - more group dynamic	None
M5	NDA	NDA	NDA	NDA	NDA
M6	Demonstration of a robust energy simulation software; Practical experience	None	None	More time (->2 days) for the workshop	None
M7	Multidisciplinary background of the students	Presentation with too many technologies left a lot of questions and not enough time to discuss them all	None	Either reduce the number of low carbon technologies or spread it over two modules and go into greater depth	None
M8	Deep knowledge given in nZEB	Too many details about other southern countries	None	Reduction of the material concerning other countries; Better translation of the text from English to Greek	None
M9	Interaction with attendees	Technical coverage of the solutions	None	Review of all the modules in order to avoid repetitive explanations; More time for the	None

				commissioning part	
M10	Financial incentives	Details about regulatory measures	None	Examples of effective ways of funding	Innovative measures of funding nZEB

Table 1: Cyprus – trainers' evaluation

Data for M3 and M5 weren't reported.

According to the observations of former evaluation data, M6 needs more time for explanation and discussion

Major improvements are suggested in terms of replacing the assessment with interviews and concentrating more on national legislation to avoid too many details of other countries. M7 should be reduced in the number of examples. Regarding the satisfaction of the participants it was mentioned that it was high in all modules.

Team working was recognized as a good tool in training to enhance group dynamics and trainees interaction. The participation was really high in every module and all participants had great experience.

Only less information is given for unclear aspects, but innovative measures of funding is needed and should be improved.

In general the content of the Modules was of high-quality and well-prepared.

	Training procedure & time management	**Trainees' queries**	**Teacher's feedback**	**Practical aspects**	**Trainees' interest, interaction and feedback**
M1	Well organized; Very efficient time management	HVAC systems	Very polite and clear	Well presented; Most of the trainees understood the exercise, about half of them knew its solution.	Very interested trainees and lively interaction
M2	Well organized; Good time management in general; Much time was spent on clarification	Natural ventilation	All questions got satisfactory answers.	No practical exercises	Lively interaction, but the trainees weren't always interested.
M3	Well organized; Time management in general ok, some examples took too long	Calculation details regarding U-values and thermal bridging additional losses factors	The teacher explained well all questions.	Well presented; Most of the trainees understood the exercise, only about 10% knew its solution.	Very interested trainees and lively interaction
M4	Well organized; Very efficient time management	Definitions of thermal comfort	All questions got satisfactory answers.	Well presented; Most of the trainees understood the exercise, only about 10% knew its solution.	Very interested trainees and lively interaction

M5	Innovative training; Very efficient time management	Construction details on listed buildings	The teacher clarified all raised questions.	Well presented; Most of the trainees understood the exercise, about 25% knew its solution.	Very interested trainees and lively interaction
M6	Well organized; The teacher took a bit more time than anticipated in explaining some aspects.	The functionalities of Energy Plus software.	The teacher clarified all raised questions.	Well presented; All the trainees understood the exercise, nobody knew its solution.	Very interested trainees and lively interaction. Some complained about lack of experience in 3D modelling.
M7	Well organized; Very good time management, still more time is needed.	Various new technologies and possible applications	The teacher explained thoroughly all raised questions.	Well presented; Most of the trainees understood the exercise, about 30% knew its solution.	Very interested trainees and lively interaction
M8	Well organized; Good time management	Application of various systems (HVAC, lighting, RES, etc.)	The teacher explained all raised questions.	Well presented; Most of the trainees understood the exercise, about 15% knew its solution.	Very interested trainees and lively interaction
M9	Well organized; Good time management	BIM model	The teacher clarified all raised questions.	Well presented; Not all the participants understood the exercise, nobody knew its solution.	Quite interested trainees and lively interaction
M10	Well organized; Good time management	Funding schemes	The teacher explained the questions raised by the participants.	Well presented; Almost all the participants understood the exercise, nobody knew its solution.	Very interested trainees and lively interaction

Table 2: Cyprus – observers'' evaluation

Analysis shows a very high degree of teachers' feedback and practical aspects with 10% to 30% of trainees knowing the solutions of the exercises.

Time management was good and the modules were well organized. Time management should be improved for M7, like mentioned by observation and some examples should be reduced in extent, like mentioned for M3.

Trainees were very interested and lively interaction was developed during all modules. The participants knew the solution in most modules and the teacher explained the questions raised by the participants.

Greece

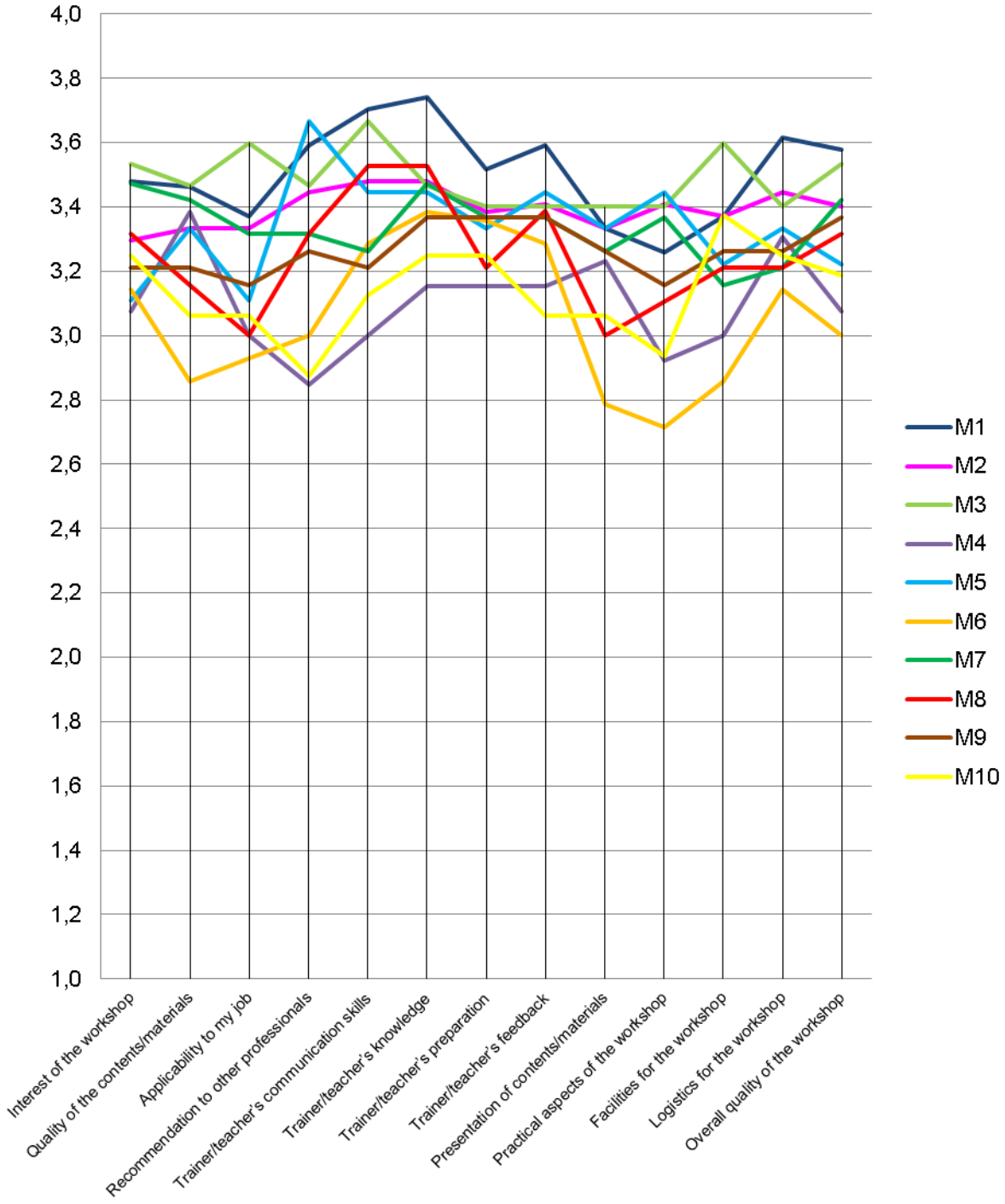


Figure 6: Greece – trainees' evaluation: questions 1-13

The variation of the data distribution is low compared to other evaluations (2.7 to 3.7), despite the levels of module quality are in a high range in general. A possible explanation can be related with the fact that content and module preparation, as well as teacher's knowledge and presentation skills, were highly satisfying for the trainees.

Surprisingly M6 (software) showed the lowest value of 2.7 because of practical aspects.

In general all the modules are characterized by a high degree of sufficiency.

M2 is the most stable module on a high evaluation level of about 3.4.

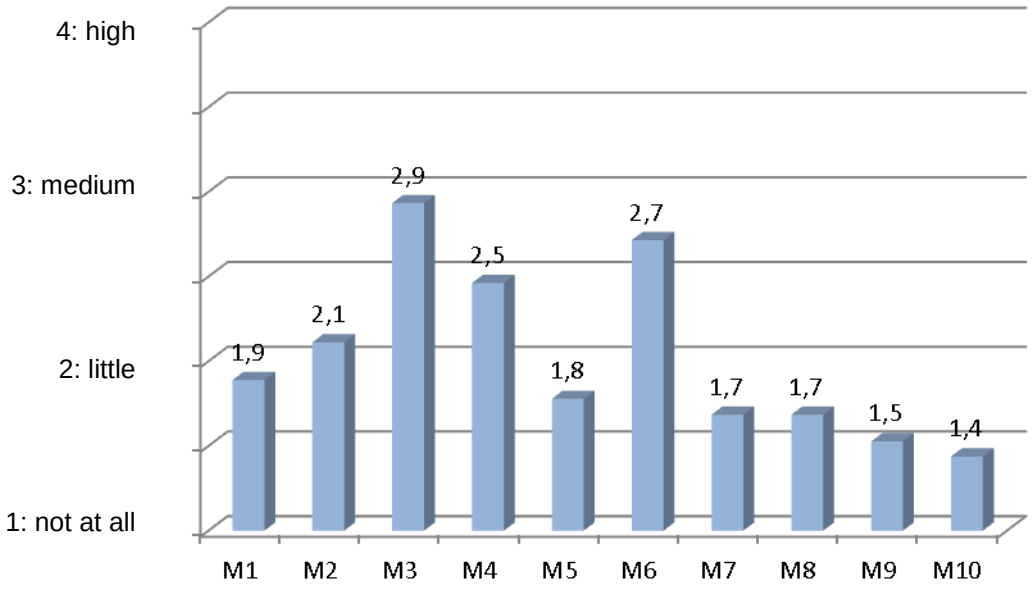


Figure 7: Greece – trainees' evaluation: difficulty level of the workshop

The analysis of the difficulty levels showed some remarkable aspects. M3 (thermal bridging) and M6 (software), two very technical and practically oriented modules, are declared to be most difficult (2.9 to 2.7), all the other modules seem very easy for the trainees with significantly lower values. The other modules have significant lower difficulty levels of about 1.9 to 1.4, especially M7 to M 10 are modules with almost no very prominent difficulty levels.

It would be helpful to know more about the specific professional background of the trainees for analysis. Obviously a lot of knowledge was already available to the trainees and/or a very well presentation of the modules content was performed by the trainers involved.

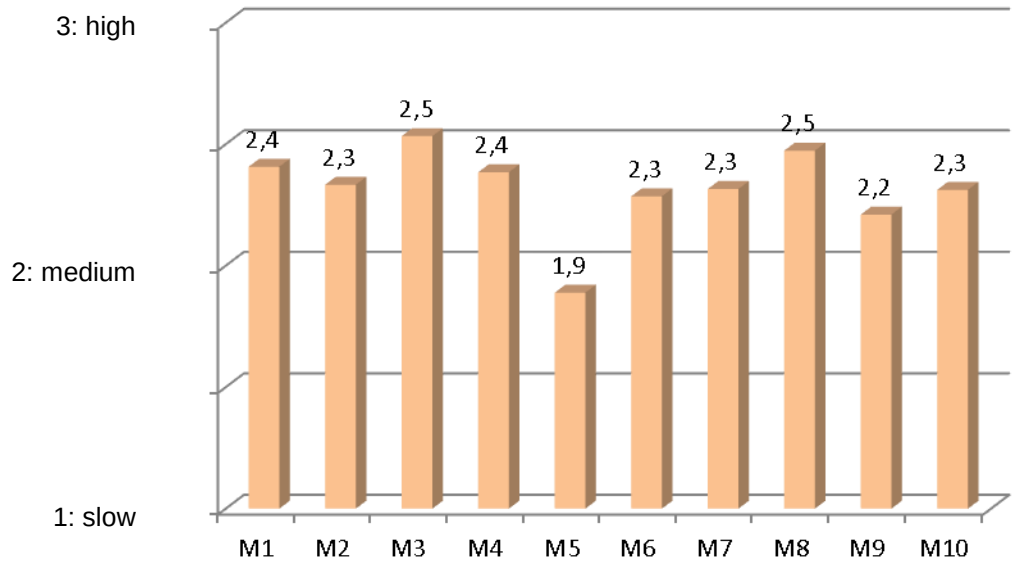


Figure 8: Greece – trainees' evaluation: pace of the workshop

Except M5, the distribution of the pace evaluation is homogeneous with small variations (2.2. to 2.5), so one can assume, that the time management for these modules was well prepared.

The lower value of 1.9 from M5 can be interpreted as a very useful training organisation and time management, if compared to the results of difficulty (1.8 low) and high knowledge transfer (2.2 as maximum of evaluation for gain of knowledge).

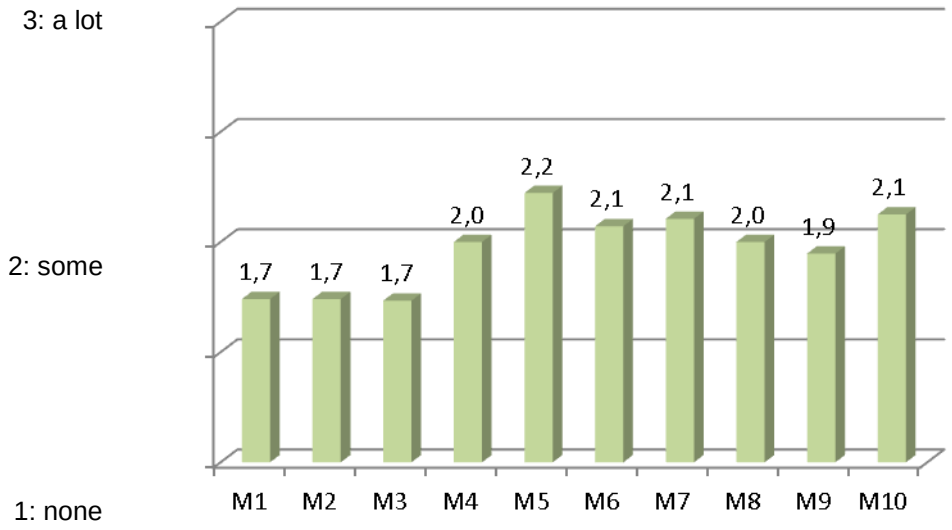


Figure 9: Greece – trainees' evaluation: new knowledge gained with the workshop

The contents of the modules are already known by the trainees, so only some new knowledge gained with the workshop.

The content and/or presentation of modules M1 to M3 should be improved because of low values of 1.7 to increase new knowledge given to the participants.

But because the average value observed is only about 2.0 corresponding to medium level, this could be valuable for all modules. Of course this depends on the education and pre-knowledge of the participants.

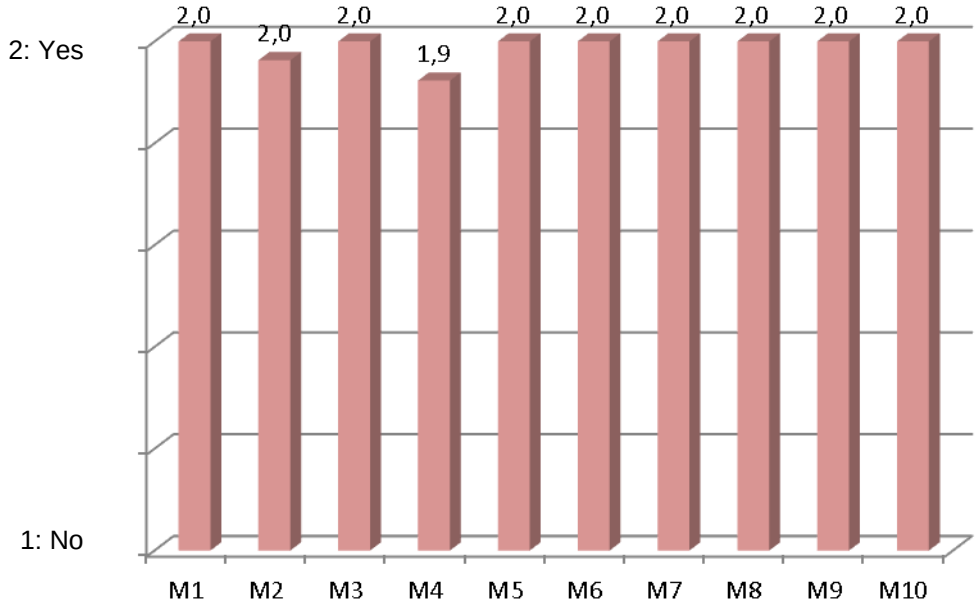


Figure 10: Greece – trainees' evaluation: satisfaction with the workshop

The analysis of satisfaction with the modules evaluates a very high degree through all modules. The organisation and performance was obviously very satisfying to the trainees in general for all modules.

	Most valuable aspects	Least valuable aspects	Improvement aspects
M1	Thermal insulation; Types of constructions	None	Clarification of rating as an nZEB building
M2	Passive systems; Bioclimatic design; Renewable energy systems; Comfort internal conditions	None	Presentation: more time (+1 day) for more details
M3	Technical discussions with experts	EU legislation aspects (focus on GB and Middle Europe)	Focus rather on the situation of Southern Europe
M4	Examples of thermal comfort assessment; Different points of view	None	None
M5	Interesting variety	Too many details	Focus on Greece
M6	Feeling of getting in contact with real projects	None	Presentation and use of a software for working on a project
M7	Energy strategy nZEB; Total energy resources; Solar systems; BIPV systems; Small size wind turbines; Cost optimality in nZEB; Methodology	None	Presentation: more time (+1 day) for more details
M8	Topic in general, needed in Greece	Solutions out of Greek reality	Analysis of Greek reality; Focus on Greece and its (financial) problems
M9	Bioclimatic and thermodynamics	None	Fewer details in some aspects
M10	UK-example: involvement of the energy supplier for energy saving in buildings	None	Examples also from outside the UK, proposals for Greece

Table 3: Greece - trainers' evaluation

Trainers' evaluation analysis results in mainly two aspects, namely the technical discussion and energy strategies and getting in contact with real projects and energy strategy dealing with nZEB are the most valuable aspects. On the other hand in some cases too many details are shown in the presentations. Especially more focus on the Greek situation and Greek reality is required as well as clear rating of nZEB buildings.

Like in many other cases throughout this evaluation more time for some modules, here M2 and M7, should be planed for coming presentations. Discussion of more details is required in the frame of presentation.

	Training procedure& time management	Trainees' queries	Teacher's feedback	Practical aspects	Trainees' interest, interaction and feedback
M1	Well organized; Good time management	Definition of nZEB	The teacher answered thoroughly all questions.	No practical exercise	Interested trainees and lively interaction
M2	Well organized; Good time management	Technical physics issues and new technology materials	The teacher answered thoroughly all questions.	Well presented; Most of the trainees understood the exercise, about	Interested trainees and lively interaction

				30% knew its solution.	
M3	Well organized; Good time management	Humidity and active directives	The teacher answered thoroughly all questions.	Well presented; Almost all the trainees understood the exercise, about 25% knew its solution.	Interested trainees and lively interaction
M4	Training within the scope; Good time management	ASHRAE 55 & EN 15251	The teacher answered thoroughly all questions.	No practical exercise	Interested trainees and lively interaction; Several discussions between participants
M5	Well organized; Good time management	Greek regulations	The teacher answered thoroughly all questions.	No practical exercise	Interested trainees and lively interaction
M6	Well organized; Good time management	Accuracy of the energy demand estimations based on software tools	The teacher answered thoroughly all questions.	Almost all the trainees understood the exercise, about 20% knew its solution.	Interested trainees and lively interaction
M7	Well organized; Good time management	Cost changes and the new technologies; Financial basis	The teacher answered thoroughly all questions.	Well presented; Most of the trainees understood the exercise, about 50% knew its solution.	Interested trainees and lively interaction
M8	Well organized; Good time management	Efficiency of the various measures	The teacher answered thoroughly all questions.	No practical exercise	Interested trainees and lively interaction
M9	Well organized; Good time management	Latest construction standards for nZEB	The teacher answered thoroughly all questions.	Well presented; Most of the trainees understood the exercise, about 20% knew its solution.	Interested trainees and lively interaction
M10	Well organized; Good time management	Greek policy and legislation issues	The teacher answered thoroughly all questions.	No practical exercise	Interested trainees and lively interaction

Table 4: Greece – observers' evaluation

The training was well organized through all modules and teachers' feedback was satisfying to a very high degree. Discussions and lively interaction with interested trainees occur in all modules. Good time management was stated for every module and the trainees were interested in the issues presented.

The exercises were well prepared when taking into account, that 20% up to 50% (an outstanding high value) of the trainees knew the solutions of the exercises und understood the details.

Like observed for other evaluations, mainly questions of Greek regulations and the specific needs for technical realization of nZEB according to Greek situation were of high interest to the trainees.

Italy

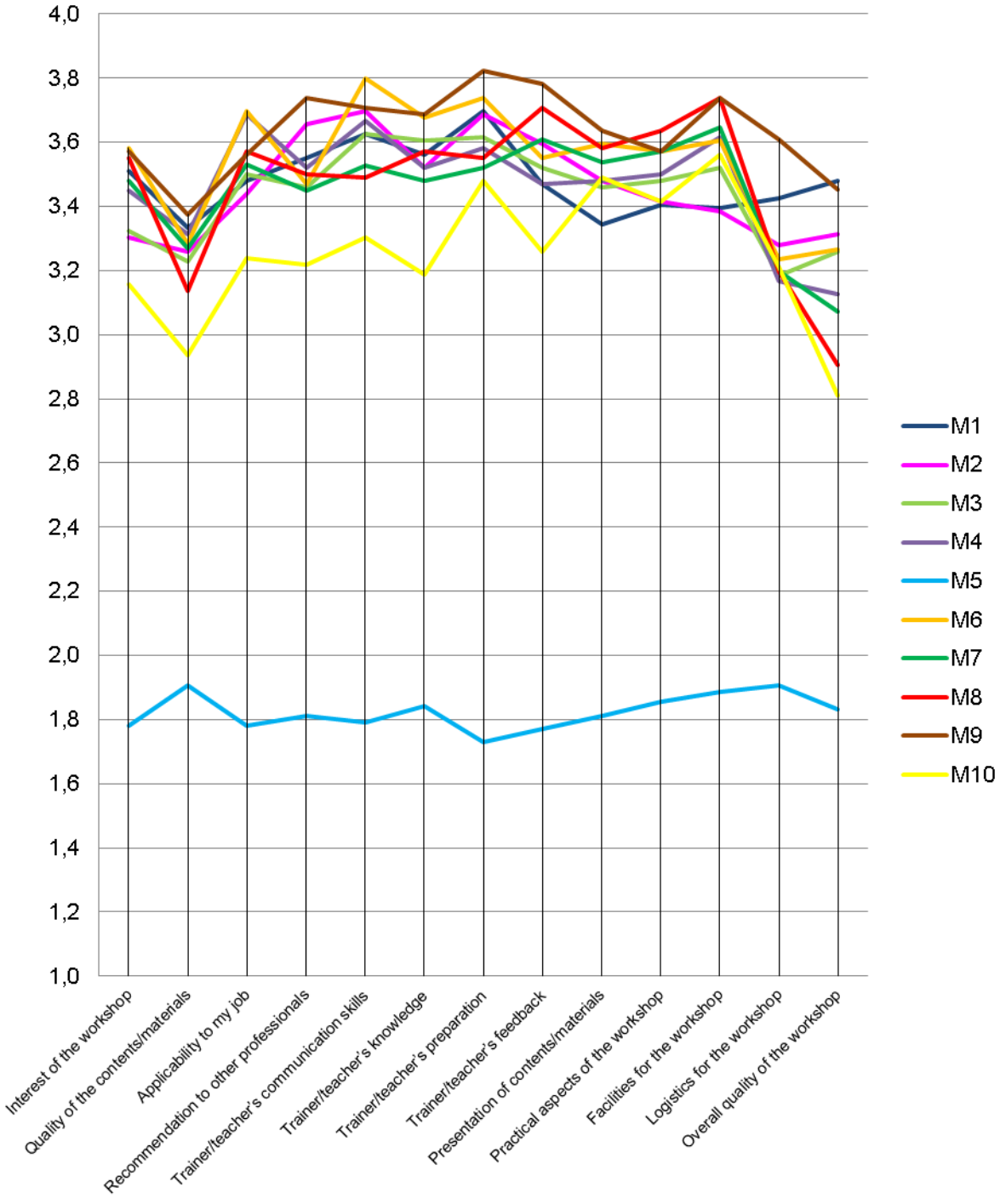


Figure 11: Italy – trainees' evaluation: questions 1-13

Except M5, the variation of the data distribution is low with a scatter of 2.8 to 3.8, over a wide range the data are very near to 3.5. So the participants were highly satisfied with the workshops and trainers performance. The variation of the data distribution is low in the range of 1.0 and the levels of module quality are in a high range in general. One can assume that content and module preparation as well as teacher's knowledge and presentation skills were highly satisfying for the trainees.

A remarkable drop for most modules in terms of facilities and logistic for the workshop is observed, which occurs very prominent for M8 and M10.

Surprisingly M5 showed the outstanding lowest value of about 1.8 to 1.9, thus deeper analysis for improvement is necessary.

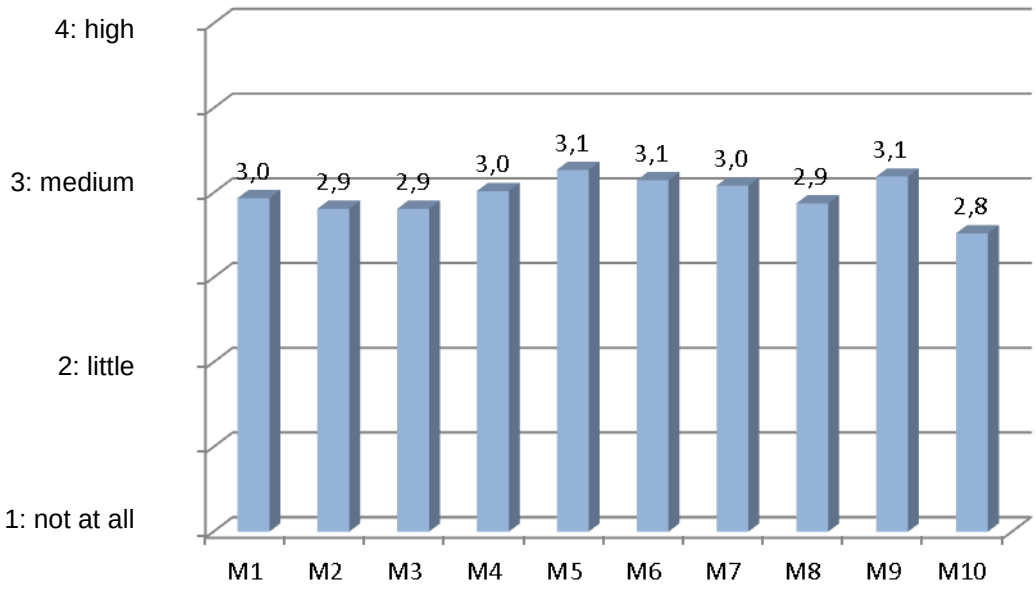


Figure 12: Italy – trainees' evaluation: difficulty level of the workshop

The analysis of modules' difficulty is characterized by a degree of medium throughout all modules with a small scatter from 2.8 to 3.1.

This is different to the evaluation of other data sets from other modules, where a wider spread in levels of difficulties can be observed. Here the modules are evaluated very homogeneously and no difference between more technical and legislative contents can be observed.

The presentations are obviously well prepared and presented in good agreement with the technical contents for different issues of nZEB.

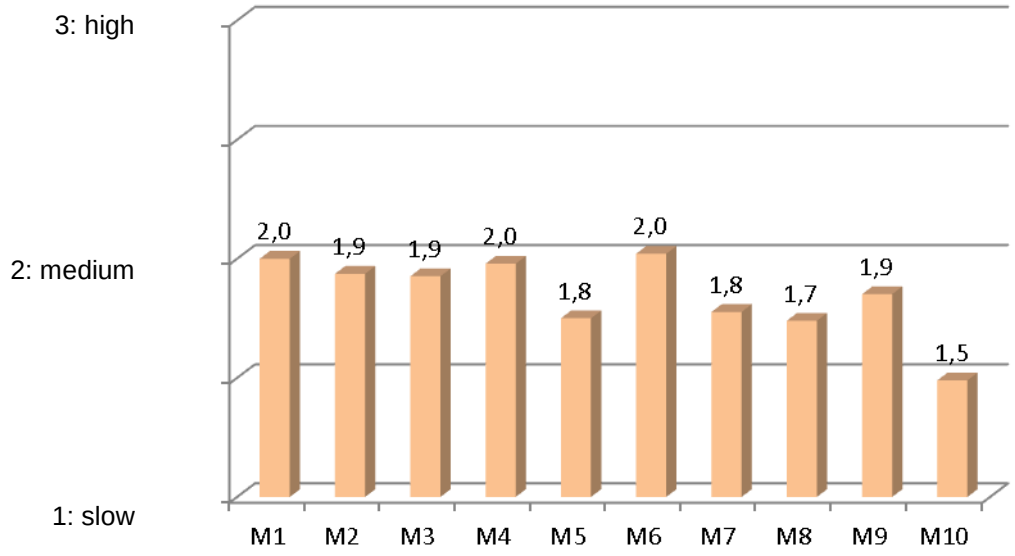


Figure 13: Italy – trainees' evaluation: pace of the workshop

Analysis of the pace data showed that medium or lower is observed for all modules, so it seems to be convenient for most of the trainees.

The slightly lower values M5, M7, M8 and M10 can be explained taking into account the very different technical issues of the presentations and are of no very significant extent.

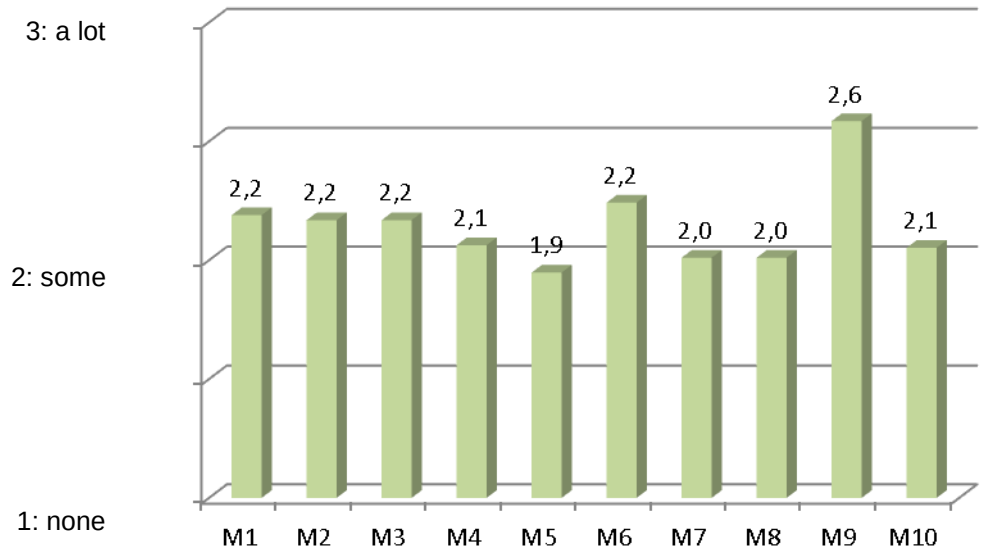


Figure 14: Italy – trainees' evaluation: new knowledge gained with the workshop

The distribution of new knowledge is almost stable and homogeneous about 2,0 with a small scatter (2.2 to 1.9), which is observed in most of the analysed data, except M6 and mainly in M9, where a higher rate of knowledge transfer is observed.

So the gain of knowledge for the participants is a very positive result for all modules.

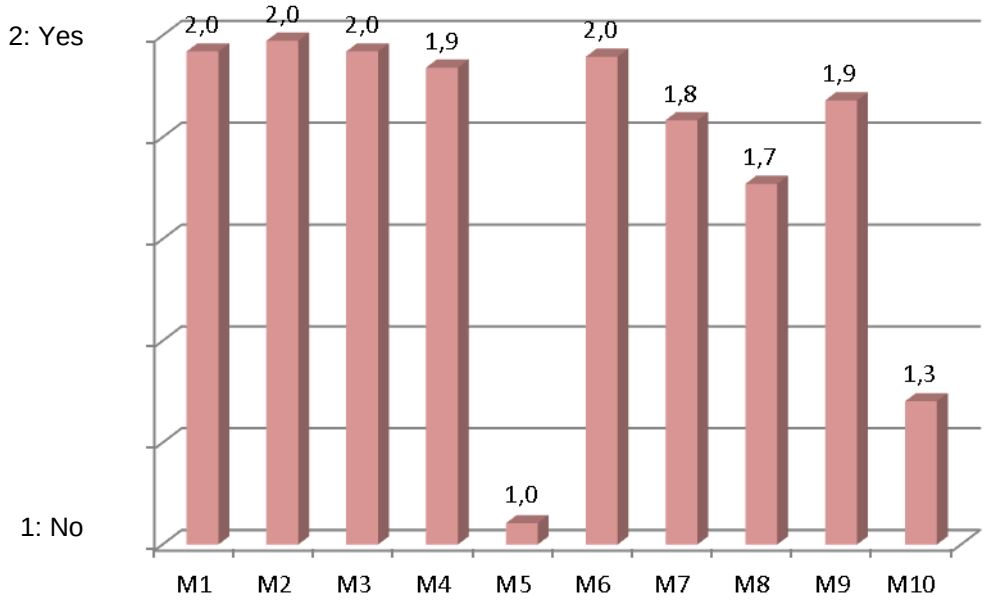


Figure 15: Italy – trainees' evaluation: satisfaction with the workshop

The distribution of satisfaction levels shows very high levels for M1 to M4 and M6 to M9 (low scatter from maximum value 2.0 down to 1.7), but a separated region is observed for the Modules M5 to M10, where the scatter is larger.

Results indicate that M10 and especially M5 can be improved and some major problems in presentation of the topic or other reasons can be also reflected.

	Most valuable aspects	Least valuable aspects	Unclear aspects	Improvement aspects
M1	Open discussion; Interest of trainees	Too many questions in the assessment	None	None
M2	Interest of trainees: Bioclimatic design and concept of comfort and passive houses	None	None	None
M3	Interest of trainees	Details about EU regulations	None	Less details, especially about EU regulation; More time for presentation; More details about Italian regulation and legislation
M4	Topic of “comfort”	None	None	None
M5	None	Difficult to follow and understand topic, presentation and assessment (nobody passed the assessment)	Presentation; assessment; translations	Review and improve Italian translation of the whole module; Less and easier slides; Review and simplify the assessment;
M6	Very interesting topic;	None	None	Simulate software use in practice
M7	Interesting topic in general	None	None	
M8	Important topic in Italy	None	None	Adaption of concepts to the local/southern reality; Maybe reduce the number of low carbon technologies discussed
M9	Details about Italy; Bioclimatic	None	None	Review Italian translation (all modules!)
M10	None	None	None	Add some other programs, not only from the UK

Table 5: Italy – trainers ‘evaluation

Analysis of this dataset showed some challenging issues. The topics of the modules are described as very interesting to trainees, but other points of least valuable aspects and improvements are more prominent.

Like could be observed in previous countries’ evaluations, the focus of the training should be concentrated more on local aspects of the different countries. Regulation and legislation for the specific region are more desirable than too much information about EU regulation in general.

Results suggest that would be important to review some of the translations. Especially in M5 but also in M8 a reduction in the modules' content will be helpful.

	Training procedure & time management	Trainees' queries	Teacher's feedback	Practical aspects	Trainees' interest, interaction and feedback
M1	Well organized and presented; Most of the time was spent on the presentation.	HVAC	The trainer showed good competences and skills to answer all the questions.	No practical exercise	Interested students and good interaction
M2	Time management: 90% concepts	Practical examples	The teacher was good in explaining the technical details.	No practical exercise	Active interaction; Most of the participants were interested.
M3	Good training procedure; Time management: 80% slides, 20% exercises	U-values and the commissioning activities; Details of thermal bridges	Good feedback	Well presented; Most of the participants understood the exercise, the majority knew its solution.	Very interested students; Good feedback and interaction
M4	Good training; Time management: 80% slides, 20% answers	Comfort topic; regulation parts (ASHRAE, UNI…)	Good technical answers	No practical exercise	Very interested students and good interaction
M5	The Module didn't seem to be prepared adequately: The presentation was difficult to understand and the trainer wasn't able to provide good explanation. Time management: 90% slides, 10% exam	Contents of presentation	The teacher was not enough expert to provide adequate answers. The class was not able to follow.	No practical exercise	The teacher tried to do her best in involving the participants but there have been so many questions that the time was mainly spent trying to answer them. The trainees were not bored but sometimes a little bit upset due to the difficulties to understand the contents. They preferred not to take the exam and suggested to review the contents of the slides.
M6	The teacher spoke clear and was an expert on topic. Time management: 80% slides, 20% examples and software simulation	Use of different software for designing nZEB	The teacher showed very well the contents.	Software tools; Most of the trainees understood the exercise.	Very interested participants and very good interaction
M7	Good teaching; Time management:	Different technologies for	The teacher explained very	Well organized;	Interested trainees and good interaction

	80% slides, 20% examples	nZEB buildings	well.	Most of the students understood the exercise, the majority found its solution	
M8	Good explanation; Time management: 90% slides, 10% examples and software simulation	Cost optimal renovation solutions	Good presentation of the contents and examples	No practical exercise	Interested trainees and good interaction
M9	The teacher showed good skills. Time management: 80% slides 20% questions	Due to the high curiosity in this new procedure, many questions have been posed.	The teacher was able to answer properly.	No practical exercise	Very interested trainees and high interaction
M10	Contents were not so easy but the teacher was good. Time management: 80% slides 20% questions	UK founding system	The teacher prepared a good module.	No practical exercise	Quite interested trainees

Table 6: Italy – observers' evaluation

Most of the modules are well organized in terms of time management and presentation with interested or very interested participants and very good interaction. The teachers showed good presentation skills and technical knowledge. When practical exercises were part of the specific module, the majority of participants found the solution.

Like mentioned in former analysis, sever problems occur in M5. The Module didn't seem to be prepared adequately: The presentation was difficult to understand and the trainer wasn't able to provide good explanation. Therefore many questions occurred and most of the time was consumed by trying answering them. The teacher was not enough expertise to provide adequate answer, but tried to do her best.

Portugal

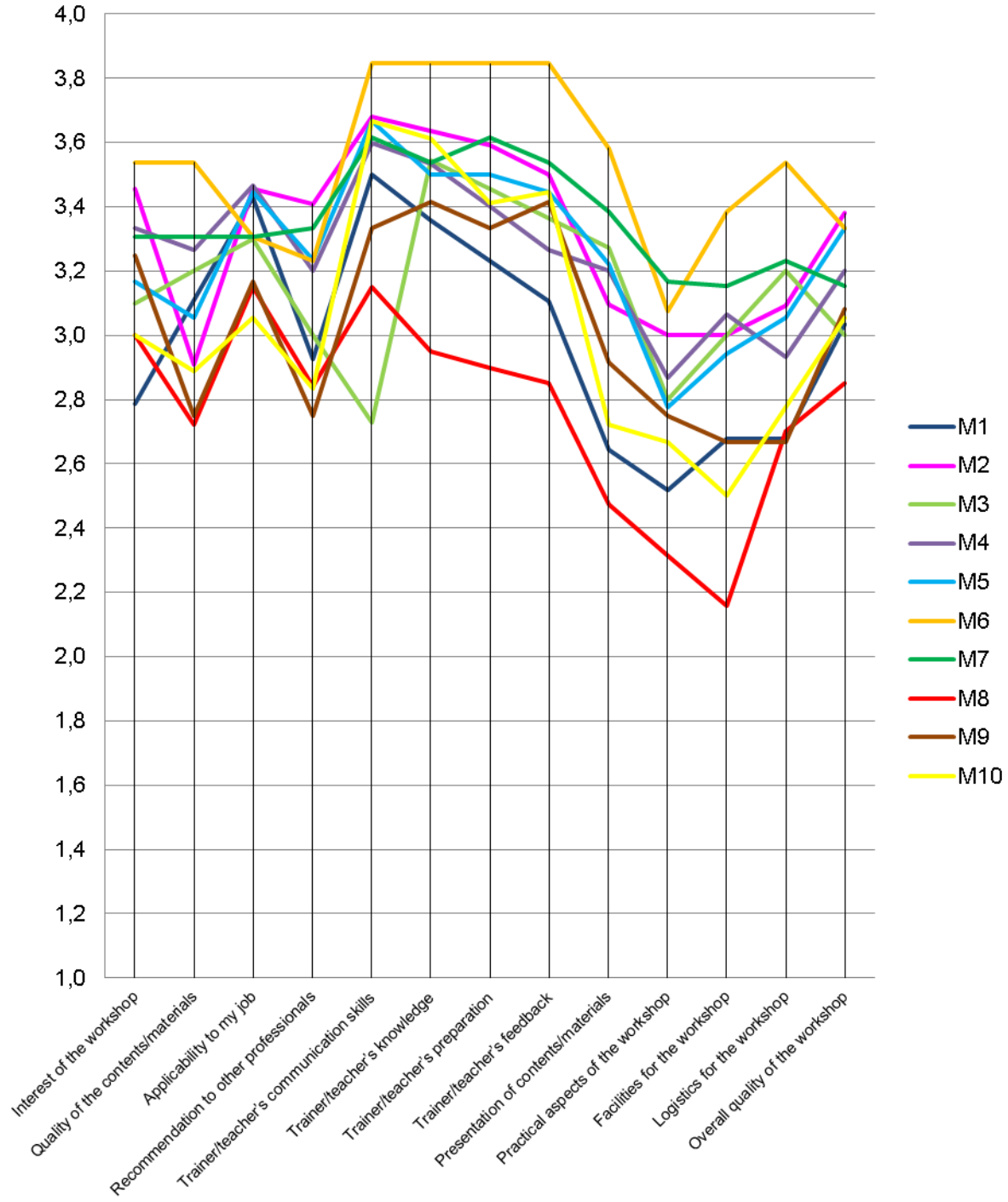


Figure 16: Portugal – trainees' evaluation: questions 1-13

The variation of the data distribution is high with a scatter of 2.2 to 3.9 compared to other evaluations, over a wide range the data are very near to mean value 3.2. So the participants were very satisfied with the workshops and trainers performance.

The variation of the data set shows two remarkable regions. One is an increase for communication skills of the teacher's quality and teachers' preparation. One can assume that content and module preparation as well as teacher's knowledge and presentation skills were highly satisfying for the trainees.

The second region of interest is a decrease of evaluation values in terms of practical aspects of the workshop and workshop facilities. For this section some improvement seems to be helpful.

M8 shows these observed results most prominently with the lowest value of the dataset (2.2) for facility evaluation. For this module some improvement is recommended.

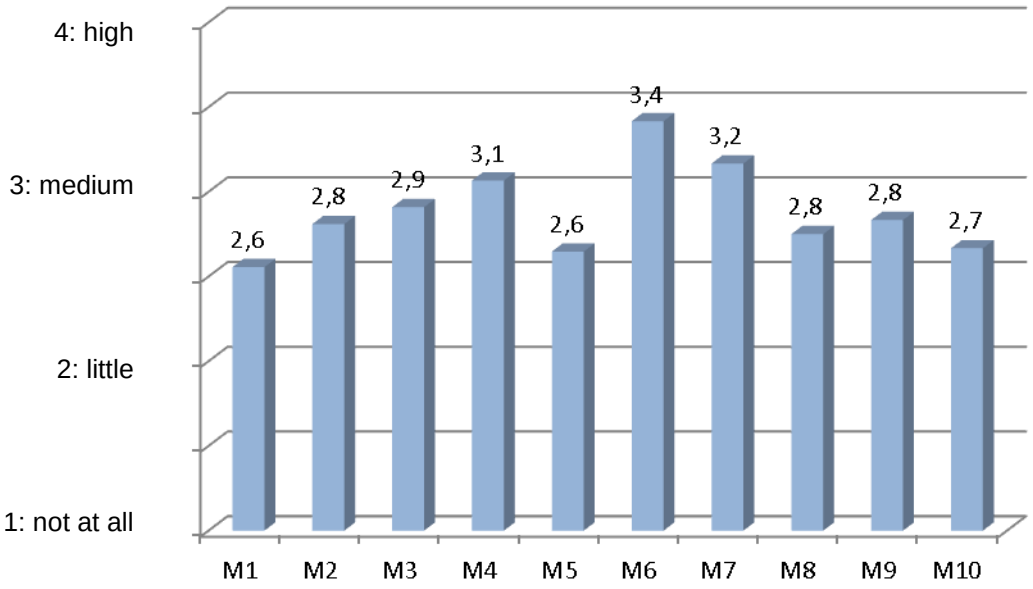


Figure 17: Portugal – trainees' evaluation: difficulty level of the workshop

The analysis of modules difficulty is characterized by a degree of medium throughout all modules with a scatter from 2.6 to 3.4, averaged nearly 2.9.

M4, M6 and M7 occur as the most difficult workshops compared to the rest of the distribution.

Over all, the modules are evaluated very homogeneously and no significant difference between more technical and legislative contents can be observed.

The presentations were obviously well prepared and presented in good agreement with the technical contents for different issues of nZEB.

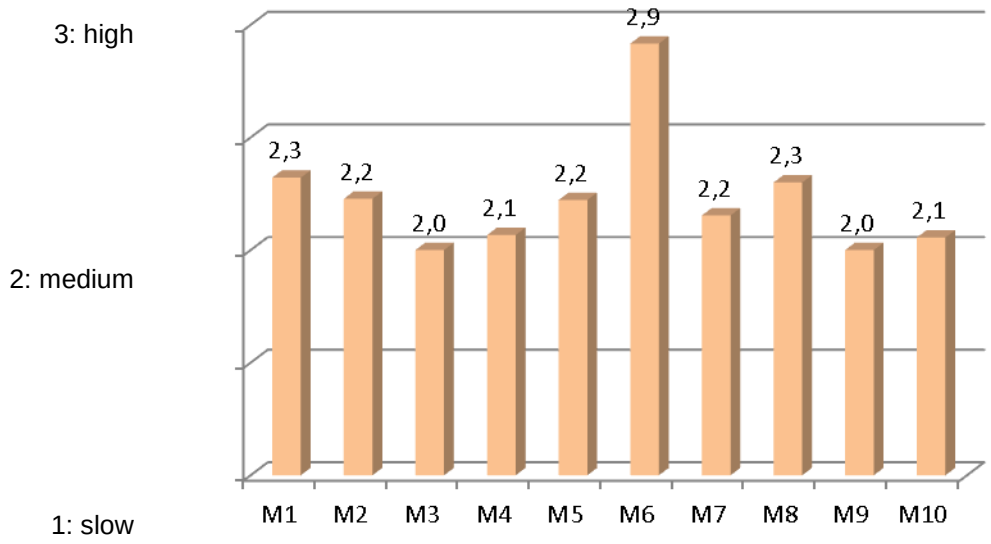


Figure 18: Portugal – trainees' evaluation: pace of the workshop

In this dataset pace evaluation is distributed very homogenous with a small scatter between 2.3 and 2.0, so pace of the workshops was medium for most of the trainees.

There is only one significant exception for M6 with an outstanding high value of 2.9, thus more information is needed for interpretation of this result, but it can be compared to the high level of difficulty and the highest value of gained knowledge for this module.

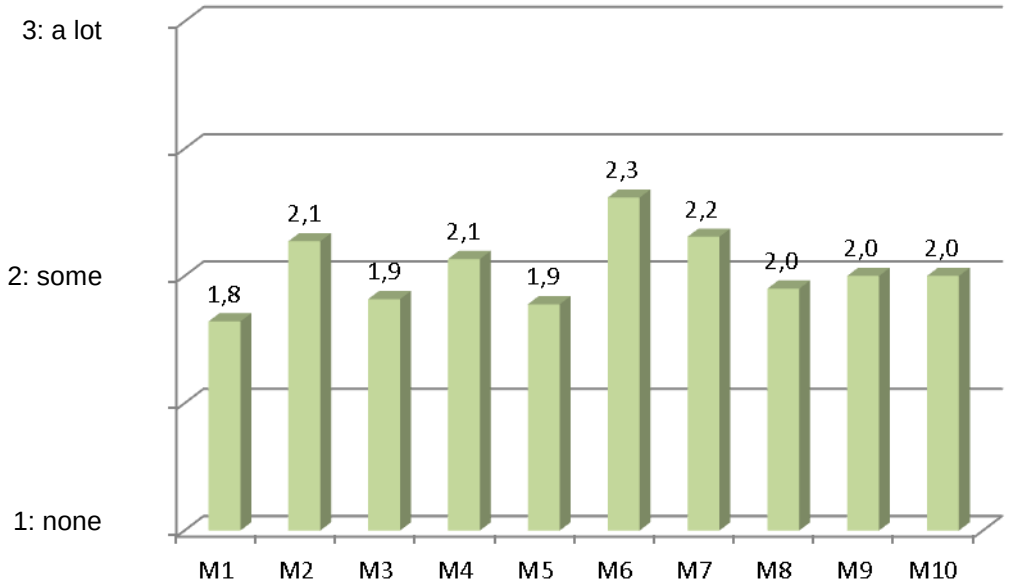


Figure19: Portugal – trainees' evaluation: new knowledge gained with the workshop

The distribution of new knowledge is almost stable and homogeneous about 2.0 with a small scatter (2.3 to 1.8), which is observed in most of the analysed data, with highest value for M6 (2.3), where a slightly higher rate of knowledge transfer is observed.

So the gain of knowledge for the participants is a very positive result for all modules.

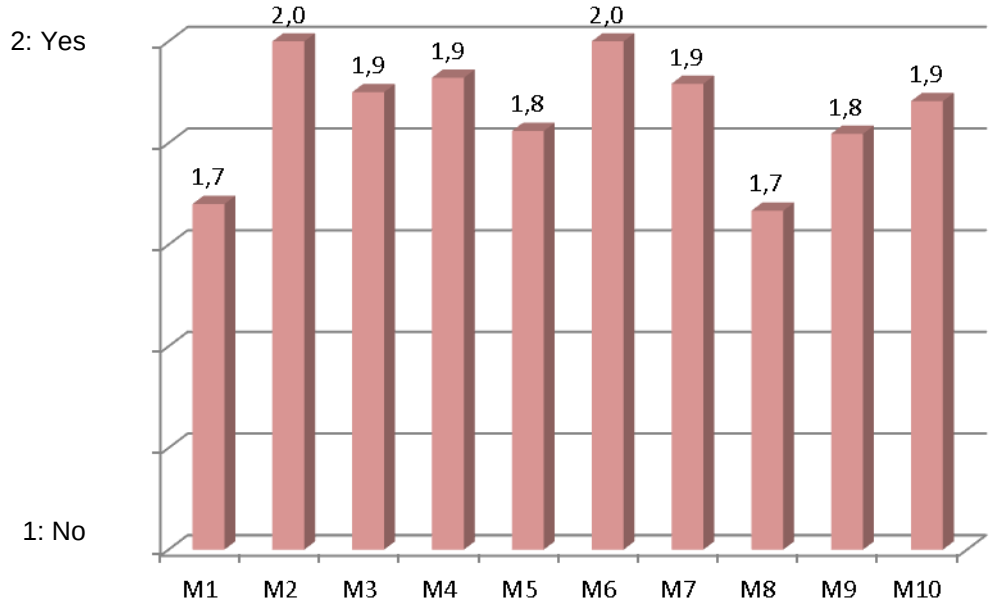


Figure 20: Portugal – trainees' evaluation: satisfaction with the workshop

The distribution of workshop satisfaction of the participants homogeneous distributed with a high mean of 1.9, taking into account low values for M1 and M8 (1.7), one can observe a small scatter (2.0 to 1.7).

Therefore the trainees were very satisfied with the modules in general.

	Most valuable aspects	Least valuable aspects	Unclear aspects	Improvement aspects	Not covered aspects
M1	Comments from trainees	None	None	Focus more on nZEB; Focus on expectations of trainees - validation of presentation; No pressure on future trainers to participate in the workshop and evaluation	None
M2	Sharing experience of real case studies	None	None	Update, simplify and rectify the presentation	None
M3	Presentation on thermal bridging (discrete thermal bridging at junctions of the thermal envelope)	Presentation on the calculation of U-values (students know enough about it)	role of industry in meeting the regulatory requirements	Importance of the buildability problems in Portugal (e.g. insulation gaps in the plane elements and at junctions)	None
M4	Standardization	None	None	None	None
M5	None	Unrealistic presentations	None	Improve Presentations	None
M6	Practical Part	Not enough time	None	More time for training	None
M7	Examples and exercises on cost; Solar generation (PV and thermal)	None	None	More local examples and references	None
M8	System of intervention	Redundancy of general contents; Mistakes in presentation	None	Rectify the presentation; Concentrate the information	Classification of the most effective interventions by rehabilitation typology
M9	Participation of trainees	High number of slides	None	Shorter presentation	None
M10	Financing in Portugal; Swot-analysis for nZEB buildings	Conclusion of FEE announcements	Financing outside of Portugal	Deepen the potential future financing of POSEUR and FEE	None

Table 7: Portugal – trainers' evaluation

Analysis of this dataset showed some valuable facts. The topics of the modules are well described and participation of the trainees is mentioned and one can assume interested trainees, but other points of least valuable aspects and improvements are more prominent.

Like in previous evaluations, the focus of the training should be concentrated more on local aspects of Portugal in terms of financing and importance of buildability in Portugal. Regulation and legislation for the specific region are more interesting than too much information about EU regulation in general. It is mentioned, that shorter and improved presentations could simplify workshops contents.

Sharing experience of real case studies and examples and exercises of costs were considered as one of the most valuable aspects. Some mistakes in presentations of M8 were found and reduction of slides as well as more time for some presentations are recommended.

	Training procedure & time management	**Trainees' queries**	**Teacher's feedback**	**Practical aspects**	**Trainees' interest, interaction and feedback**
M1	The teacher gave a general perspective of the most important subjects. Time management: 90% theory	Portuguese Legislation and the effectiveness in the use of bioclimatic strategies in Portugal to achieve nZEB goals	The teacher tried to explain the lack of articulation between I&D institutions and construction market.	No practical exercise	Lively interaction; Most of the participants were interested. Need to reduce the amount of details
M2	Good performance and skills; Time management: 70% concepts, 30% case studies	Importance of energy efficiency measures and different strategies for Southern Countries	The teacher showed a mature and committed approach to each of the questions posed to him.	No practical exercise	Great interest and lively interaction; Some complaints about repetitive contents and missing adaption to Portugal.
M3	Well organized; Time management: 50% theory, 20% concepts, 30% case studies	Identification of major problems and solutions of thermal bridges; Local legislation and simulation tools	The teacher explained through some examples the absolute need to prevent, in early stages of the project, the negative impact of thermal bridges.	Some practical exercises with good participation; Almost all the trainees understood the exercises and the majority knew its solutions.	Interested students with a lot of questions; The module should be adapted more to the Portuguese reality.
M4	Good performance of the teacher; Time management: 60% theory, 20% concept, 20% case studies	Physic Laws related to constructive systems; Thermal comfort with less investment; Ensuring high levels of certified systems; Impact of right policies	The teachers explained the benefits and opportunities to save money on the operational costs.	No practical exercise	Great interest and a lot of questions.
M5	Good performance of the teacher; Time management:	Higher initial cost of nZEB buildings	The teacher explained the need of getting	No practical exercise	Great interest of the students and lively interaction

	60% theory, 20% concepts, 20% case studies		rid of “business as usual”.		
M6	Good performance; Time management: 20% concepts, 80% practice	Heating and Cooling Design; Natural ventilation; Software	The teacher showed some examples.	Well presented; Most of the trainees understood the exercise	Great interest of the students and excellent interaction
M7	Well organized; Time management: 70% concepts, 30% case studies	Concept of nZEB according to 2010/317UE Directive and nZEB Energy strategy	The teacher showed some examples.	No practical exercise	Great interest of the students and good interaction
M8	The teachers were not well prepared in some topics and adapted the contents according to their skills and interests. Time management: 60% theory, 20% concepts, 20% case studies	Sustainable strategies to retrofit ancient buildings; Need of insulation and heating systems; LCA methodology; Correct characterization of RCD	The trainers showed some unfamiliarity with parts of the content and presented mainly their personal opinion causing contradictions with the slides.	No practical exercise because of lack of time and skills.	The majority of the participants showed great interest on the topic. One of the trainers was frequently disagreeing with the content of the slides, which caused lively discussions. The different background of the participants also led to discussions. Some of the participants criticized: - a lack of examples of case studies from Southern Europe - the unfamiliarity of the trainer - too much politics with too many personal opinions
M9	Well organized; Time management: 60% theory, 20% concepts, 20% case studies.	BIM Features in Zero Energy Buildings and its role in Construction Management	The teacher had good knowledge of subjects and explained the major factors to enhance the project sustainability.	No practical exercise	The participants showed great interest and the teacher involved the participants in the discussion.
M10	Well organized; Time management: 50% funding in Europe, 50% funding in Portugal	Funding schemes and incentives defined to promote energy efficiency in Portugal	The teacher explained clearly the framework, scope and objectives of the funds and incentives.	No practical exercise	The participants showed great interest and the teacher involved the participants in the discussion.

Table 8: Portugal – observers' evaluation

The training was well organized through all modules (except M8) and teachers' feedback was satisfying to a very high degree. Good performance of the teachers was considered, discussions and lively interaction with interested trainees occur in all modules. Good time management was stated for every module and the trainees were interested in the issues presented.

The exercises were well prepared and the trainees knew the solutions of the exercises und understood the details for M3 and M6.in other modules there were no exercises, sometimes due to lack of time.

As observed for other evaluations, mainly questions regarding regulations in Portugal and the specific needs for technical realization of nZEB according to local situation were stated and were of high interest to the trainees.

Conclusions of the "Train the Trainer workshops"

In general, the train the trainer workshops of SouthZEB project in front-runner countries (i.e., Cyprus, Greece, Italy and Portugal) were very successful to intensify exchange of opinions between experts in the field. Very fruitful discussions developed between trainers and participants resulting in interesting workshops for all countries involved. Feedback of the participants was a very important input for implementation of new ideas into the workshop programme in general. Main conclusions from interviews, with 10 % of trainers and 10% of the trainers, and teleconferences workshops (tcf) (see Appendixes) organised between the responsible persons of training modules in participating countries and the Coordinator for the sZEB project in terms of Task3 – Work Package 5 are presented below.

Cyprus

The modules were well organized with good time management in general. The trainers explained all questions very well and there was lively interaction with very interested trainees. Four tcf were organised in March and April 2016. It was mentioned by the responsible persons that the participation was really high in every module and all participants had great experience. For some modules the time was quite limited for the course material however the content of the modules was in general of high-quality and well-prepared. Time of workshops mainly depends on participants' experience.

Greece

The modules were also well organized with good time management in general. The trainers were very willing in answering to all questions, promoting active participation and exchange of experiences. It was stated as improvement aspects, that the workshops should be focused on the situation of Greece, in terms of financial situation and Greek reality analysis. During the tcf organised on 27th of April 2016 and it was considered that there is quite a difference in complexity of contents between different modules, but for all modules the organisation of the workshop was satisfactory.

Italy

With the exception of M5, the modules were well organized with good time management in general. The trainers explained all questions very well, especially technical questions and there was lively interaction and good feedback with very interested trainees. Most valuable aspects were interested trainees, topics and details for Italy and open discussion. In the 24th March 2016 tcf it was mentioned, that the topic of nZEB is not quite known in Italy and like other countries, more focus on the situation of Southern Europe is needed. The quality of the workshops over all was mentioned to be really well prepared.

Portugal

The modules were well organized with good time management, case studies and concepts. The trainers explained all questions well and there was lively interaction with very interested trainees. Questions of

financing, Portugal situation in terms of national legislation and the use of bioclimatic strategies in Portugal to achieve nZEB goals were highlighted. The most important issue from participants feedback mentioned during both May 2016 tcf (one with BRE) was the limited time of the workshops. But the participants were satisfied with the course and the organization of the workshops was also considered adequate.

Advices emerged from the evaluations

The 10 modules of SouthZEB offer relevant and new information about nZEB to high number of trainees. Lively interaction and discussions developed in every workshop and the contents of the modules were stated as highly interesting and helpful for the near future of nZEB in Southern Europe. Interaction between experts in the field (trainers as well as trainees) gave new insights to the specific demands and current situations of every country.

For **M1**, mainly positive comments were received for the teachers, who exhibited great knowledge in all subjects presented. As for negative comments it was mentioned that some of the issues discussed were mainly superficial and the time was limited in order to present them all in detail. It was stated that there was good participation, however not at a great extent due to the fact that the module was not so interactive, but the majority of the participants were satisfied by the workshop. Regarding to the content of the module it was mentioned that it covered many different issues and the time was limited, whereas the difficulty of the presentation was average. It was stated that more time was needed for the presentation.

For **M2** it was mentioned that the main comments received referred to clarifications for passive houses and renewable energy, but mainly positive comments from the participants were received. Like for other modules, time limitation was a major point of improvement. It was mentioned that the level of participation was high. The participants were considered satisfied and the presentation was well-within the scope of the module.

M3 mainly positive comments were received although it was mentioned that the presentation should have greater relation to the reality of Southern Europe. Also for M3 it was mentioned that the participation of the trainees was high and the participant considered satisfied. The content of the presentation was considered adequate and for the organization of the workshops was stated satisfactory for most of the countries involved.

M4 it was mentioned that the main questions received referred to the prevailing standards for Thermal Comfort (ASHRAE and EN) and it was found interesting from the participants although difficult. It was mentioned that case studies were not presented to the participants, thus the participation was moderate. The participants were satisfied although the difficulty of the Module was mentioned. The quality of the content of the presentation was satisfactory, however it was mentioned that there should be a review regarding the translation of the slides. The module was stated as well structured and the participants were satisfied from the content. It was mentioned that the time was limited and the course material was too extended, however it gathered the interest of the participants.

For **M5** mainly positive comments were received by the participants, however it was also mentioned that the presentations should have a greater relation to the situation of Southern Europe. It was stated that the participation of trainees was high, due to questions that were posed to the teachers and in most cases lively discussions developed. The participants were very satisfied by the workshop, but it was mentioned that the presentation should be more focused on specific demands of the countries. The content of the presentation was considered adequate and for the organization of the workshops was stated satisfactory for most of the countries involved.

M6 mainly positive comments were received. Great interaction with the participants was reported and the attendees participated in the example that the teachers performed. In some cases it was mentioned that the content was quite difficult however interesting. For improvement it was suggested to have practical sessions for the software presented. It was mentioned that the quality of the contents of the module was considered high, however it would require more time in order to adequately explain to the participants and to make

simulations, since no exercises besides the use of the computes could be used. The organization of the workshops was also considered adequate in general. Positive comments were that the topic presented was very interesting and there was interaction with the participants, as many questions were posed regarding the software, whereas the negative comment referred to the fact that it was quite difficult to present this module through a presentation.

For **M7** the main comments received referred to the cost of the different technologies and renewable energy and the module was considered of moderate difficulty. The participation was reported as high and interaction with the teachers existed. The quality of the content of the module was considered adequate. It was mentioned that some of the technologies were well known to the participants and they felt more familiar with them whereas in other sessions of the modules clarification in detail was needed.

M8 it was mentioned that mainly positive comments were received and the participants were satisfied, however it was mentioned that there should be more focus on Southern Europe situation. The participation was moderate to high and the quality of the content of the presentation was considered adequate. As recommendation it was mentioned, that the material concerning other countries should be reduced.

M9 it was considered of moderate difficulty from the participants and the main comments and questions referred to the energy management and the construction standards for nZEBs. Also it was mentioned that some sections were overanalysed with no special purpose for that. M9 showed high participation of the attendees participated and teachers' explanations and clarifications were considered as well. For this module it was mentioned once more that the content should be more focused on Southern Europe situation, however the quality of the content was considered adequate. It was mentioned that there were duplicated sections, thus a relevant review should be performed.

For **M10** it was mentioned that it other countries should be included in the presentation besides UK, however it was considered interesting to learn for UK (as general knowledge). The level of satisfaction was considered moderate. No case – studies were presented thus the participation was moderate in most workshops. M1o it was mentioned as a "strange" module due to the fact that it contained much information regarding the UK and other countries.

2.5 THE EVALUATION OF THE SEMINARS

The objective of this evaluation report drafted by BEST is to compile and present the results of the evaluations made by the Cypriot, Greek, Italian and Portuguese participants involved in the "pilot training sessions" (WP5, T2), following the common evaluation procedure and toolkit developed by UPATRAS (WP5, T3; see Appendix A), specifically:

- Participants' Evaluation Questionnaire – set of 17 closed questions to collect the formal feedback about the various pedagogical and logistic aspects of the workshops;
- Trainers' Evaluation Questionnaire – set of four open questions aiming to summarize the informal feedback collected during the workshops;
- Trainees' Interview Questions – to approximately 10% of the total number of trainees to collect further comments to four open questions.

A total of 6965 participants attended the various pilot sessions organised in the front runner countries: 718 in Cyprus, 1460 in Greece, 4219 in Italy, and1460 in Portugal. The number of trainees varied from module to module, country to country. In Italy, modules 3, 5 and 10 were not delivered due to the fact that no one chose the topics proposed for modules 3 and 10, whereas for module 5 DTTN didn't have any trainer who passed the exam to become a trainer for this module. Regarding the number of evaluations received, a total of 4792 questionnaires were delivered by the trainees: 371 in Cyprus, 568 in Greece, 2566 in Italy, and 1287 in Portugal.

	CYPRUS (*/)**	**GREECE (*/**)**	**ITALY (*/**)**	**PORTUGAL (*/**)**
Module 1	74/123	142/142	608/997	271/277
Module 2	19/87	142/142	650/1010	247/275
Module 3	33/79	42/42	n/a	72/82
Module 4	31/65	42/42	302/621	101/104
Module 5	34/58	40/40	n/a	134/150
Module 6	34/73	40/40	602/980	88/89
Module 7	34/68	20/20	80/137	68/78
Module 8	41/73	40/40	282/432	157/208
Module 9	37/51	40/40	42/42	68/105
Module 10	34/41	20/20	n/a	81/92

*Nr. of evaluations received
**Nr. of participants

The present report is based on received evaluations and provides, in each section, the average results per country and per modules. Conclusions are drafted and key recommendations for further improvement of each module are provided at the end.

Cyprus

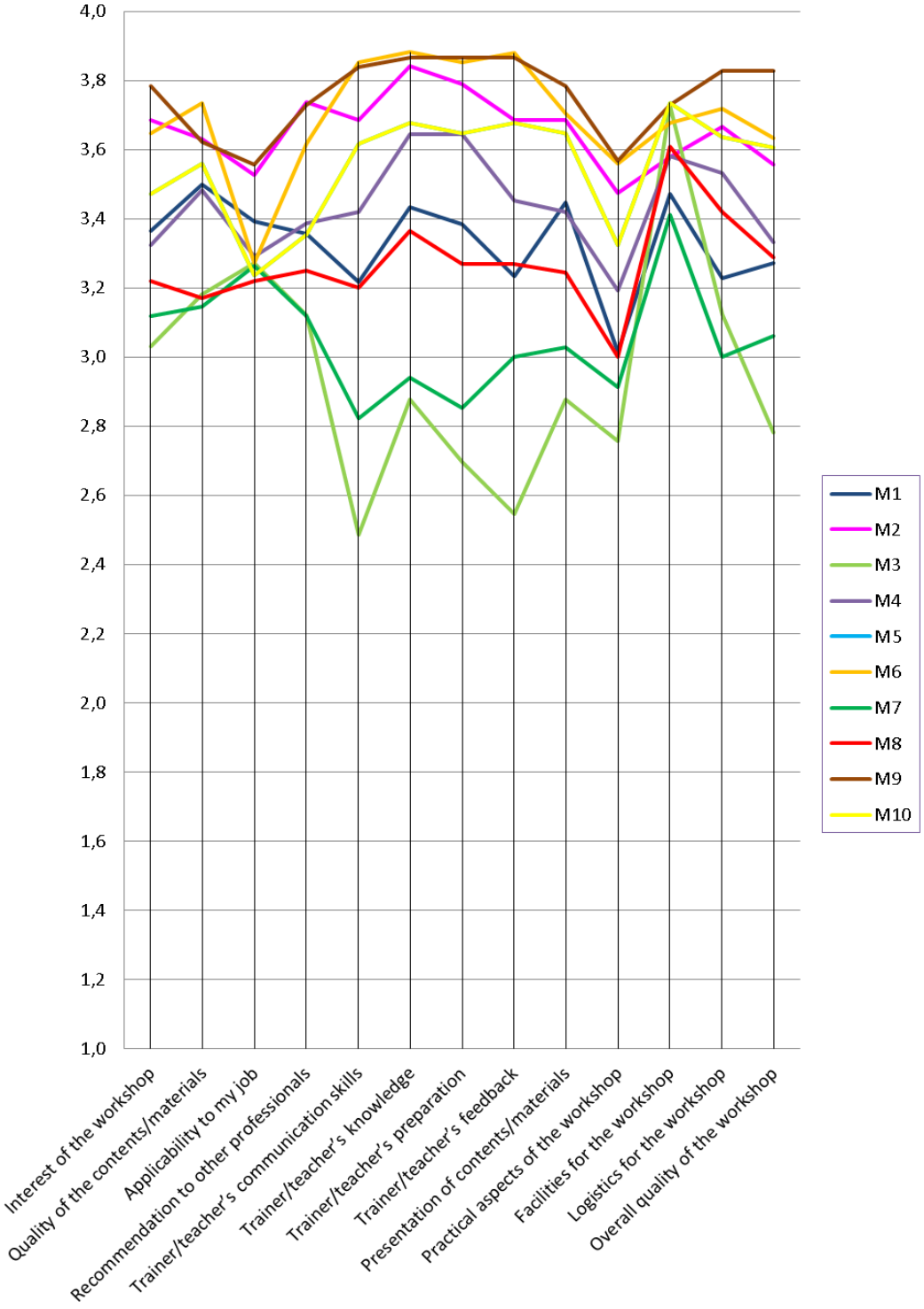


Figure 5: Cyprus – trainees' evaluation : questions 1-13

In most of the workshops, the level of teacher´s knowledge was well evaluated.

The workshops show high levels up to 3.8 of evaluation, not lower than 2.5 with M3 showing the largest spread in evaluation from 2.5 to 3.7. Despite M3 and M7, all modules take place in the range of about 3.5 as it was mean, so a very high quality of the workshops can be deduced.

Comments from trainees

M1

- For a basic program there was too much focus on technical details and on mechanical engineering aspects, and somehow deviated from the nZEB concept
- I am satisfied but the trainer did not have the knowledge regarding energy in buildings. Often, he talked about irrelevant topics
- Not enough adequate practice. The fact that the seminars take place on working days poses a problem
- Suggestions for ways to be found in order for the theory to become practice and to achieve the nZEB concept in Cyprus
- Excellent initiative regarding the seminar topic. The fact that there was no charge allows unemployed people to attend. The basic module was well structured, even though was a bit oriented towards mechanical engineering issues
- there could be more in-depth introduction to basic concepts of mechanical engineering (thermodynamics, energy, work, power, etc.), as in the audience engineers of various backgrounds (architects, civil engineers, electrical engineers, etc.) are present
- The seminar itself and the facilities are excellent. But the schedule of the seminars is not so well suited for people that work as it is almost impossible to be absent so many days from work. It is suggested that classes start after 15:00 during weekdays
- It would be better if there were less slides to be analyzed more
- the only negative thing was the sudden change in the lecture hall
- It would have been better if the slides had less text and better targeted bullet points
- The seminar topic was very good. It would have been better if some subjects, that are known to mechanical engineers and less known or unknown to other engineers, were more simplified. During the seminar, some terms were used in English but the Greek term was not provided
- The fact that the seminar addressed engineers from various fields, resulted in the presentation of information that was not fully understood by everyone. Even though this is justified, it should be taken into account for the following seminars
- The seminar was satisfactory. The seminar duration in terms of attendance hours should have been less and the presented material should be more summarized

M2

- The material covered in the advanced module is repeated in other modules as well.
- This results in excess seminar duration time without any significant reason the trainer has been really good, up to that point and with a lot of knowledge. Really suitable for this kind of seminar
- M3
- The presented examples were examples of good practices. More examples on poor thermal insulation applications should have been presented as well. In addition, the concept of linear thermal transmittance should have been presented in more detail.
- The presentations should not be just reading the slides.
- The tricky questions during the exams are confusing and do not help towards gaining new knowledge. The trainer had difficulty in presenting and explaining the topic
- The trainers should have the necessary professional experience in order to provide answers to the questions on practical issues raised by the audience
- More explanatory notes should exist for some slides. Some of the presented diagrams needed more explanations.
- The material that was sent for further reading was really good but was not presented or analyzed during the seminar. In general, the topic of thermal bridging is unknown to most engineers, so more emphasis should be given and more time to be dedicated to the subject
- There should be more analysis and examples for modern buildings (metal constructions, wooden constructions, combinations, etc.)

M4

- The trainer was exceptional and really knew the subject. He was contagious and provided explanations and answers in a simple manner to the questions raised by the audience.
- The topic of thermal comfort could be presented adequately in a faster pace, overlooking some specialized chapters, which could not be fully explained in the dedicated time and significantly prolonged the duration of the seminar. For example, the measurement protocols of thermal comfort and the necessary equipment should either be presented in much more detail or in just an overview, since the

way it has been presented it took quite a lot of time but on the other hand this chapter could not be presented in an adequate manner
- Very slow pace and very analytic. Things could be presented more briefly.
- The trainer was really good and contagious. The same information kept repeating in every chapter but in a different manner. Some chapters were presented in great analysis, greater than necessary.
- A lot of information and details have been given, which are not very useful in my line of practice as an architect. More emphasis should be given in more important aspects and their application. The topic is too theoretical and contains a lot of unnecessary information.
- Quite a few mistakes in the slides. Absence of practical session for use and familiarization with the equipment necessary for measurements
- The presentation was quite detailed but a few things repeated themselves.
- The trainer seems to know the topic very well and was well prepared for delivering the presentation. Nevertheless, the presentation went into too much detail in some aspects, which was tiring. In addition, the content of many slides repeated throughout the presentation.
- The trainer was very contagious and presented the topic in a pleasant manner. He has a lot of knowledge over the presented material and used examples based on his personal professional experience in order to make the presentation more interesting and enhance understanding.
- The trainer really knew the topic and could explain it well.
- very good trainer
- 400 slides for two consecutive days of presentations is too much. There is not enough time to absorb everything. On the other hand, the material is rich and one can come back later for further reading. The exam should focus to the most important things. In general, good and rich content but some things are repeated. In addition, there are some mistakes in the translation and sentences that do not make sense.

M5
- Very good seminar and at last a topic closer to the architectural part of the seminars. The trainers had a deep knowledge of the subject and could answer all questions raised.
- Slightly general presentation. The trainers could provide more technical details and examples in applications of energy efficiency measures for listed buildings.

M6
- Very good pace of lecturing, the speaker knew the topic really well and could transfer his knowledge to the audience. The seminar was organized in a really good manner and the schedule was followed strictly.
- The trainer's presentation was really helpful. The trainer knew the software really well, he could explain the various functions and could transfer his knowledge to the participants. He contributed significantly to the learning of the software
- Energy plus is in general a difficult software for someone to learn and the software's interface is not at all user friendly. If this seminar had not taken place, it would have been really difficult for someone to learn the software on their own.
- The exam was really difficult. There are too many technical details
- Very difficult exam
- The trainer's interest and willingness to answer questions from the audience are really praiseworthy

M7
- The presentation slides were not adequately explained
- The seminar pace was too fast and some presentation slides were overlooked, despite the fact that there might be questions based on their content in the exam. In general, it is like the seminar never took place and looks to me the same as someone taking the seminar material and reading it on his own. More attention should be given in the important things and topics of the seminar and these should be presented and explained in greater extent
- Poor presentation. I anticipated more based on the seminar title

M8
- The trainer was really good, well prepared and had deep knowledge over the presented material.
- Part of the seminar material we have seen in previous modules. I believe that having this in mind, the seminar could have been shorter and more interesting, if focused only on the new material
- Most of the seminar material has been presented in previous modules (e.g. PV systems, DHW, geothermal, etc.). I would like to see more examples regarding the cost and benefits of an nZEB retrofit

– Very interesting seminar due to the knowledge of the trainer and his ability to transfer this to the audience. The presented examples from the trainer's personal professional experience has been a major plus.

M9

– Even though the seminar content is a bit boring, the trainer is really good
– Very good trainer
– The best module we have had so far.

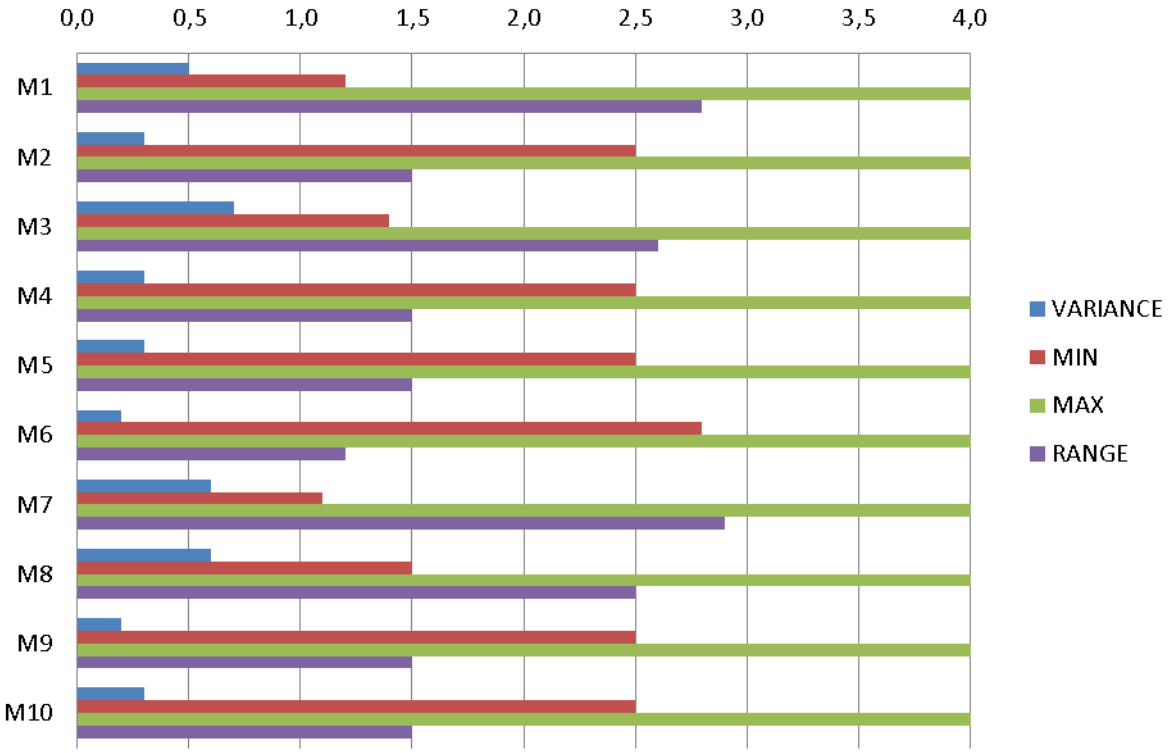


Figure 6: Cyprus – trainees' evaluation: sum questions 1-13: average values for variance, min, max and range

The modules M2, M4, M5, M9 and M10 are completely similar in range and variances. One can conclude a similar quality in presentation characteristics.

M7 shows the highest range with the lowest min value but also a higher variance, indicating a broader distribution characteristic. Obviously, the trainee's evaluation results are highly variable and different for the different topics of question 1-13.

A similar situation can be observed for modules M1,

M3 and M8, where range and variance are of the same order for all of these three modules.

The most homogenous evaluation result can be seen for M6 with the lowest variance (narrow distribution) and lowest range for all modules, according to the highest minimum value of all modules.

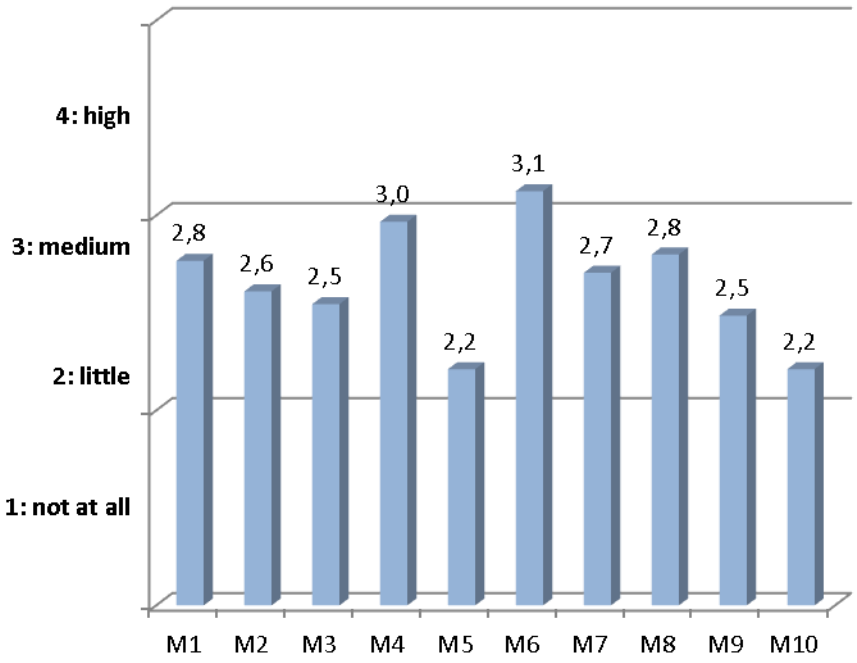


Figure 7: Cyprus - trainees' evaluation: difficulty level of the workshop

Characteristical variables for difficulty level of the workshop over all modules	
Mean	**2.7**
Min	2.2
Max	3.1
Range	**0.9**
Var	0.08
Std. deviation	0.3

The range of the evaluation data regarding difficulty levels is low with 0.9 with a mean of 2.7. M4 and M6 seem to be more difficult to the trainees, M4 (thermal comfort) and M6 (software implementation) seem to be more difficult for trainees with more technical background, dependent on the former qualification and experience.

The other modules are evaluated with very similar values of about 2.5 (lower than the overall mean value) in average, which clearly concludes a very homogeneous level of quality in training, content and presentation.

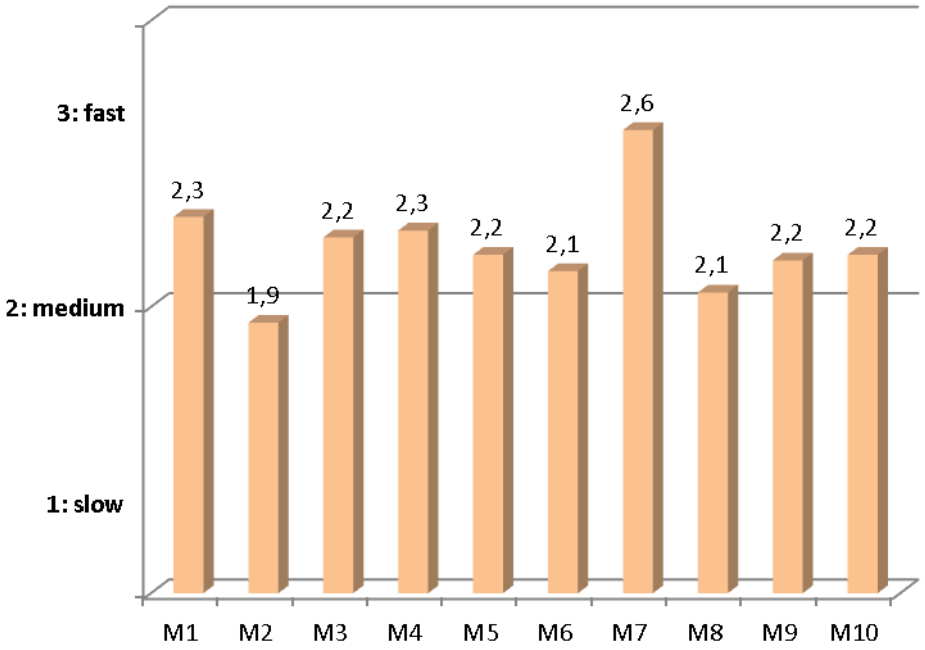


Figure 8: Cyprus – trainees' evaluation: pace of the workshop

Characteristical variables for pace of the workshop over all modules	
Mean	**2.2**
Min	1.9
Max	2.6
Range	**0.7**
Var	0.03
Std. deviation	0.2

The analysis for pace of the workshop over all modules show a mean value of 2.2 with a range of 0.7.
M7 is valuated with 2.6, outstanding compared to the other modules and M2 with lowest value of 1.9 but overall the distribution for pace of the workshops is very homogenous because of the range of 0.7.

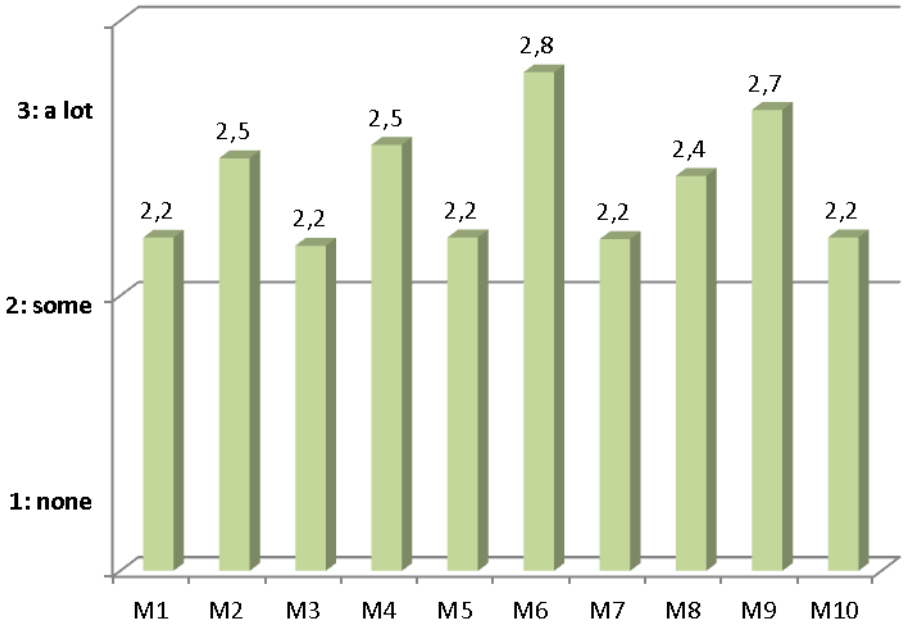


Figure 9: Cyprus – trainees' evaluation: new knowledge gained with the workshop

Characteristical variables for knowledge gained with the workshop over all modules	
Mean	**2.4**
Min	2.2
Max	2.8
Range	**0.6**
Var	0.05
Std. deviation	0.2

The analysis of knowledge gained with the workshop over all modules show a mean value of 2.4 with a range of 0.6.
Corresponding to the analysis of difficulty levels M6 and M9 display the highest values of new knowledge gained (2.8 and 2.7 respectively). In both analysed issues combined it may be assumed that new knowledge was given to the trainees despite the higher difficulty level.

But overall some new knowledge was gained with a very homogeneous distribution over all modules because of a range of 0.6 and variation of 0,05.

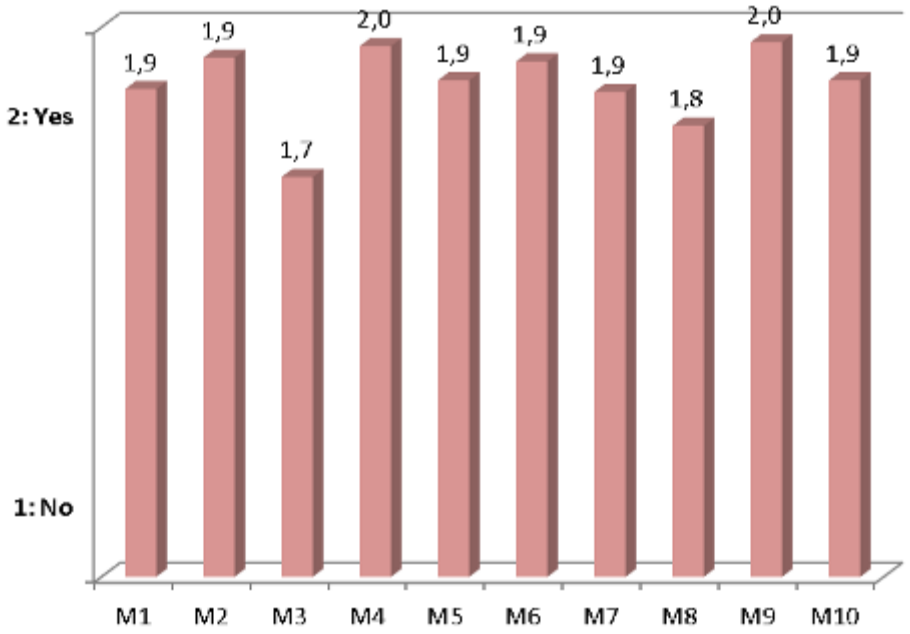


Figure 10: Cyprus – trainees' evaluation: satisfaction with the workshop

Characteristical variables for satisfaction with the workshop over all modules	
Mean	**1.9**
Min	1.7
Max	2.0
Range	**0.3**
Var	0.01
Std. deviation	0.08

The satisfaction evaluation of the workshop over all modules show a mean value of 1.9 with a range of 0.3. This range is low compared to other sets of analysis of the modules, so satisfaction with the modules was high over all, only with some lower values for M3 and M8, where more clarification seems to be needed.

Module 1
For improvement, more practical examples should be included in the presentation. Examination needs revision in terms of expanding the examination not only using multiple choice questions. Material on HVAC Systems as well as European directives should be reduced.

Module 2
For improvement, more practical examples should be included in the presentation.

Module 3
It was recommended to enhance the input of more numerical examples on U-values and thermal bridging contribution to overall losses.

Module 4
No recommendations and improvements were given.

Module 5
It was stated, that a detailed example of an energy retrofit of an existing listed building would be helpful for better understanding of difficulties encountered and solutions provided. In general, more practical examples could improve the presentation.

Module 6
It was recommended to reduce the amount of details on the equations embedded in the software. Seminar duration should be increased and more practical examples in terms of exercises and homework could improve the understanding of the presentation content.

Module 7
For improvement of the workshop more details in the presented technologies should be provided.

Module 8
Details about other countries should be reduced and for improvement, the provided material should be increased as well as an in-depth analysis on the financial analysis should be given.

Module 9
For improvement, it was stated, that more practical examples are needed and some material was already presented in previous modules.

Module 10
To improve the workshop, more information on practical aspects concerning the application to get funding should be included.

Table 4: Cyprus – trainers' recommendations

Greece

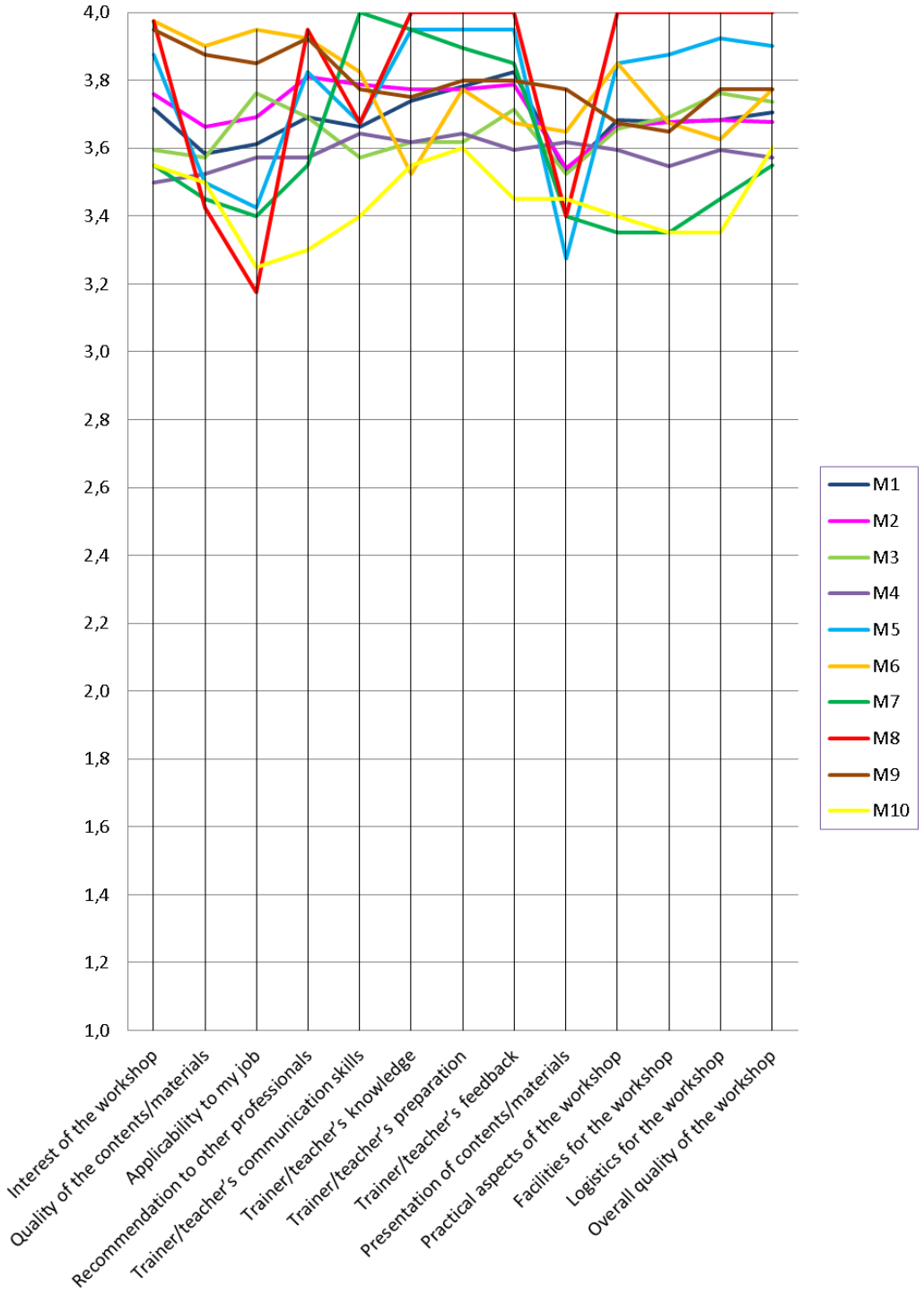


Figure 11: Greece – trainees' evaluation: questions 1-13

The variation of the data distribution is low (3.2 to 4.0) and therefore the levels of module quality are at a high range in general. A possible explanation can be related to the fact that content and module preparation, as well as teacher's knowledge and presentation skills, were highly satisfying for the trainees.

In general, all the modules are characterized by a high degree of sufficiency.

Comments from trainees

M1
- The seminar was well presented, but more focus on the nZEB concept should be taken into consideration. Too much focus and technical details on mechanical engineering aspects.
- The seminar was satisfactory and informative. The seminar duration in terms of attendance hours should have been less and the presented material should be more summarized.
- It would be better if there were less slides that could be analyzed more.
- Better definition of nZEB buildings in Greece is required.
- Suggestion to be found for ways in order for theory to become practice in order to achieve the nZEB concept in Greece.
- there could be a more in-depth introduction to basic concepts of mechanical engineering.
- It would have been better if the slides had less text and better targeted to the most important topics.
- The seminar topic was very good. It would have been better if some subjects, that are known to mechanical engineers and less known or unknown to other engineers, were more simplified. During the seminar, some terms were used in English, it would be helpful to provide some of the terms used in Greek.

M2
- intense material repetition (twice mentioned)
- students in this seminar should be fewer (twice mentioned)
- Very interesting and well organized seminar. Excellent teacher, very efficient and effective
- In the slides, it would be appropriate to include more pictures and less text, to make the presentation less demanding and maintain the attention active.
- Some repetition with module 1 should improve the workshop
- It was mentioned, that more hands-on experience can help to improve the seminar as well as more detailed examples.
- The most valuable is the information about construction techniques.

M3
- Practical examples and more usable schemes were mentioned for improvement.
- Adaptation to Greek situation is recommended, too much input of northern countries like UK or USA
- The practical exercises are most useful for a better understanding of thermal bridging also for non-experts in the field.
- In the slides, it would be appropriate to include more pictures and less text, to make the presentation less demanding and maintain the attention active.

M4
- Most valuable for the participants are the definitions and space requirements
- More practical examples for a better understanding
- Too many slides with too much text and few images
- Most useful are definitions of thermal comfort for a human body and how to model it.

M5
- Provide more technical documentation to the participants.
- Generally very attractive.
- Too many details in the presentation, they should be reduced.
- The seminar gave interesting updates on the topic presented.
- The focus of the presentation should be more on Greek situation.
- Too many details on other countries.
- Most valuable was the information about the new Greek situation in terms of Greek law.
- More programs like this should run for engineers and other professionals.

M6
- Most valuable are the exercises about energy efficiency estimation.
- For improvement one should help work trainees on a real project.
- More application examples of building structures for a better understanding.
- This module was the most interesting and useful for my job (mentioned twice).

M7
- Most valuable are the energy strategies for nZEB and cost optimality.
- The first part of the presentation is too general; the second part is more practical and very useful.
- The seminar should be longer.

M8
- Most valuable is the presentation of new techniques. These should be updated in future seminars.
- The solutions presented are too expensive.

M9
- Most valuable are the examples for hands on experience.
- Sometimes to improve the material, the translation from English to Greek would help for better understanding.

M10
- Most valuable is the information about ongoing programs in UK.
- For improvement establishing more Greek programs were mentioned.
- Need to relate to the South European Countries context.

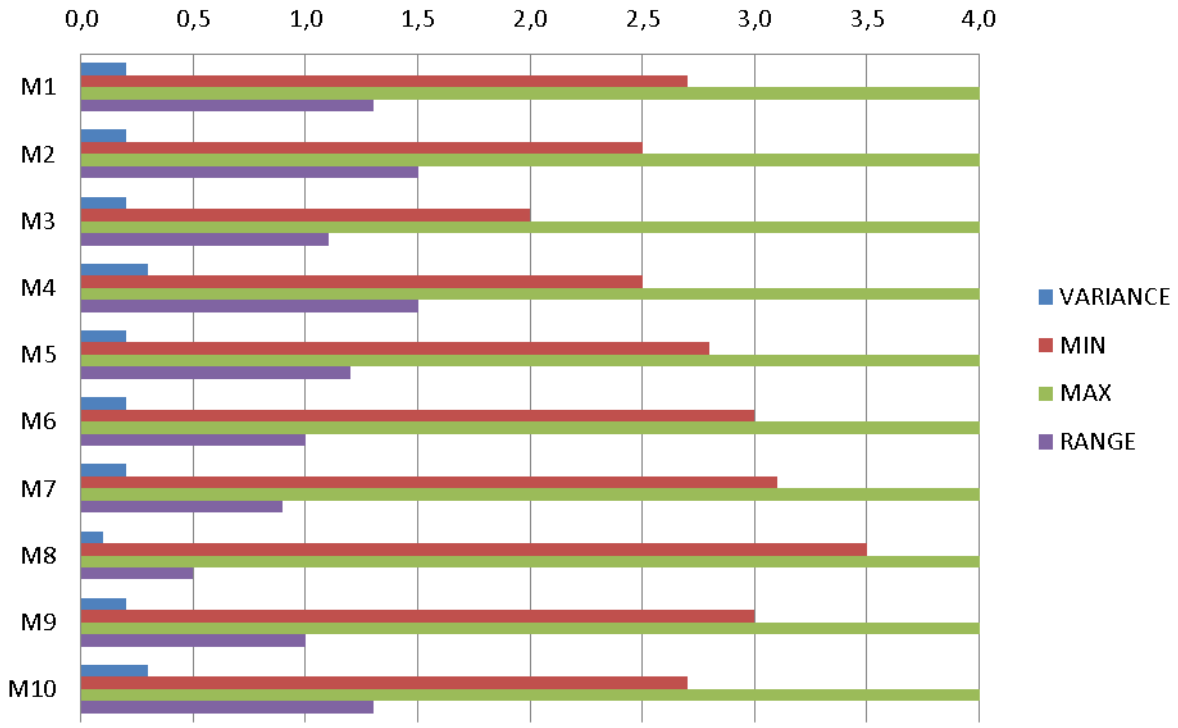


Figure 12: Greece – trainees' evaluation: sum questions 1-13: average values for variance, min, max and range

The most important and obvious fact of this analysis is the high number of modules showing minimum values higher than 2.5. Only M3 shows a value of 2.0, where all modules show maximum values of 4.0, so the trainees evaluation indicates a high degree of participant's satisfaction. The modules have a more of homogeneous quality of presentation and contents.

M8 shows best performance compared to the other modules with maximum at 4.0, range of 0.5. This module shows the highest min value and lowest variance. One can conclude a very high quality in presentation characteristics.

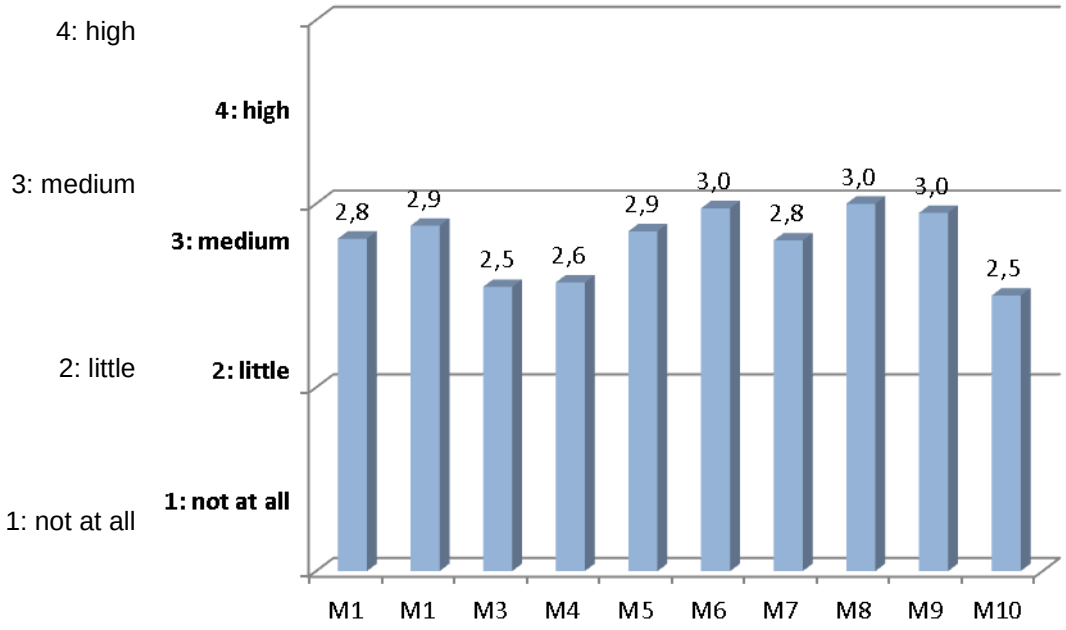


Figure 13: Greece – trainees' evaluation: difficulty level of the workshop

Characteristical variables for difficulty level of the workshop over all modules	
Mean	**2.8**
Min	2.5
Max	3.0
Range	**0.5**
Var	0.04
Std. deviation	0.19

The analysis for difficulty level of the workshop over all modules shows a mean value of 2.8 with a range of 0.5. M3 and M4 as well as M10 are declared to be only to a small extent more challenging than the minimum amount of difficulty (2.5 to 2.6), M 6, M8 and M9 show highest levels of 3.0, but no module show the possible highest level of 4. Because of the mean value of 2.8 the modules show an almost practical and medium difficulty level.

It would be helpful to know more about the specific professional background of the trainees for analysis. Obviously, a lot of knowledge was already available to the trainees and/or a very skilful presentation of the modules content was undertaken by the trainers involved.

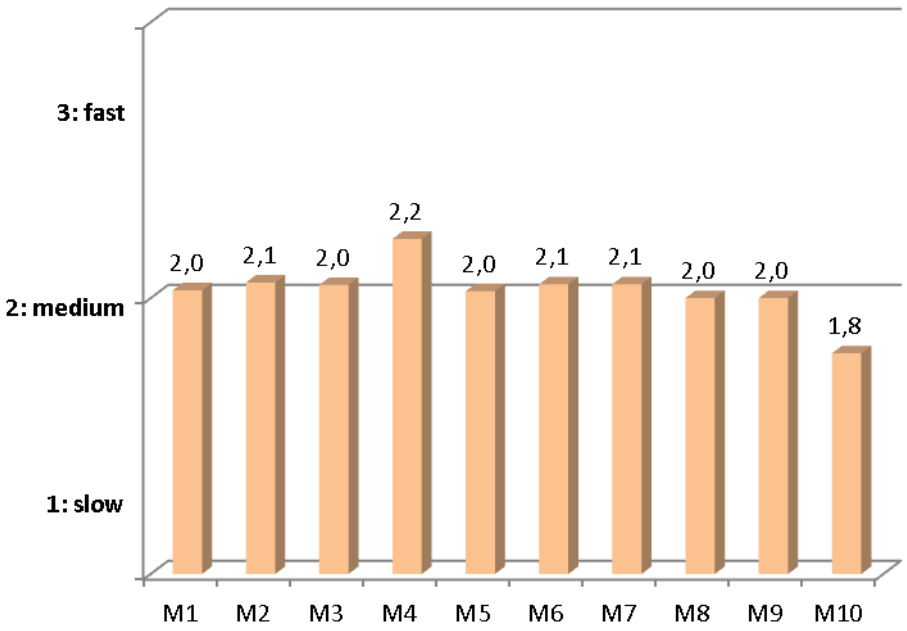


Figure 14: Greece – trainees' evaluation: pace of the workshop

Characteristical variables for pace of the workshop over all modules	
Mean	**2.0**
Min	1.8
Max	2.2
Range	**0.4**
Var	0.01
Std. deviation	0.1

The analysis of the pace of the workshop over all modules shows a mean value of 2.0 with a range of 0.4.

Except M4 and M10, the distribution of the pace evaluation is homogeneous with small variations (2.1. to 2.0), so one can assume, that the time management for these modules was well handled.

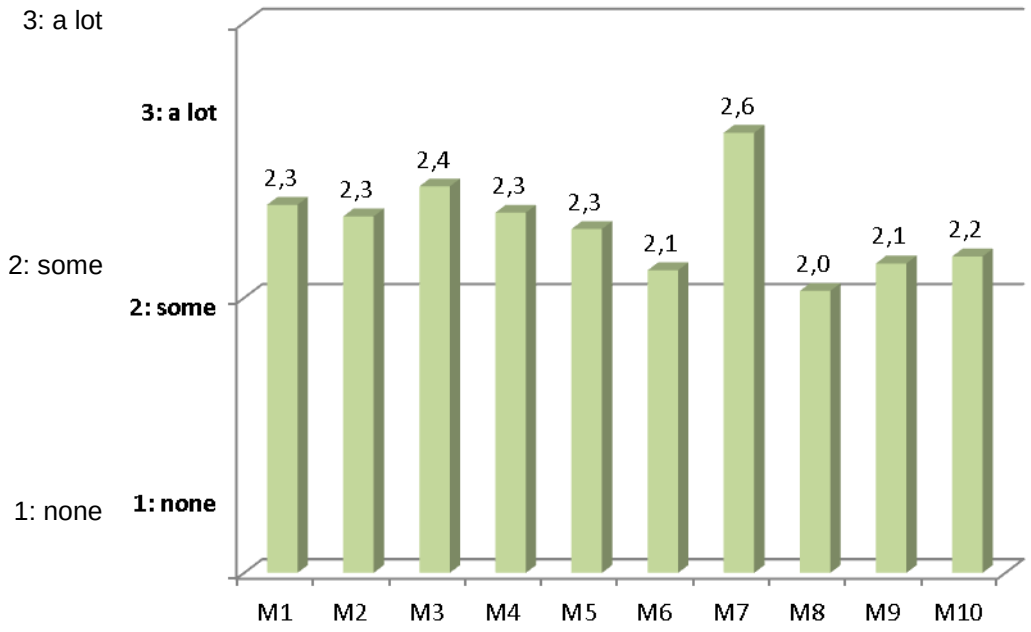


Figure 15: Greece – trainees' evaluation: new knowledge gained with the workshop

Characteristical variables for new knowledge gained with the workshop over all modules	
Mean	**2.3**
Min	2.0
Max	2,6
Range	**0.6**
Var	0.03
Std. deviation	0.16

The analysis of the pace of the workshop over all modules shows a mean value of 2.3 with a range of 0.6.

The contents of M7 show the highest value of 2.6 for a high degree of new knowledge gained with this workshop, in comparison to the other modules already known by the trainees, so only some new knowledge gained with the workshop.

But because the average value is 2.3 with a range of 0.6, for all modules an increase of knowledge of the participants was achieved. Of course, this depends on the education and pre-knowledge of the participants.

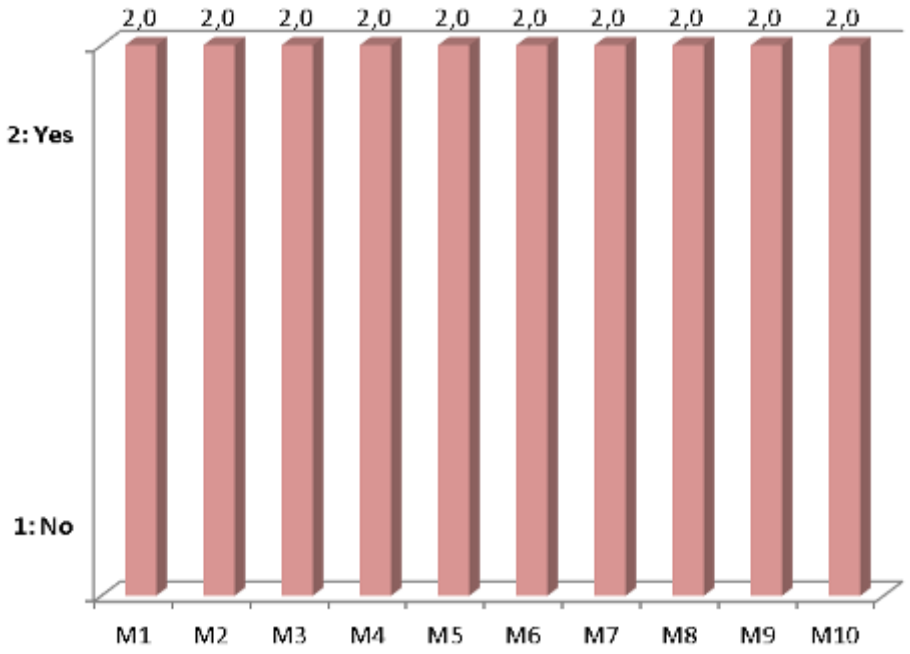


Figure 16: Greece – trainees' evaluation: satisfaction with the workshop

Characteristical variables for satisfaction with the workshop over all modules	
Mean	**2.0**
Min	2.0
Max	2.0
Range	**0.0**
Var	0.0
Std. deviation	0.0

The analysis for pace of the workshop over all modules shows a mean value of 2.0 with a range of 0.0. The analysis of satisfaction with the modules occurs at a very high degree through all modules. The organisation and performance was obviously very satisfying to the trainees in general for all modules.

Module 1

More country specific information for the situation in Greece is recommended by a number of trainees. More practical examples, particular national examples and more application details with practical exercises should be included in the presentation to improve the content of the module.

Module 2

For improvement, more practical examples should be included in the presentation. Some aspects of the module were repeated several times, this should be avoided. Slides could be more clear and simple. More summarized slides and more images, pictures and diagrams could improve the presentation as well as more national examples. Details of HVAC should be reduced.

Module 3

It was recommended to enhance the input of more numerical examples on U-values and thermal bridging contribution to overall losses. Here more practical exercises using available free software could be helpful. Improvements of some slides is necessary, because of too much text.

Module 4

More examples of good practices connected to nZEB should be included in the presentation. More practical exercises using free software will help to improve the workshop. It is recommended to simplify the presentation and point out the basic concepts of thermal comfort.

Module 5

It was mentioned, that a detailed example of an energy retrofit of an existing listed building would be helpful and in general, more practical examples could improve the presentation. More pictures, graphs and other visual elements will enhance the quality of the presentation. Less detail in the operation of HVAC Systems and more practical sessions, cases and exercises could also clarify the content of the module.

Module 6

Seminar duration should be increased and more practical examples in terms of exercises and homework could improve the understanding of the presentation content.

Module 7

For improvement of the workshop more details in the presented technologies should be provided. Examples related to the most relevant topics should be included, for example PV systems. Presentations how to calculate the energy savings achievable will improve the presentation as well as the presentation of the optimal costs. More Greek oriented examples and a comparison of the several systems shown would be helpful to clarify the content of the module.

Module 8

Case studies of Northern Europe should be replaced by cases from South Europe, to explain in more detail the specific needs of national nSZEB concepts. More practical exercises and examples should be included and repletion of contents should be avoided. Details of other countries should be reduced and for improvement, the provided material should be increased as well as an in-depth analysis on the financial analysis should be given.

Module 9

For improvement it was stated, that more practical examples are needed and some material was already presented in previous modules. The module should be shortened, as some topics were already covered in modules 1 and 2. The number of slides could be reduced as some of the content is repeated even in the same module.

Module 10
To improve the workshop, more information on practical aspects concerning the application to get funding should be included. It is recommended to introduce more examples of incentives applied to southern Europe countries. More practical examples should improve understanding of the details and contents of the module.

Table 5: Greece - trainers' recommendations

Italy

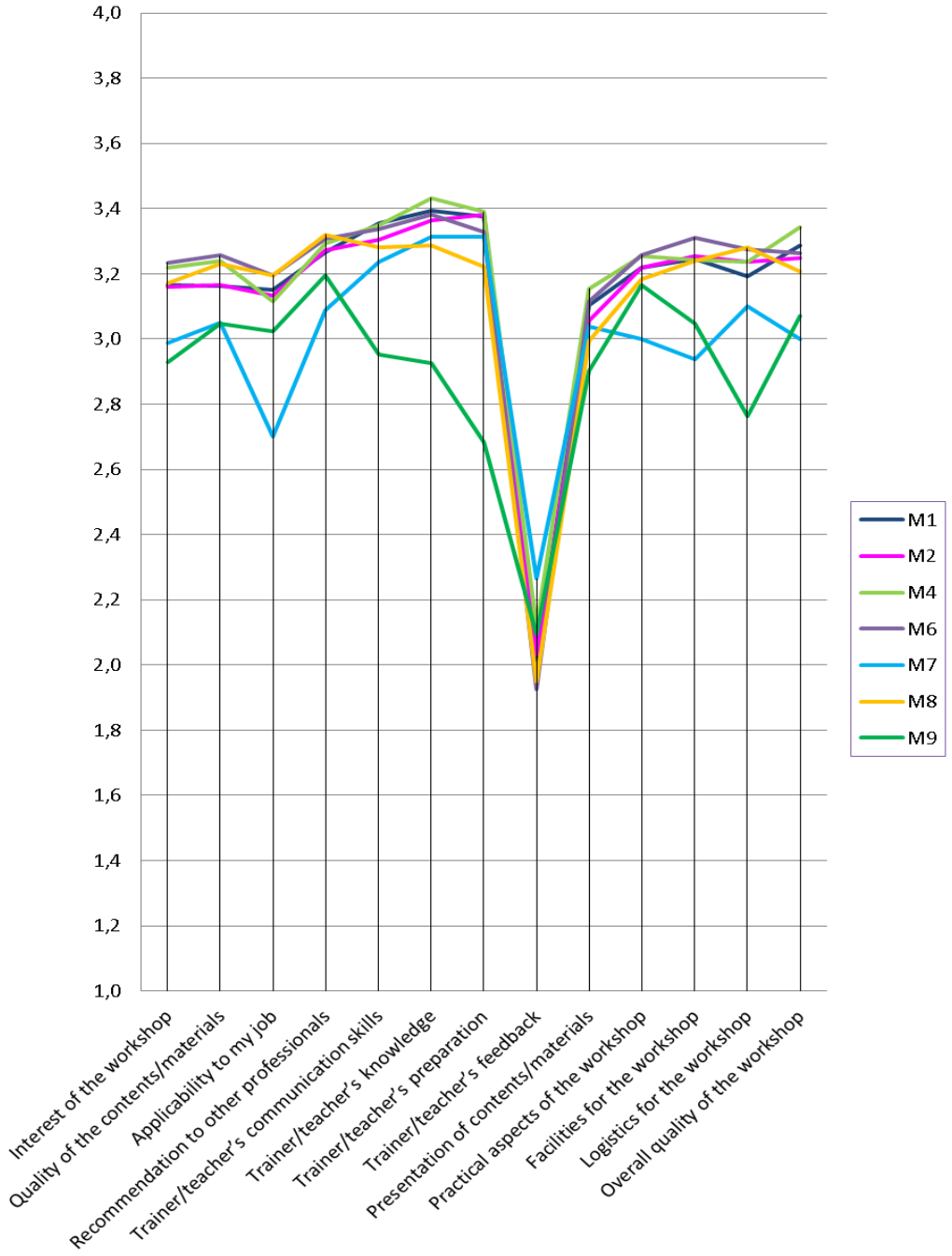


Figure 17: Italy – trainees' evaluation: questions 1-13

The variation of the data distribution shows a remarkable behaviour. For most of the questions a range from 2.7 to 3.4 is observed with a mean near 3.2. But for all questions there is a remarkable drop in the satisfaction level for all modules down to 2.0 to 2.3. So, the participants were highly satisfied with the workshops and trainer's performance but some clarification about trainer's feedback seems to be discussable.

One can assume that content and module preparation as well as teacher's knowledge and presentation skills were highly satisfying for the trainees.

Comments from trainees

M1

- It would be helpful to have the slides before the training
- Slides should be sent before the training in order to better follow the teacher
- Slides should be sent early in order to better understand the training and the preparation
- As company, we want to contact you for clarification on our products
- To repeat focusing on specific topics
- Better care of the planning
- Make available course material by email or on the Professional Association's website
- Some further practical cases in addition to those already seen
- Send the slides to the participants
- The first part was too long, it has been focused more towards design principles of passive house rather than NZEB. In addition, for workers in the industry who operate in the field of research, the contents were a little ordinary.
- Very interesting. Possible insights and more specialized courses
- Small conference room and not well aerated
- I did not know nZEB concepts but paradoxically now I have been widely satisfied with the given "input" to increase knowledge
- It would be useful to combine the technical concepts with some examples of nZEB architecture to compare them with existing architecture and analyze them.
- In the feasibility of the SouthZEB project in the province of Catanzaro, I recommend the acquisition of territorial knowledge since the customers are almost too poor to benefit from advantages in the investment area.
- Too much theory and less application
- Later it should be specified (through a purely technical figure) how to apply the materials given during the training and to have this as a help on the design for a correct application.
- The conference room is not adequate, there would have served benches and a notebook to take notes
- The logistic organization should be improved. Complete absence of information (brochures, notepads, pens ...). Bad form by the hostess. A mini coffee-break would have been welcome.
- Interesting topics, little known here. To offer more advanced courses in the future.

M2

- Location not suited for outdoor climate
- Too much theoretical content, there should have been application exercises
- A bit too theoretical, there should be some application examples
- Graphics of the slide a bit bigger, for remote reading: it helps the attention
- To equip the presentation of a more analytical presentation, with numerical examples and calculation methods and less Illustrative
- I believe the discussion should be summarized as there are topics repeated many times, repeated concepts which then force the exhibitors to rush and it is more difficult to follow.
- These seminars are of little use for professional purposes. Now it is plenty of information material. If the books are well made, they remain irreplaceable and always ready when you need to consult them.
- Practical examples and more usable schemes
- The course could be "cut out" depending on the type of participants, avoiding making a roundup of all the slides of the modules, but thinking of the key points that should be presented and sent to the participants at the course
- The use of materials or methodologies mentioned is of considerable importance. The economic problem that now affects our nation, far exceeds the importance of using methods / materials mentioned in the workshop. We have to find the funds to implement the building according to the methods and materials under discussion.
- For those who are professional energy certifiers (or know the topic well) the seminar is not enough, I would have preferred to see the projects analyzed in the Mediterranean area
- In the slides, it would be appropriate to include more pictures and less text, to make the presentation less demanding and maintain the attention active. Add the text in the documents to be delivered to the participants, in order to analyze the information learned in the seminar later, on their own.
- The slides have too much text and few images

M4

- Provide more technical documentation to the participants
- Generally, very attractive. If it is possible it would be great if you could organize other training meetings
- A good course on nZEB buildings, clear contents and deepened in future meetings. Nice and very ambitious project but also very powerful for the dissemination of knowledge especially in the south of Italy
- These workshops are very good because they increases the level of culture and preparation, then add it and practically adopt it in the workplace, see technical advices to outsource to manufacturering companies which need to use construction methods mentioned in the construction of nZEBs
- The availability of the teacher (his preparation) allowed me to solve problems for the design of a small photovoltaic power station of about 250 kwh peak. My vote is 10.
- Too many slides with too much text and few images
- More CFP (professional credits for the Association of the Professionals)
- To organize them more frequently
- More practical examples for a better understanding

M6

- Other editions of the courses with the possibility of attending other modules in addition to those provided
- 16 hours in 2 days I believe are too many for both the degree of learning and for the attention. Maybe better to do 4 hours per day for 4 days.
- First was part too general, the best was the second part
- The course has been planned to be moderate in high schools, the first much more technical than the second
- Deepen the topic “BIM”
- It could be given a practical example to manage together
- More application examples of building structures for a better understanding
- It is all ok. My evaluation is positive. Evaluation number = 10. Days 26-27/10/2016
- Sorry for the comment: boring, boring, boring
- Passive reading of slides. Less passion and interactivity.

M7

- It would be useful, especially for the first presentation, to have the original versions of the presentation (I think in English language) as the translation is badly performed and often misleading
- The first part quite slow and too general; excellent the second part, practical and perhaps too fast for the sake of brevity available time

M8

- Interesting topics, good trainer, very prepared. Interesting dialogue and reflections at the end of the test for the evaluation of the responses.
- Interesting analysis of nZEB themes, good the trainer who knows many things
- Interesting project. Other modules available? Will you be able to organize other courses in the future?
- Rather well satisfied
- More technical information material should be distributed
- Difficulties in reconciling interesting courses with other work commitments - activation of on-line courses?
- More in-depth about the comparison and conveniences of savings from the expenditure of maintenance between buildings which are more ... and low-energy buildings

M9

- To be done jointly with Professional Associations to have the professional credits because the themes are very current and interesting
- To improve the material and the translation from English to Italian

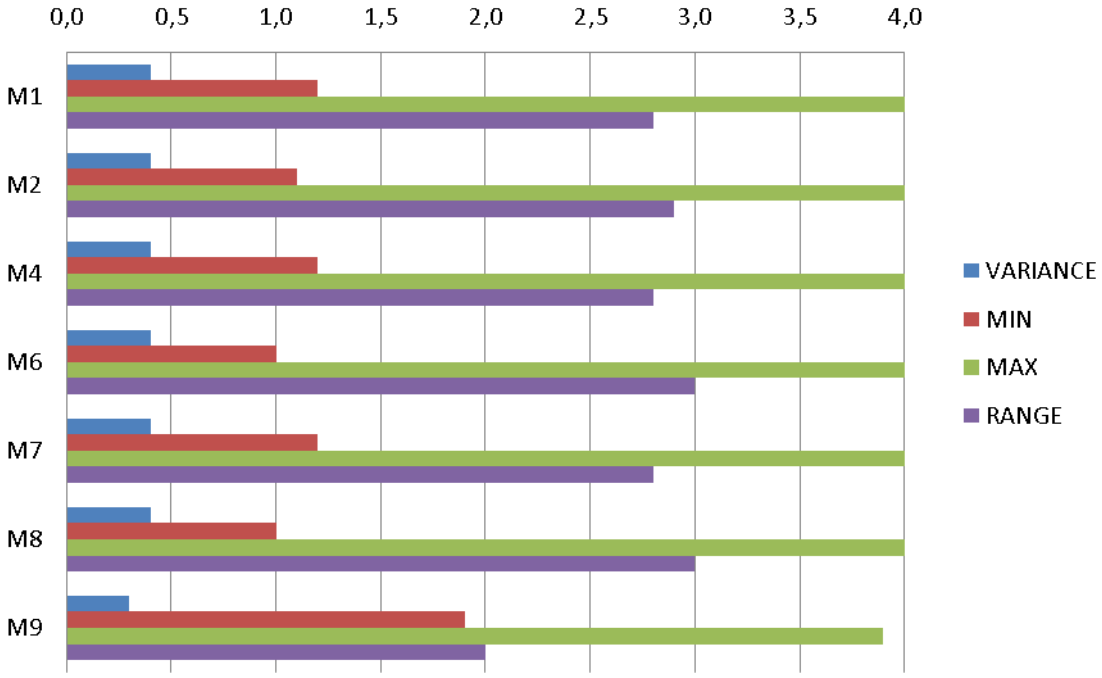


Figure 18: Greece – trainees' evaluation: sum questions 1-13: average values for variance, min, max and range

This analysis shows the data distribution from trainee's evaluation. In every module one can find the highest values, only M9 is a little lower with 3.9. The trainee's evaluation has a wide spread distribution in ranges to 3.0 and large differences in trainee's satisfaction can be concluded. For these modules, a more homogeneous quality of presentation and contents should be improved.

M9 shows best performance compared to the other modules. This module shows the highest min value, lowest variance and lowest range.

M6 and M8 shows the highest range with the lowest min value but also a higher variance, indicating a broader distribution characteristic. Obviously, the trainee's evaluation results are highly variable and different for the different topics of question 1-13.

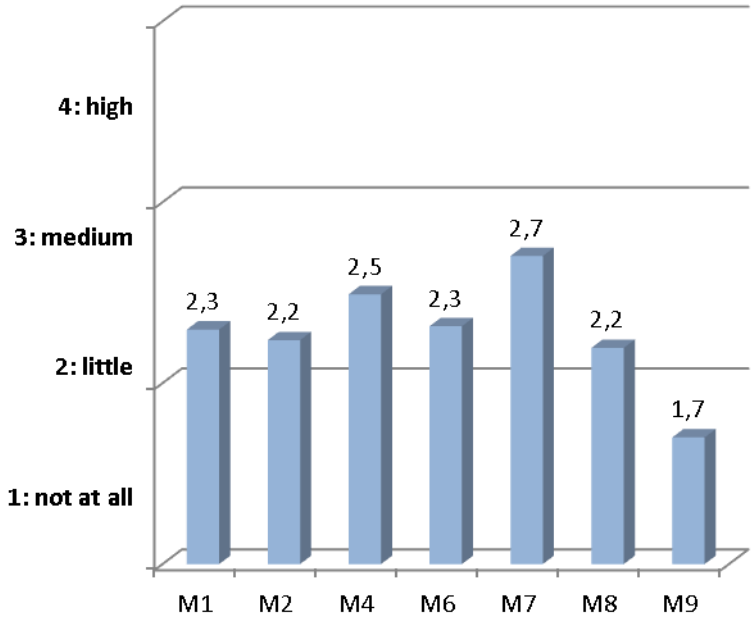


Figure 19: Italy – trainees' evaluation: difficulty level of the workshop

Characteristical variables for difficulty level of the workshop over all modules	
Mean	**2.3**
Min	1.7
Max	2.7
Range	**1.0**
Var	0.08
Std. deviation	0.28

The analysis for pace of the workshop over all modules shows a mean value of 2.3 with a range of 1.0.

The analysis of modules is characterized by a small scatter from 2.2 to 2.5 for M1, M2, M4, M6 and M8. The high range of the distribution (1.0) can be explained by the differences in M7 and M9, otherwise the dataset would occur almost homogenously.

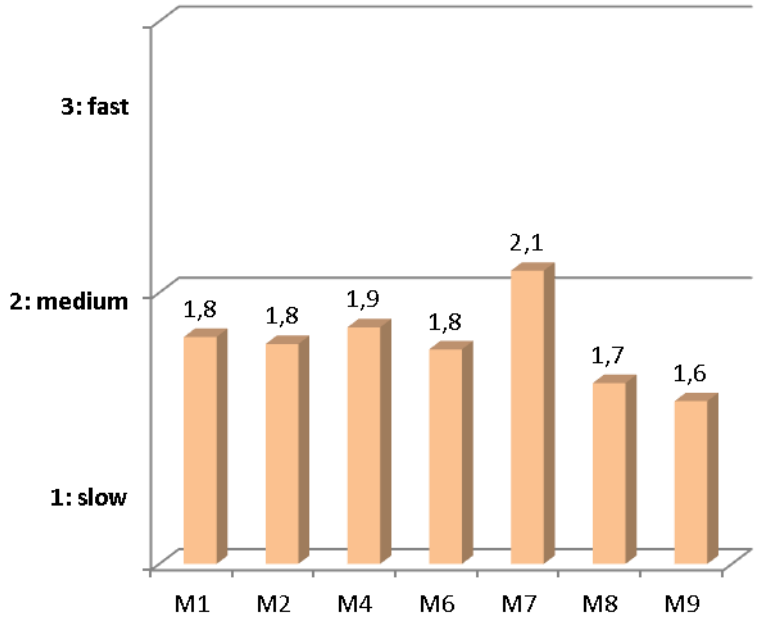


Figure 20: Italy – trainees' evaluation: pace of the workshop

Characteristical variables for pace of the workshop over all modules	
Mean	**1.8**
Min	1.6
Max	2.1
Range	**0.5**
Var	0.02
Std. deviation	0.15

The analysis for pace of the workshop over all modules shows a mean value of 1.8 with a range of 0.5.

Analysis of the pace data showed that medium or lower range is observed for all modules, with only one exception for M7, so it seems to be convenient for most of the participants.

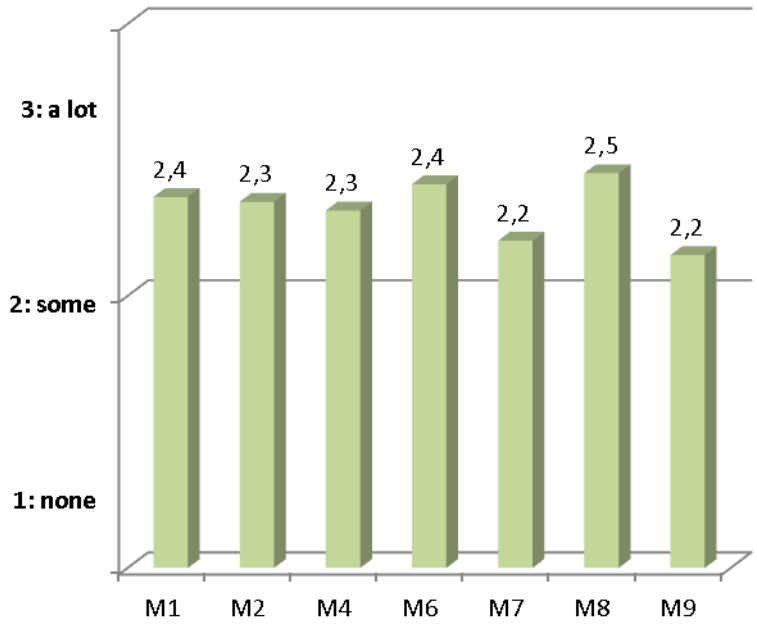


Figure 21: Italy – trainees' evaluation: new knowledge gained with the workshop

Characteristical variables for new knowledge gained with the workshop over all modules	
Mean	**2.3**
Min	2.2
Max	2.5
Range	**0.3**
Var	0.01
Std. deviation	0.1

The analysis for new knowledge gained with the workshop over all modules shows a mean value of 2.3 with a range of 0.3.

The distribution of new knowledge is almost stable and homogeneous about the mean value of 2.3 with low range of 0.3, So the gain of knowledge for the participants is a very positive result for all modules.

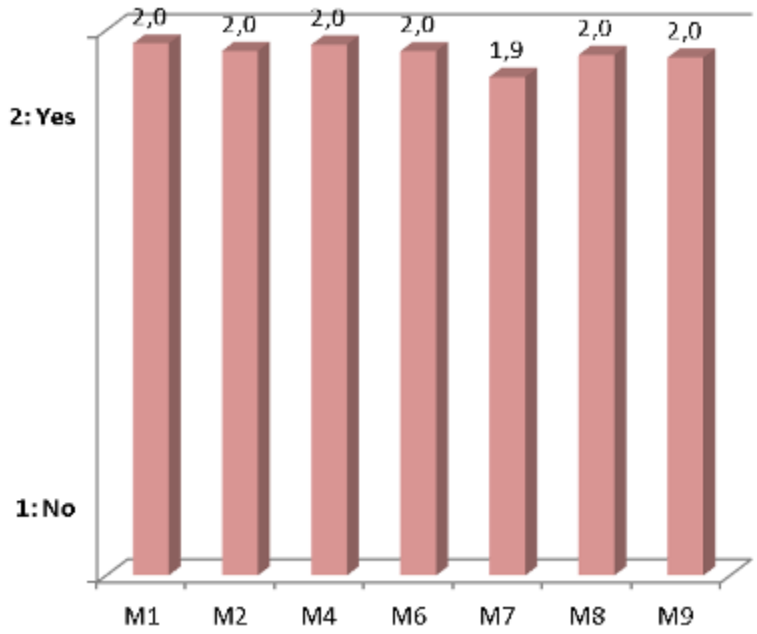


Figure 22: Italy – trainees' evaluation: satisfaction with the workshop

Characteristical variables for satisfaction with the workshop over all modules	
Mean	**1.98**
Min	1.9
Max	2.0
Range	**0.1**
Var	0.0012
Std. deviation	0.04

The analysis for satisfaction with the workshop over all modules shows a mean value of 2.2 with a range of 0.7.
The distribution of satisfaction levels shows very low levels of scatter represented by the range of 0.1.
The analysis of satisfaction with the modules occurs at a very high degree through all modules. The organisation and performance was obviously very satisfying to the trainees in general for all modules.

Module 1
More country specific information is recommended by a number of trainers. More practical examples, particular national examples and more application details with practical exercises would improve the content of the module. For improvement, more practical examples should be included in the presentation. Less details of HVAC Material on HVAC systems as well as European directives should be reduced.

Module 2
Some aspects of the module were repeated several times; this should be avoided. More summarized slides and more images, pictures and diagrams could improve the presentation as well as more national examples. Details of HVAC should be shortened and slides could be more clear and simple. Repetition of topics and subjects should be avoided. More practical examples should be included in the presentation.

Module 3
Improvements of some slides is necessary, because of too much text. The contents of the slides should be improved for a better understanding. It was mentioned to enhance the number of numerical examples on U-values and thermal bridging contribution to overall losses.

Module 4
The presentation should be simplified and more practical examples and exercises will help to improve the module. More examples of good practices connected to nZEB should be included in the presentation. More practical exercises using free software will help to improve the workshop.

Module 5
Less detail in the operation of HVAC Systems and more practical examples, cases and exercises could clarify the content of the module. More pictures, graphs and other visual elements will help to clarify the content of the module. It was stated, that more practical examples could improve the presentation.

Module 6
It was recommended to reduce details on the equations embedded in the software and a more in depth explanation of the simulation software is highly recommended. Seminar duration should be increased and more practical examples in terms of exercises and homework could improve the understanding of the presentation content.

Module 7
Examples related to the most relevant topics should be included. For improvement of the workshop more details in the presented technologies should be provided.

Module 8
More practical exercises and examples should be included and recycling of contents should be avoided. Case studies should focus more on national topics, therefore details of other countries should be reduced and for improvement, the provided material should be increased as well as an in depth study of the financial analysis should be undertaken.

Module 9
It is recommended to redesign the content of the module or optimize the duration of the module. The number of slides could be reduced as some of the content is repeated even in the same module.
For improvement it was stated, that more practical examples are needed and some material was already presented in previous modules.

Module 10
It is recommended to introduce more examples of incentives applied to the national situation. More practical examples should improve understanding of the details and contents of the module. To improve the workshop, more information on practical aspects concerning the application to get funding should be included.

Table 6: Italy - trainers' recommendations

Portugal

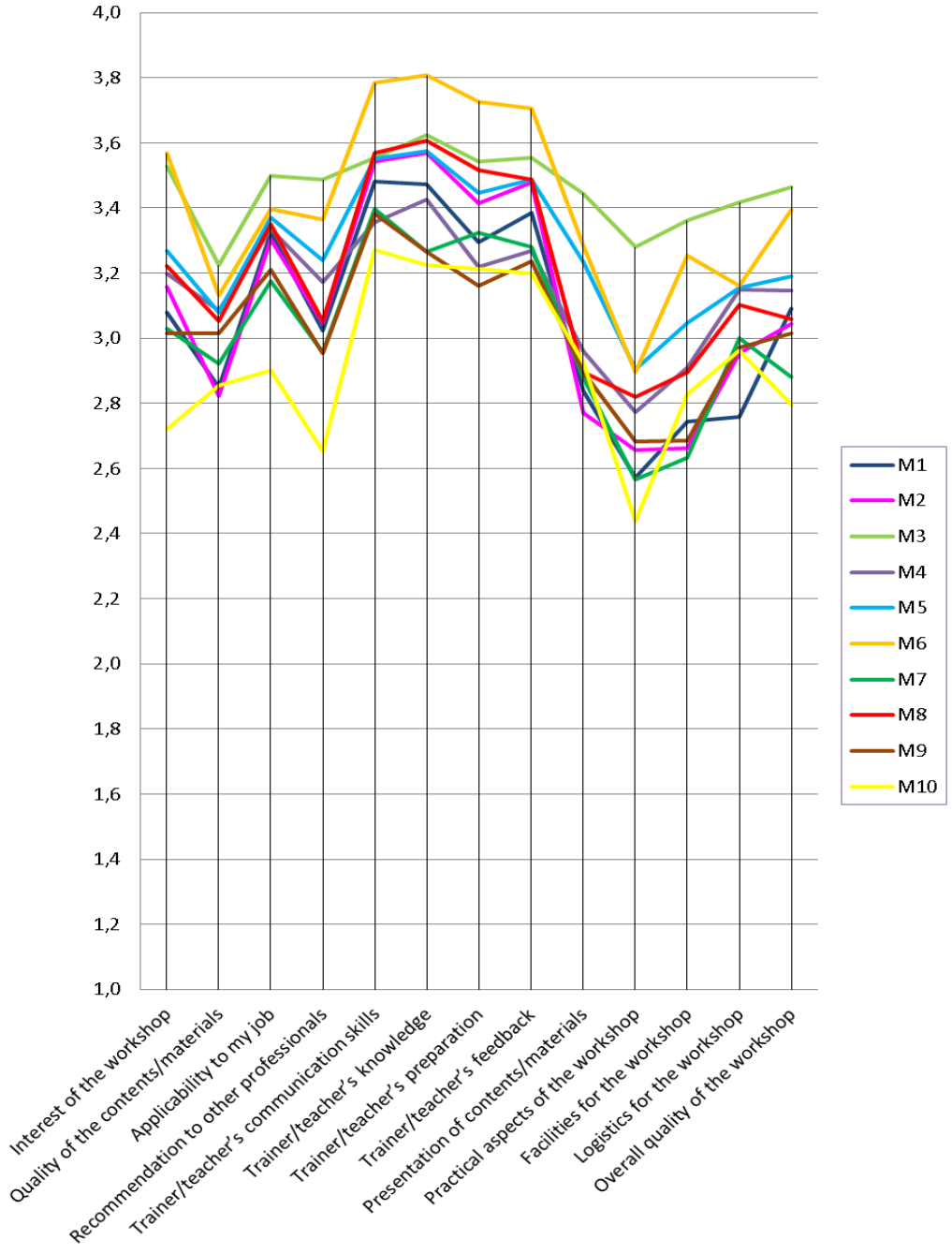


Figure 23: Portugal – trainees' evaluation: questions 1-13

The variation of the data distribution is high with a scatter of 2.5 to 3.8 compared to other evaluations, over a wide range the data are very near to mean value 3.1. So the participants were very satisfied with the workshops and trainers performance. The evaluation data for the modules show a very similar behaviour over the range required.

The variation of the data set shows two remarkable regions. One is an increase in teacher's communication skills and teachers' preparation. One can assume that content and module preparation as well as teacher's knowledge and presentation skills were highly satisfying for the trainees.

The second region of interest is a decrease of assessment values in terms of practical aspects of the workshop and workshop facilities. For this section some improvement seems to be helpful.

Comments from trainers

M1

- training a little disorganized mainly in the material distributed to students. On the first day too much importance is given to the HVAC systems and very little attention to insulation and building types.
- I think that the training is not organized as it should, during the training we were interrupted several times which destabilized the presentations and it seems to me that there are still some uncertainties in relation to this matter, which was reflected in how the trainers approached the theme.
- Regarding the trainer Patricia Botelho the content was presented in a clear and interesting way, revealing a high knowledge of it. The trainer of HVAC (AldaNeto) lack of knowledge of the content presented, so I consider it a waste of time in a matter with such importance as the assessment of the HVAC systems, the major consumers of energy.
- The trainer was not comfortable and clearly did not prepare the module
- Despite all the knowledge that probably the trainer has, she was not comfortable while presenting.
- The trainer managed to capture the attention and interest in a difficult topic
- Excess of HVAC training
- It would be interesting to introduce concepts and examples of NZEB project
- "The structure of part of AVAC does not follow a sequence that starts from simple to complex and does not give priority to issues such as: concentration of adequate CO2, ventilation rates, etc.
- There are some failures in the translation."
- The first part was very useful and interesting. The second part was not very interesting despite being a very important topic.
- This evaluation refers only to the part of HVAC.
- Schematics and diagrams in English were not very enlightening
- As HVAC systems will be given later, these hours could be used to give general concepts and how the NZEB design would function
- The trainer of HVAC was not at all comfortable and clearly did not prepare for the class
- Since there were no questions I cannot evaluate questions 4). Only reading the slides clearly does not seem the best way to give the presentation.
- Sources of tables, etc. The trainer did not prepare the module
- Poor presentation. References missing. Some concepts could be explained in more detail.
- Module directed to energy assessment technicians.
- Need to be more focused on the national context.
- Presentation should be improved and more adapted to Portuguese context.
- Content not adapted to Portuguese legislation. Content too basic.
- The trainer presented a practical view of the topics. Very positive.
- "The contents have fallen short of my expectations. The contents are framed by legislation distant from the real needs and advocate very technological and energy dependent solutions. The solution is to improve the building envelope and use bioclimatic techniques instead of prescribing indefinitely equipment.
- In future It would be useful to divide the training in specific modules for architecture and others for mechanical engineering.
- I would also like to appeal to contemplate the embodied energy in the materials / equipment (in production / transport) in nZEB."
- Excessive use of practicing professional examples when the subject was about legislation
- it would be advisable that the training was only initiated after the definition of the nZEB requirements because in the present situation makes every professional dispense twice the time required
- The trainer should be more dynamic
- The trainer despite showing good skills in the area of buildings and energy, had no skills in terms of efficiency energetics. The trainer exaggerated the criticism of the concept, to the certification and demonstrated lack of knowledge of the slides contents and about the NZEB concept ("too expensive", it will not take place, " makes no sense ")
- Not focused on NZEB.
- Low relation with the Portuguese reality
- The contents of the training don’t seem too useful in practical terms. I expected more practical information and specific about ZEB
- Training is designed for an initial level, for people without experience and should have a deeper level for experienced technicians.

- The slides should not contain errors regarding the formulas generating confusion in the content interpretation.
- Much information presented in a simplified way and other information is not in accordance with the current legislation
- The information on the slides is very poorly prepared / organized, containing concepts presented often incorrectly or inconsistently. Some information presented is not adequate to our reality.
- I think more concrete measures with practical application in nZEB buildings should be introduced
- Basic concepts.
- Need more attractive slides, with less text.
- Knowledge of the trainees is very different. Due to this the seminars are less relevant for the trainees that want to improve their knowledge.
- Contents more related to nZEB concept. Procedures.
- I think that the room was not suitable for training
- Very good training
- Considering the specificity of the topic, it makes no sense to join in the same class architects, civil engineers and mechanics, among others. The training is too general and ends up not satisfying anyone

M2

- Very focused on mechanical engineering, which causes me some difficulty to follow, there are concepts with which I am unfamiliar
- I do not understand the difference between SouthZEB and ZEB. I did not find specific contents of southern Europe. The use of passive house standard is inadequate.
- Lack of knowledge and reading just slides does not seem a training or a workshop. Also revealed a lack of technical knowledge. Taking into account that the trainees are mainly civil engineers and architects with experience, the content given is very basic and for students of 1st year of university.
- Sometimes the voice of the trainer was muffled by background noise in the room
- I do not understand the relevance of detailed knowledge of air conditioning machines for the concept of NZEB, because as we know the HVAC increases the energy consumption of buildings.
- The trainer was significantly more comfortable than in the previous module.
- Duration of contents is inadequate, too much time with the theme HVAC and related topics
- Excellent training and knowledge of the concepts and Portuguese reality
- Once again reveals a lack of knowledge of the concepts that is being transmitted, the trainer talked about building systems and then did not explain the operating principle of it and moreover transmitted misconceptions level of installed systems. Probably you should have put a civil engineer or architect in charge of teaching these subjects.
- Should have, in future workshops, a more careful language to disseminate to all areas of engineering
- The sequence of contents does not correspond to the sequence of the module's bibliography
- Too much information
- Discussion of contents during class was very interesting.
- Slides not well organized. Too much information not relevant to nZEB.
- Contents should be more adapted to national context.
- Presentation is too dense.
- Too much information.
- Information needs to be adapted to Portuguese context/legislation.
- Debate very useful.
- The trainer literally read acetates, not being minimally prepared to teach the module. Sincerely it seems to me that in general the trainers are not taking the training seriously which makes me wonder if it is worth being here.
- There is some repetition in the slides of the various modules. Sometimes the trainers have some difficulty to manage time, dispersing by themes that add knowledge but that deviate from the central theme of the module.
- Mismanagement of time, despite good transmission of knowledge
- The trainer did not use the time well
- There is repeated content in module 1 and 2
- I think that time is short for the amount of content. There should be a better relation between time / content. There is a repetition of the concepts throughout the modules.
- There was a great difference between the various trainers. The architect Manuel Carvalhosa talked about contents not focused on SouthZEB.
- Information. Not well organized.

- I believe that the training is not well structured, there is no objectivity, which makes the work of trainers difficult. For this reason I consider that the content should be resumed.
- The trainer had no knowledge in the area, and merely read the slides. In certain slides this reading showed lack of knowledge about the content and poor preparation of the class. He also expressed suspicion about the NZEB concept and the promotion of energy efficiency in general. No ability to transmit knowledge.
- The trainer spoke of his personal experience and professional (in excess) not following the structure of the slides. Showed lack of knowledge about the contents and when asked gave no concrete answer. No ability to transmit knowledge
- Trainers should have the minimum knowledge of the contents, communication skills and better preparation, which did not occur. contents are repeated. Too much information.
- Connection between LCA and nZEB was not presented.
- The slides have a large amount of information, for studying, not suitable for a class.
- Very focused on AVAC
- Shading is repeated. The sequence of topics is not well organized.
- Information. Not well organized.
- Directed to professionals with experience.
- Some content is repeated.
- lacking concrete solutions and ideas to apply
- Presentation is too dense.
- Some content is repeated (M1)
- Choose trainers with relevant professional experience and more practical content.
- The training is poorly structured, trainers are very badly prepared and they teach the matters for which they do not have the minimum qualification, supported in presentations full of scientific, translation and spelling errors. Frankly I think the level of training is below the minimum required.
- Module 1 and 2 with many concept repetitions. Even in the same module there are repetitions in the different sessions. Trainers with questionable training in the area which they teach.
- Some trainers do not have adequate knowledge of the contents. For example the contents of HVAC that were taught by civil engineers, could have been taught by a mechanical engineer who has greater knowledge of the subject. Modules 1 and 2 have many repeated contents; modules could be merged into one, condensing the contents.
- Modules with repeated contents should be organized. Examples of Nordic countries with different realities of the southern countries. Technical terms used in the translation are hardly perceivable.
- translation of the slides by specialized technicians in order to avoid improper terms (not technical) and even spelling errors.
- Synthesize the slides so there are no repetitions." Greater specialization of trainers and avoid repetitions
- the exam should take place at the end of each module, the analysis of each slide should be performed more slowly
- Slides more summarized and more practical examples. Avoid unnecessary repetitions
- The slides go with any framework, for those unfamiliar with the subject, to a level of detail excessively technical even for those who work in these areas without the capacity to explain these technical terms. The same information, images and diagrams are repeated over and over.
- the course is poorly structured and who does not know does not learn
- No questions were asked, probably due to the format of the formation. The documentation has a low quality.

M3

- Content should be more focused on Portugal./ Slides very concise and appellative.
- Slides very concise and appellative.
- more developed. Detailing the different types of thermal bridges, with a computational analysis.
- In various presentations appears "buildings of almost null energetic consumption." it seems to me that the word "consumption" refers to “balance". They should review the terminology.
- The room does not offer good conditions for trainees. I suggest room with tables arranged in "u" or amphitheatre.

M4

- The trainer, besides not being completely comfortable with the contents and, perhaps this is why, the trainer was lost on the topics, spoke of contents not covered by the program.

- More national practical examples. Approach directly the needs of our territory (south, center and north)
- The trainer blamed architects for the lack of natural ventilation, neglecting the role of engineers. I do not understand why there are architects as trainers.
- the training focuses on issues that are not the most essential for NZEB
- Better training of trainers. Revealed lack of knowledge.
- Too much detail.
- Need practical cases
- Too long. Too theoretical.
- Too focused on calculation methods.
- Too much information. Contents not related to nZEB.
- Too theoretical.
- Practical cases missing.
- Too extended.
- More case studies. Use simulation performed on Module 6 for case studies.

M5

- Excellent trainer with practical sense and deep knowledge of the content
- Part of the session repeated previous contents
- The trainer was clear and promptly prepared their presentation
- Title of the Module is misleading (thought it was related to vernacular architecture and not standards and legislation)
- Focused on legislation (that is systematically referred on the different modules). It would be more interesting if it was focused on the local architecture.
- Presentation has a lot of text and is repetitive.
- The connection between the topic and the seminar is not clear.
- CE labeling is out of scope in this module. Too based on legislation. Contents are repeated.
- This module should be mandatory. Some contents are repeated from Module 1.
- Too much repetition of contents during the training!
- Generic. More case studies and exercises are needed.
- too much repeated information

M6

- Well organized
- Very interesting. With high return.
- Very interesting.
- Very useful and well organized.
- Well organized
- Very interesting. With high return.
- Very interesting.
- Very useful and well organized.
- More interaction needed.
- Theoretic overview of the software was not sufficiently presented. The way of introducing data was presented, but not its functionalities.
- This Module This module needed to be longer. More time is necessary to develop the topics, namely simulation parameters.
- It is an expository/practice module which always needs plenty of time to get a result. The program delivered by mail should have been more complete.
- I think there is too much dispersion in the contents lacking tangible goals

M7

- The module was taught in a reasonable way. There should be a better distinction made between systems and specific technologies for buildings of services and housing.
- Location of training should be in Lisbon
- The didactic materials lacks some corrections especially in translations
- Congratulations to the trainer, very enlightening and good communicator
- Some information is not accurate.
- Some information is not correct and other is not up to date
- Too many incorrections. Small amount of content adapted to national content
- Topics too repetitive and not detailed.

- Presentation has errors.
- Examples for Portugal are missing.
- The title of the module is misleading. A lot of the contents are repeated. Expecting subjects related to demotic and automation.
- More examples related to the south of Europe are needed.
- Contents are repeated from M1 and M2. Tables and graphs are not adapted for Southern Europe. In the examples the cost of storage is not considered.
- Very interesting.
- UK regulation should be replaced by national codes. Use national examples. Meaning of acronyms is not referred.
- Some slides have lots of information (and thus, it is difficult to fully understand them).
- Slides with too much information (19-20 lines).

M8

- He prepared in advance of class and brought contents besides the ones described in the slides, a situation that was not the case with other trainers who were limited to fully reading the slides.
- Room conditions, including excessive heat and lack of internet access
- More practice (exercises)
- Exercises optimal cost - very fast and poorly explained.
- Audits - repeated for other modules. Lost the theme "Rehabilitation in the NZEB context."
- The management of time is not good, with various topics with too much time without adding new knowledge. Nevertheless the module 8 is better than the previous (M1, M2, M4 and M5) which deals with the issues in a superficial way and repeats itself.
- Too much information.
- Practical part of the module was very useful.
- "Could be introduced in the presentations:- Examples and case studies with results analysis;- Take advantage of the experts who are trainees and stimulate discussion with sharing of experiences / best practices between the group;- Show many more examples of NZEB buildings detailing good practices; - Introduce issues related to local resources, energy efficiency in urban design, water and other
- resources such as local food."
- It would give credibility for the training if the trainers had a more positive attitude towards the subject and organization of training
- He was not well prepared to teach the module but the performance has improved compared to the previous module.
- Slides have errors and are not properly translated. Introduce great uncertainty, generate global discredit and create difficulties for the trainer.
- The training should take place in Lisbon, the contents of this module are a little repetitive in relation to others already taught. The presentation of some practical cases is a positive aspect.
- Too much material / information for the time of study and class. There are too many slides for the training time and the information appears over several modules dispersed and repeated becoming not very objective.
- There is a lot of repetition of topics covered in the module 1 and 2. Eliminate repeated contents and take longer detailing contents not repeated.
- In this module there is an excessive amount of repeated information from the previous modules.
- "I think that in a global way there is a lot of repeated information in the various modules and that the presentations have too many slides. Organizing the training a little better
- it would be possible to reduce the number of slides which would give more time for the trainers to speak a bit of their experience and give some practical examples. Also if the information is a little more separated and organized by key topics (without repetitions in the various modules) it would be easier to choose the best prepared trainers for each subject.
- The trainers should at least hold training in the area on which they deliver the training.
- Detailed explanation of the practical example
- Too much information.
- Case studies should be reduced.
- Practical part of the module was very useful.
- It is necessary to avoid (eliminate) the repeated contents.
- The seminar was too focused on systems, but not its adaptation to renovation works.
- More contents related to renovation should be included on the 1st day.
- Repeated contents.

- Some of the module content is repeated from previous modules

M9

- Too many repetitions between modules. Not adapted to Portuguese context.
- A high number of slides are repeated. presentation is too long. Less detail would be better.
- Generally the training was poorly prepared with excessive time for each module. The information was wrong on several slides and should have been reviewed by someone in mechanical engineering. We deserved better.
- This module should be reviewed and directed to the management of construction and no to product checklists.
- This module was given three trainers who had no knowledge of subjects, supported by documentation with many errors. It is lamentable that IST associate with so badly organized training.
- Very repetitive.
- The contents should be more detailed with fewer repetitions between modules. There should be more interaction between stakeholders and exchange of professional experiences. The contents should be addressed with greater relationship with the national laws and regulations. All data relating to statistical data should be updated.

M10

- It was not necessary to present the financing programs in such detail. It was only necessary to refer some measures and then the trainees would consult the information provided.
- Insufficient international information
- Seminar focused on nZEB certification and Assessment. It should be focused on conception and construction.
- High amount of information not fully explained.
- National examples should be more focused because they have already existed for some time.
- There were no examples in Portugal
- Too much information from United Kingdom
- Lamentable the lack of national examples
- I question the time spent on presenting financing systems and policies of other countries
- More Portuguese and southern Europe cases and more enthusiasm to transmit NZEB
- The approach to national and southern reality of Europe is minimal. Only relevant for those who will use the funds for construction in northern Europe (UK, France). About 130 slides are not very focused on Portugal.
- Since we are in Portugal does not justify to present the UK panorama
- The results of each one of the programs are not presented.
- Need to relate to the South European Countries context.
- Contents related with financing in other countries were too detailed. Slides with too much text.
- Too much content in each slide.
- The seminar is about SouthZEB, but the contents are related to UK.
- The contents are too detailed.

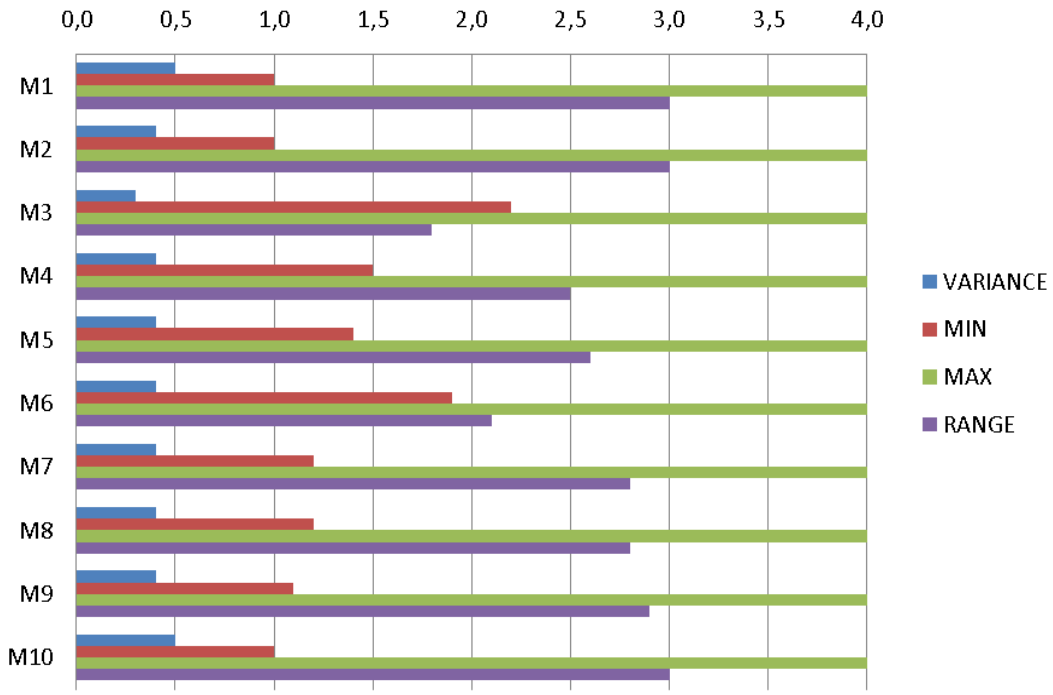


Figure 24: Portugal – trainees' evaluation: sum questions 1-13: average values for variance, min, max and range

The most important and obvious fact of this analysis is the high number of modules showing high-range values. M1, M2, M7; M8, M9 and M10 show the highest range values, so the trainees evaluation has a wide spread distribution and large differences in trainee's satisfaction can be concluded. For these modules, a more homogeneous quality of presentation and contents should be improved.

M3 shows best performance compared to the other modules. This module shows the highest min value and lowest variance. The evaluation distribution of this module appears as very stable for the whole set of questions of the evaluation.

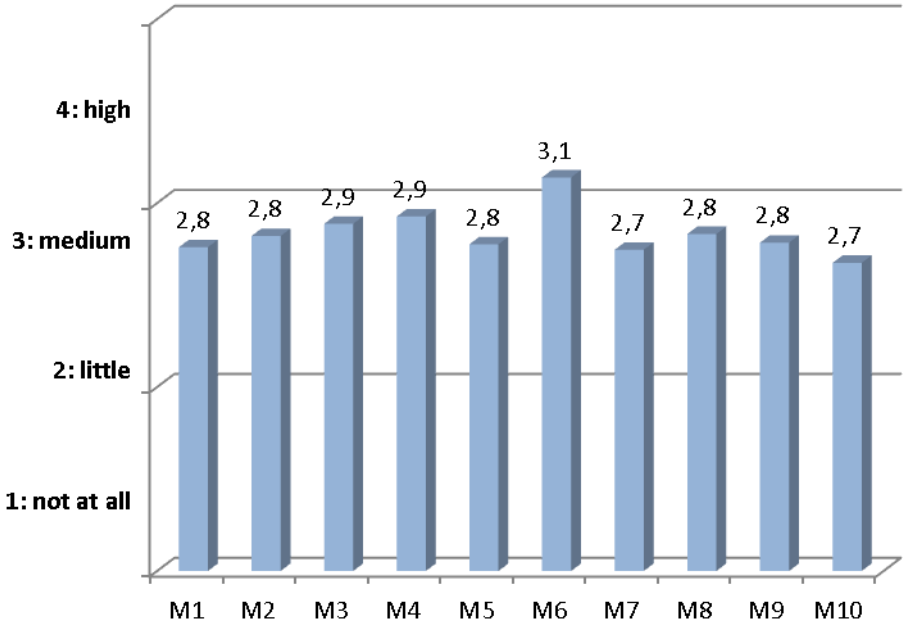


Figure 25: Portugal – trainees' evaluation: difficulty level of the workshop

Characteristical variables for difficulty level of the workshop over all modules	
Mean	**2.8**
Min	2.7
Max	3.1
Range	**0.4**
Var	0.01
Std. deviation	0.11

The analysis for difficulty level analysis of the workshop over all modules shows a mean value of 2.8 with a range of 0.4.

The analysis of modules difficulty is characterized by a degree of medium throughout all modules with a small scatter. Over all, the modules are evaluated very homogeneously and no significant difference between more technical and legislative contents can be observed.

The presentations were obviously well prepared and presented in good agreement with the technical contents for different issues of nZEB.

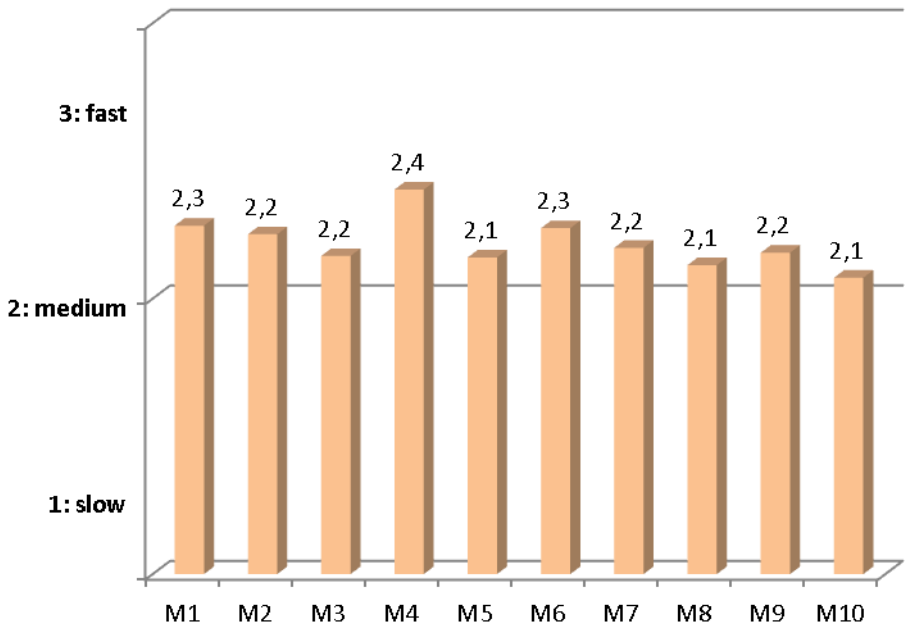


Figure 26: Portugal – trainees' evaluation: pace of the workshop

Characteristical variables for pace of the workshop over all modules	
Mean	**2.2**
Min	2.1
Max	2.4
Range	**0.3**
Var	0.01
Std. deviation	0.09

The analysis for pace of the workshop over all modules show a mean value of 2.2 with a range of 0.3.

In this dataset pace evaluation is distributed very homogenously with a small scatter between all modules, so pace of the workshops was medium for most of the trainees.

There is only one exception for M4 with a somewhat higher value of 2.4, but due to the low range of 0.3 of the whole dataset, this cannot be interpreted as significant.

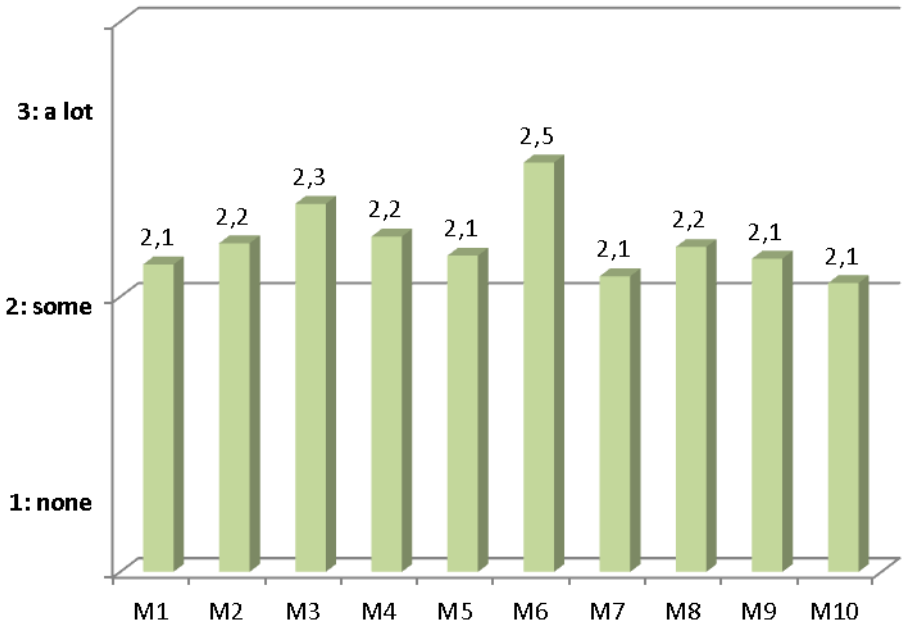


Figure 27: Portugal – trainees' evaluation: new knowledge gained with the workshop

Characteristical variables for new knowledge gained with the workshop over all modules	
Mean	**2.2**
Min	2.1
Max	2.5
Range	**0.4**
Var	0.01
Std. deviation	0.12

The analysis for new knowledge gained with the workshop over all modules shows a mean value of 2.2 with a range of 0.4.

The distribution of new knowledge is almost stable and homogeneous, about 2.2 with a small range compared to other evaluations (0.4), with highest value for M6 (2.5), where a slightly higher rate of knowledge transfer is observed.

So, the gain of more than some new knowledge for the participants is a very positive result for all modules.

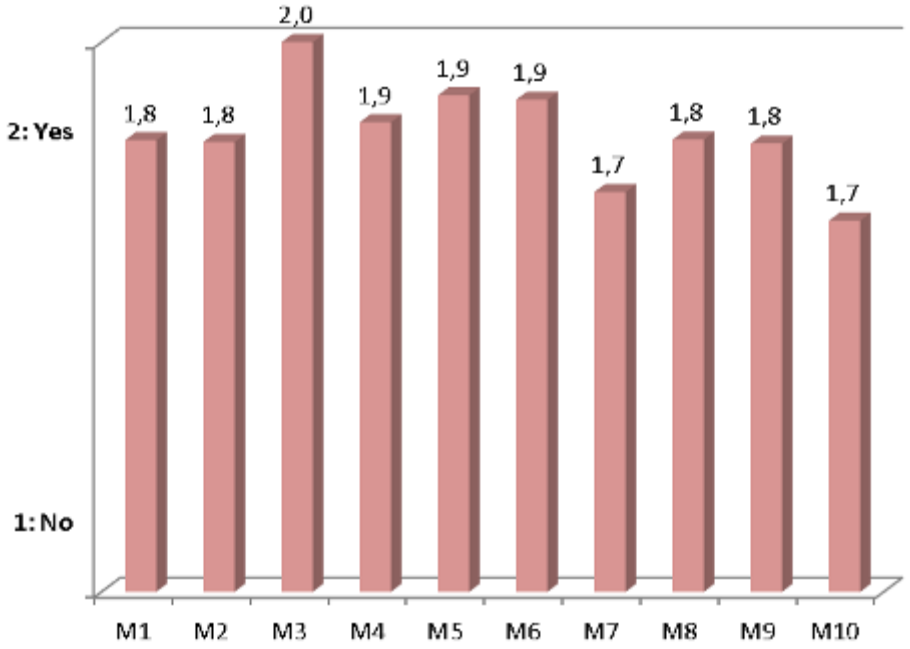


Figure 28: Portugal – trainees' evaluation: satisfaction with the workshop

Characteristical variables for satisfaction with the workshop over all modules	
Mean	**1.8**
Min	1.7
Max	2.0
Range	**0.3**
Var	0.008
Std. deviation	0.09

The satisfaction with the workshop analysis over all modules shows a mean value of 1.8 with a range of 0.3.

The distribution of workshop satisfaction of the participants is homogeneously distributed with a mean of 1.8 and small range of 0.3. Overall this analysis shows a smaller mean value for satisfaction, only M3 reaches the maximum value of 2.0, on the other hand M7 and M10 have the lowest values (1.7).

But one can conclude that the trainees were satisfied with the modules in general to an acceptable degree.

Module 1
More country specific information is recommended by a number of trainers. Presentations should be improved (namely session 6) and addition of illustrative figures is required, the sequence of contents could be better. More practical examples, particular national examples and more application details with practical exercises would improve the content of the module. Less details of HVAC systems would also be recommended.

Module 2
Some aspects of the module were repeated several times, this should be avoided. More summarized slides and more images, pictures and diagrams could improve the presentation as well as more national examples. Details of HVAC should be reduced and examples of bioclimatic architecture included with redefinition of slides avoiding repetition of topics and subjects. Slides could be more clear and simple.

Module 3
Improvements of some slides is necessary, because of too much text. The contents should be split in more than one slide. This will make it easier for trainers to transmit the message. In general, more additional slides would be helpful.

Module 4
It is recommended to simplify the presentation of standards and introduce comparative analysis between them. Some case studies should be presented, showing the basic concepts of thermal comfort. More examples of good practices connected to nZEB should be included in the presentation. More practical exercises using free software will help to improve the workshop.

Module 5
It is recommended to remove some statistical data information from the presentation, which sometimes is repeated in other modules and add more detailed calculation of energy needs for heating and cooling according to the legislation. More pictures, graphs and other visual elements will enhance the motivation of the trainees. Some contents of the module should be presented in module 1. Less detail in the operation of HVAC Systems and more practical sessions, cases and exercises could also clarify the content of the module.

Module 6
Increase the duration of the module will allow presenting more aspects relevant to nZEB. Further deepening the operation of the simulation software is highly recommended instead of exemplification of the software. So, the use of Energy Plus will be more useful for the students and it should give more time for explaining and practice.

Module 7
It was mentioned by the trainers, that the translation of expressions used need revision. Examples related to the most relevant topics should be included, for example PV systems. Presentations on how to calculate the energy savings achievable will improve the presentation as well as the presentation of the optimal costs. National examples and a comparison of the several systems shown will be helpful to clarify the content of the module.

Module 8
Some Information related to the national energy certification system needs to be updated because a new legislation was published recently. More practical exercises and examples should be included and repletion of contents should be avoided. Case studies of North Europe should be replaced by cases from South Europe.

Module 9
It was mentioned, that the module should be shortened, as some topics were already covered in modules 1 and 2. The number of slides could be reduced as some of the content is repeated even in the same module.

Module 10
It is recommended to introduce more examples of incentives applied to southern European countries, with details at the level of operation, as well as evaluation of the measures with higher impact. More practical examples should improve understanding of the details and contents of the module

Table 7: Portugal – trainers' recommendations

Conclusions of the "Train the Trainees" seminars

In general, the pilot seminars of SouthZEB project in front-runner countries (i.e., Cyprus, Greece, Italy and Portugal) were very successful. Main conclusions are presented below.

Cyprus

The various pilot sessions were attended by 718 participants from Cyprus. 371 questionnaires were delivered by the trainees
All modules were delivered.
Analysis of the workshop evaluation showed, that in most of the workshops the level of teacher´s knowledge was well evaluated. A high level of satisfaction of the trainees could be observed and interesting discussions between participants and trainers developed. From trainers as well as from trainees as a result a high amount of many important comments, remarks and recommendations for improvement of the workshops could be achieved. The importance of nZEB for Southern Europe could be placed into the focus of experts and engineers but also the importance of the specific needs of southern countries in comparison to Northern Europe could be brought into light.

Greece

The various pilot sessions were attended by1460 participants from Greece. 568 questionnaires were delivered by the trainees. All modules were delivered.
For Greece, the analysis of the workshop evaluation showed a very high level of satisfied trainees over a wide range of evaluation. A remarkable high level of satisfaction of the trainees could be observed and interesting discussions between participants and trainers developed. From trainers as well as from trainees as a result a high amount of important comments, remarks and recommendations for improvement of the workshops could be achieved. It was pointed out, that more information and some changes in the presentation contents are needed when the situation of Greece is taken into account for the future of nZEB´s.

Italy

The various pilot sessions were attended by 4219 participants from Italy. 2566 questionnaires were delivered by the trainees.
In Italy, modules 3, 5 and 10 were not delivered due to the fact that no one has chosen the topics proposed for modules 3 and 10, whereas for module 5 DTTN didn't have any trainer who passed the exam to become a trainer for this module.
The modules were rated successful and the participants were satisfied with the trainers and modules contents. Only for trainer's feedback, an untypical drop in evaluation was observed for all modules. For Italy, an important point for further development was discussed. It was mentioned, that for Italy territorial knowledge is of high importance, since the customers are almost poor in some regions and some problems might occur to benefit from advantages in the investment's area. This point might be important also for other countries.

Portugal

The various pilot sessions were attended by1460 participants from Portugal. 1287 questionnaires were delivered by the trainees. All modules were delivered.
The Analysis of the workshop evaluation showed, that in most of the workshops the level of the teacher´s knowledge was well evaluated. A high level of satisfaction of the trainees could be observed and interesting discussions between participants and trainers developed. From trainers as well as from trainees many important comments and recommendations for improvement of the workshops could be achieved.

Portuguese participants were satisfied with the modules and the performance of trainers as well as their technical knowledge and presentation skills.

2.6 THE EVALUATION VIA PERFORMANCE INDICATORS

The evaluation of the project impact has been assessed continuously during the project duration.

This specific report was prepared by UPATRAS as a request from the EASME and its content refer to the update of the IEE Common Performance Indicators. The project was completed on the 4th of March 2017, after the time extension of 6 months that has been provided by the EASME. For the projection till 2020, updated information was used when possible, which resulted in the update of the IEE Common Performance Indicators. It is stated that the main objectives of the project have been achieved, which refer to the development of 10 training modules and relative assessment tests and the training and certification of 150 trainers and trainees in all target countries. It should be specified that the certified trainers are 165 and the certified trainees are 1556.

It should be mentioned that the assumption and expectations stated in this report are based on the current trends and surveys. However, the decrease in oil price is another factor that will influence at a greater scale the construction and renovation of the building stock to nZEB levels, by possible decreasing the rate stated in this report. Thus, funding schemes shall play a more important role in order to achieve these targets, mainly in the Southern European countries.

The following Table 1 presents the summary of the updated IEE Common Performance Indicators.

Overall Objective	Target within the action duration:	Target by 2020:
To contribute to the EU 2020 targets on energy efficiency and renewable energy sources	• €7.88 Cumulative investment made by European stakeholders in sustainable energy (Million Euro)	• Maximum of €188 million (maximum of 3.9-5.1 million direct) Cumulative investment made by European stakeholders in sustainable energy (Euro)
	• 1.686 toe/year Renewable Energy production triggered (toe/year)	• 570.21 toe Cumulative Renewable Energy production triggered (toe)
	• 1.686 toe/year Primary Energy savings compared to projections (toe/year)	• 570.21 toe Cumulative Primary Energy savings compared to projections (toe)
	• 11.61 tCO_2/year Reduction of greenhouse gas emissions (tCO_2/year)	• 3578.58 tCO_2 Cumulative Reduction of greenhouse gas emissions (tCO_2)

Table 1: Update of IEE Common Performance Indicators

The IEE Common Performance Indicators for the SouthZEB project consist of the following terms:

- Cumulative investment made by European Stakeholders in sustainable energy (EUR)
- Renewable energy production triggered (toe/year)
- Primary Energy Savings compared to projections (toe/year)
- Reduction of greenhouse gas emissions triggered (t CO2e/year)

In the Grant Agreement, the IEE Common Performance Indicators for the SouthZEB project are presented and more specifically the target during the lifetime of the project is presented as well as the target by 2020. The SouthZEB project ended at 2017 (March of 2017), thus approximately 3,5 years remain till 2020.

2.6.1 Target within the Action Duration

The SouthZEB project was completed on the 4th of March 2017. According to the records provided by the partners in each target country, the objectives regarding the certification of the trainers and trainees have been achieved. More specifically, 165 trainers and 1556 trainees have been certified as a total in all target countries. During the implementation of the project and based on the 1st design meeting, a proposal was drafted as an improvement in the training modules on August 2014, which included the modification of the minimum number of successful completion of training modules for certification from 3 to 4. Moreover, it was decided that from the 4 training modules, the Module 1 and 2 would be compulsory whereas the rest 2 modules would be chosen by the participant him/herself. The minimum total duration was decided to be 100 hours in order to be eligible for certification.

The following table 2 presents the distribution of the certified trainers per target country, as well as the total hours of the training per country:

S/N	Target Country	Number of certified trainers	Total hours of training
1	Greece	26	80
2	Cyprus	14	72
3	Portugal	34	80
4	Italy	91	80

Table 2: Number of certified trainers per target country

The following table 3 presents the distribution of the certified trainees per target country:

S/N	Target Country	Number of certified trainees	Total hours of training
1	Greece	262	1,425
2	Cyprus	85	311
3	Portugal	277	1,680
4	Italy	932	216

Table 3: Number of certified trainees per target country

Moreover, a categorization of the certification level was decided and commonly approved among the partners, as proposed initially by CUT. Thus, the certified trainers and trainees are distributed also per the modules in which they have been certified, since some of the trainers and trainees had been certified for the minimum 4 training modules, whereas others for more. This specific categorization plays an important role in the duration of the courses offered in all target countries.

Based on relevant comments from the partners of the consortium, it was commonly agreed to customize the average hourly cost of seminars per target country. According to the input by the responsible partners in the target countries the hourly rate for the seminars is defined as follows:

- Greece: 37 €/hr
- Cyprus: 40 €/hr
- Portugal: 35 €/hr
- Italy: 27.5 €/hr

Regarding the hourly cost in Italy and Cyprus the average of the minimum and maximum cost was considered.

Moreover, steps have been made in all target countries and buildings have been constructed presenting low energy con-sumption. Also, in Cyprus a funding scheme is currently running, which refers to a subsidy of up to 75% for the application of energy efficiency measures resulting in upgrading a building to nZEB level. However, it should be stated that a clear def-inition on the nZEB concept is yet to be determined in the rest of the target countries (Greece, Italy and Portugal)[1] . There-fore, it is not possible to measure the nZEBs constructed or relevant renovations in these countries for the time being.

Consequently, the calculations of the cumulative investment will be implemented based on the certified trainers and trainees achieved, according to their certification level and the aforementioned average hourly costs. Regarding the con-struction or renovation of a building to nZEB level based on the aforementioned it is mentioned that still there are legislative obstacles in most countries, thus it was not possible till the end of the project to record the design or construction of 1 nZEB per target country. It is mentioned though that low energy buildings are designed and constructed in the target countries, however due to the lack of concrete definitions it is not possible to consider these buildings as nZEBs. When concrete legislation exists in every target country regarding the nZEB definition, then the certified professionals shall play an important role in the construction or renovation of buildings to nZEBs.

2.6.1.1 Cumulative investment

Based on the aforementioned, the direct investment during the project is calculated at 7,878,468 €.

2.6.1.2 Renewable Energy Production triggered

Based on the aforementioned, it is not possible to assume the number of the nZEB buildings, constructed or renovated due to legislative objects that still exist in most of the target countries. However, low energy buildings and being designed incorporating a high percentage of renewable energy sources. According to the recast EPBD (2010/31/EU), the low amount of energy required by the nZEBs should be covered to a very significant extent by energy from renewable sources. As it was previously mentioned, Cyprus is the only country from the target countries of the project, which has provided a concrete definition for the nZEBs. According to Cyprus, the share of the renewables in the nZEB should be at least 25%. However, in other EU countries the share of renewables in the energy required by the building differs greatly and is up to approximately 50%[2]. It should also be stated that in Portugal it is recommended for service buildings the use of a share of energy produced from the renewable sources of at least 40%. Therefore, due to the lack of evidence for the rest of the target countries the share of 40% is assumed.

The average useful floor space of a building in the Southern European countries is considered based on the data from the Eurostat and differentiates per the target country. More specifically, the following number are considered for each country[3]:

- Greece: 91.3 m^2
- Italy: 94.5 m^2
- Portugal: 107.4 m^2
- Cyprus: 142.6 m^2

The promotion of the SouthZEB project and the nZEB legislation is considered to increase the use of the renewable energy in the building stock. As an average, it is assumed that a building of the abovementioned area per target country will be affected. Regarding the primary energy consumption of the nZEBs according to the concrete definitions existed currently a wide variety can be observed, not only in terms of primary energy but also in terms of the factors used for calculations. More specifically, the primary energy varies from approximately 20 – 250 kWh/m^2/year, whereas the factors of calculation may consist of heating, ventilation, cooling and DWH in some countries and in others only of heating and DHW (the aforementioned are

[1] BPIE, April 2015, *Nearly Zero Energy Buildings Definitions Across Europe / Factsheet*

[2] BPIE, *NZEB DEFINITIONS IN EUROPE*, http://www.buildingsdata.eu/nzeb-definitions-europe (Retrieved on 30/12/2015)

[3] EUROSTAT, *PEOPLE IN THE EU – STATISTICS ON HOUSING CONDITIONS,* http://ec.europa.eu/eurostat/statistics-explained/index.php/People_in_the_EU_%E2%80%93_statistics_on_housing_conditions, (Retrieved on 21/2/2017)

indicatively)[4]. Concerning Cyprus, the maximum primary energy in residential buildings is 100 kWh/m^2/year and for non-residential buildings is 125 kWh/m^2/year. Due to this diversity and the lack of definitions from the rest of the target countries the numerical indicator of Cyprus will be assumed. Based on the aforementioned calculation the average primary energy consumption of a nZEB in each target country is assumed to be 112.5 kWh/m^2/year.

Consequently, the energy produced by renewables shall be approximately 45 kWh/m^2/year in terms of primary energy. Thus for 4 buildings (in the target countries) of the aforementioned area the total renewable energy production triggered by the action shall be 19,611 kWh/year (primary energy) or 1.686 toe/year[5].

2.6.1.3 Primary Energy savings

For the primary energy savings during the project the assumptions mentioned in the previous chapter are being considered also for the primary energy savings. Thus, taken into account that 4 buildings are affected during the SouthZEB project (one in each target country) as low energy buildings the primary energy savings shall result from the penetration of the renewables in the energy mixture of the building. Consequently, it is assumed that 19,611 kWh/year or 1.686 toe/year of primary energy are saved.

2.6.1.4 Reduction in greenhouse gas emissions

It is believed that the greenhouse gas emissions should be properly addressed and a threshold should be set, so that the nZEB definition can be comprehensive and in order to achieve the targets set by the European Union. However, a relevant threshold is not apparent in the nZEB definitions of the countries. It is assumed though that the specific CO2 emissions should be restricted below 3kgCO_2/m^2/year in order the European Union to achieve the 2050 decarbonisation goals[6]. As mentioned in the previous sections, the primary energy of a nZEB is assumed to be 112.5 kWh/m^2/year. The rate from final to primary energy depends on the energy mixture of the building. Thus, in order to calculate the final energy consumption of a nZEB building the average rate of primary to final energy consumption in EU was assumed, based on the data collected from EUROSTAT[7] for each target country. The rate occurred equals to:

- 1.445 for Greece
- 1.294 for Cyprus
- 1.285 for Italy
- 1.356 for Portugal

Thus, the final energy consumption of a nZEB building is assumed to be:

- 77.85 kWh/m^2/year for Greece
- 86.93 kWh/m^2/year for Cyprus
- 87.53 kWh/m^2/year for Italy
- 82.95 kWh/m^2/year for Portugal

For the estimation of the reduction in greenhouse gas emissions statistics regarding the fuel consumption in households in each target country was recorded (EUROSTAT 2015[8]) and the following table presents the percentage of each fuel in the energy consumption in buildings. It should be mentioned that the main fuels were taken into account, which sum amounts to more than 70% of the final energy consumption in each

[4] BPIE, *NEARLY ZERO ENERGY BUILDINGS DEFINITIONS ACROSS EUROPE*, http://bpie.eu/wp-content/uploads/2015/09/BPIE_factsheet_nZEB_definitions_across_Europe.pdf (Retrieved on 21/02/2017)

[5] IEA, *Unit converter*, http://www.iea.org/statistics/resources/unitconverter/,(Retrieved on 27/02/2017)

[6] BPIE, October 2012, *IMPLEMENTING NEARLY ZERO – ENERGY BUILDINGS (nZEB) IN POLAND – TOWARDS A DEFINITION AND ROADMAP,* http://bpie.eu/documents/BPIE/publications/Poland_nZEB/Executive_Summary_nZEB_Poland.pdf (Retrieved on 25/02/2017)

[7] EUROSTAT, 2015, FINAL ENERGY CONSUMPTION / PRIMARY ENERGY CONSUMPTION, http://ec.europa.eu/eurostat/data/database, (Retrieved on 24/02/2017)

[8] EUROSTAT, 2015, *FINAL ENERGY CONSUMPTION IN HOUSEHOLDS BY FUEL %*, http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=t2020_rk210&language=en, (Retrieved on 24/02/2017)

target country. Especially for the conversion factor for Electricity, this has been considered per target country.

Fuel	Greece	Italy	Cyprus	Portugal	Conversion Factor[9]
Electricity	34.3 %	17.5 %	41.1 %	40.6 %	-
Total petroleum fuels	33.3 %	7.3 %	37.7 %	17.1 %	0.267
Natural Gas	8.1 %	52.3 %	0 %	10.4 %	0.202
Conversion Factor for Electricity (t CO_2/MWh_e)	1.149	0.483	0.874	0.369	-

Table 4: Percentage of fuel in final energy production in households

Based on what mentioned above, the following table occurs, including for each target country the expected CO_2 emissions for one nZEB or low energy building and corresponding reduction considering a threshold of 3kgCO_2/m^2/year. It is stated that the assumptions regarding the space floor of a building in each target country remains the same as described in previous sections.

	Final energy consumption (kWh/m^2/year)	CO2 emissions (kgCO_2/m^2/year)	Reduction (tCO_2/year)
Greece	77.85	38.88	3.28
Italy	86.93	18.35	1.45
Cyprus	87.53	39.98	5.27
Portugal	82.95	17.96	1.61
Total		115.16	11.61

Table 5: Reduction in CO_2 emissions

Thus, based on Table 3, the reduction in greenhouse gas emissions is expected to be 11.61 tCO_2/year.

2.6.2 Target by 2020

The SouthZEB project will be completed in March 2017, thus approximately 3 years remain till 2020. For the extrapolation of the aforementioned indicators till 2020, trends based on surveys and statistics were used as well as the partner expertise.

2.6.2.1 Cumulative investment

Considering the European legislation regarding the energy efficiency of the buildings in order to achieve the relevant targets it is most likely that that the training of professionals in nZEB design and construction shall have great appeal in the years to come till 2020. However, during the implementation of the project it became evident to the partners of the consortium responsible for the training of the professionals that the initial estimations on the annual number of the professionals following the seminars should be lowered. Based on the experience gained by the partners, it is mentioned that still there are legislative obstacles in the majority of the target countries, thus the issue of the nZEBs has not been clearly defined yet and it has not been disseminated by the local authorities and the government at the extent it should. Furthermore, it is mentioned that in Cyprus, where the definition of the nZEBs exist and no legislative objects exist, the market of the professionals able to attend the seminars is quite low. The partners of the consortium though the difficulties faced during the implementation of the project have agreed in the sustainability of the project and

[9] Convenant of Mayors, n.d., Technical annex to the SEAP template instructions document: THE EMISSION FACTORS, http://www.eumayors.eu/IMG/pdf/technical_annex_en.pdf , (Retrieved on 24/02/2017)

shall maintain the same roles as currently till 2020, whereas the E-learning platform, which shall facilitate a vast number of professionals to join the SouthZEB scheme and get trained also is in use and shall be maintained till then. Based on the aforementioned it is considered that the estimation of 1000 professional per year in total (in all target countries) could be achieved. Based on primary discussions among the partners of the consortium it is proposed the training for the minimum 4 training modules for the certification to cost approximately 400 - 800 € (depending on the local costs of each target country), whereas for any additional training module the cost to be approximately 150 €/module. Thus, in case of providing the total sum of 10 training modules to cost approximately €1300 - 1700. The direct investment from this numerical indicator equals to €3.9 – 5.1 million (for following the 10 training modules).

Besides the direct investments, this shall result in indirect investments since more professionals will be capable in designing and constructing nZEBs, which shall act as a driver for the country and local authorities to promote funding schemes for nZEBs. In order to assess the direct investments, figures from BPIE survey[10] are taken into account. Based on this survey, it is expected that approximately €62 billion per year shall be invested in order to reach the targets regarding nZEB requirements. The increase in investments per year is estimated according to the survey to be approximately 1% till 2020. In lack of relevant historic rates and considering the lower expectations of the professionals to be trained till 2020, it is assumed that the training of the professionals from the SouthZEB project shall induce an increase of an additional 0.05% to the annual increase of investments. Therefore, the indirect investments from the SouthZEB project for the next 3 years are estimated to be approximately 188 million €..

2.6.2.2 Renewable Energy Production triggered

The renewable energy production is mainly associated with the construction of new buildings achieving the nZEB levels and the renovation of the existing building stock. Concerning renovation rate till 2020 this is considered to be low (approximately 1%[11]), from which the “deep renovation” in order to achieve nZEB levels is much lower. Thus, it is assumed that till 2020 a moderate rate of 0.001% of the renovations shall be “deep renovations” to reach nZEB levels. However, by 2020 an annual rate of 1% renovation is expected to be performed in order to reach nZEB levels[12]. Based on statistical data from EU Buildings Database, the following represent the useful floor area (including residential and non-residential buildings) of each target country. It is noted that the data for the residential buildings are for 2014, whereas for the non-residential buildings 2013.

- Cyprus: 74.88 Million m^2
- Greece: 657.42 Million m^2
- Italy: 3271.45 Million m^2
- Portugal: 765.42 Million m^2

Taking into account the aforementioned total useful floor in the target countries, a total of 47,692 m^2 (useful floor)[13] shall be affected in the target countries. Thus, based on the numerical indicators occurred in the aforementioned sections, 2146.13 MWh/year (primary energy) is expected to be produced by renewable energy or 184.53 toe/year. It should be stated that the renovations are already being supported by funding schemes in European countries, such as the funding scheme in Cyprus, which may cover up to 75% of the renovation costs in case the renovated building achieves nZEB levels.

Also, regarding the construction of new buildings, according to the European Construction Market Forecast from 2015-2020[14], an average annual rate of approximately 3.00% is expected for all buildings. Due to lack of evidence a moderate percentage of 0.001% from the total sum of new buildings is assumed to reach nZEB levels till 2020. Therefore annually 1430.75 m2 are expected to be built as nZEB buildings in the target

[10] BPIE, October 2011, PRINCIPLES FOR NEARLY ZERO-ENERGY BUILDINGS

[11] The Economist Intelligent Unit, 2013, *Investing in energy efficiency in Europe’s buildings*

[12] The Policy Partners, January 2013, *Renovation Roadmaps for Buildings*

[13] EU Buildings Database, 2014-2013, http://ec.europa.eu/energy/en/eu-buildings-database (Retrieved on 27/02/2017)

[14] Building Radar, nd, *European Construction Market Forecast from 2015 to 2020*, https://buildingradar.com/construction-blog/european-construction-market-forecast/ (Retrieved on 27/02/2017)

countries and till 2020 a total of 4292.25 m^2 are expected to be built as nZEB buildings, which will result to 64.38 MWh/year primary energy produced by renewable energy or 5.55 toe/year.

Based on the aforementioned, the sum of the renewable energy triggered amounts to 2210.51 MWh/year or 190.07 toe/year in the target countries, which results to approximately 570.21 toe (till 2020).

2.6.2.3 Primary Energy savings

For the primary energy savings during the project the assumptions mentioned in the previous chapter are being considered also for the primary energy savings. Thus, the sum of primary energy savings till 2020 is 2210.51 MWh/year or 190.07 toe/year, which results to approximately 570.21 toe (till 2020).

2.6.2.4 Reduction in greenhouse gas emissions

For the projection till 2020, the assumptions presented in the previous sections are still considered. Thus till 2020 a sum of 51,984.25 m2 is assumed to be of nZEB level (renovations and new-build). The annual renovation rate and growth rate for the new-build is assumed to be same as the European indicator (3.00% annual growth, from which 0.001% shall be nZEBs and 0.001% renovation to nZEB level). The percentage of the different types of energy in the energy mixture of the final energy of buildings in each target country is assumed to be the same as previously indicated (Table 4) in relevant section. Thus, it is assumed that 1192.86 tCO_2/year shall be the reduction till 2020 of greenhouse gas emissions, which results to approximately 3578.58 tCO_2.

2.7 CONTINUOUS QUALITY CONTROL

The quality control was a procedure that was initiated from the enactment of the project and was being implemented in parallel to the rest of the tasks of the project. The University of Patras as the responsible partner for this procedure has developed specific templates to be used for the documents produced during the project and also, he monitored the data displayed in the deliverables to be in compliance with the requirements set by the EASME.

Furthermore, the quality of the deliverables was controlled through the reviewing procedure that was implemented not only from the Coordinator but also from the rest of the partners, whereas in parallel the monitoring of the performance indicators of the project was being realized. Comments and reminders were sent to the responsible partners from the University of Patras in order to provide relevant information when required or to update as required the deliverables of the project. Moreover, the topics regarding the difficulties that the partners were facing were discussed in the teleconferences in order to reach a commonly approved solution.

Furthermore, the Coordinator controlled the timetable of the deliverables and the Coordinator urged the responsible partners to set relevant deadlines in order to meet the required time of delivery as per the Grant Agreement of the project.

Last but not least, based on the aforementioned and on the data collected by all partners during the preparation of the technical and financial reporting for the EASME, the Coordinator checked the information received to be in accordance with the estimated budget and hours of work as stated in the Grant Agreement of the project. In case of deviations, the Coordinator provided relevant comments to the partners in order to update the information.

2.7.1 Quality Control procedure

The Laboratory of Applied Mechanics from University of Patras, which is participating in the SouthZEB project as the Coordinator of the project has great experience in the monitoring of projects through its participation in several European funded projects. The quality control of the project has been initiated from the enactment of the project. Initially, the Coordinator provided a template – controlled document for all the reports prepared by the partners. The template of the document is presented in Annex J in order to provide uniformity and quality control in the documents produced during the implementation of the project.

Besides the aforementioned, the Coordinator proceeded in the control of the deliverables prepared and their format in order to be in line with the requirements set by the EASME. More specifically, all deliverables of the project have the required disclaimer label and the figure that informs that the project is co-funded by the Intelligent Energy Europe Programme of the European Union.

The main idea in the quality control of the project was the common approval of the deliverables prepared by all partners. Therefore, the Coordinator urged the responsible partners for the preparation of the deliverables to provide for a specific time period their deliverables for review from the rest partners of the consortium in order to receive comments and finally be commonly approved by all partners. The comments that were received by the reviewing procedure were analyzed and the deliverables were updated. The Coordinator also monitored the performance indicators of the project and their level of completion through the finalization of the deliverables. Criticism was made when there was a differentiation in the divergence in the performance indicators that should be achieved and increased effort was asked by the responsible partners in order to achieve the targets of the project. The partners shared their view and difficulties experienced during the implementation of the project in order to achieve specific targets and the Coordinator through the teleconferences set the specific topic for discussion in order to proceed to a solution commonly approved by all partners.

The Coordinator through the emails, teleconferences and the project meetings monitored also the timetable of the deliverables. Besides the comments and discussion that were implemented, the Coordinator always at the end of the meetings / teleconferences presented the expected timetable of the deliverables and the

deadlines were set accordingly by the responsible partners in order to meet them. It should be stated though that there were divergences from the expected timetable, which however did not result in the project not to be successful. The divergences related mostly to the procedure of updating the version of deliverables after the reviewing period has completed. In any case, the Coordinator reminded the partners their obligations concerning the deadlines of their deliverables and offered any help in terms of management and monitoring in order the partners to meet the expected timetable.

Regarding the technical and financial reporting, the Coordinator had reviewed the data sent by the partners in relation to the estimated budget and hours of work originally set by the partners in the Grant Agreement in order to comply with the requirements and guidelines set by the EASME and comments were made to the partners for corrections when necessary. Moreover, the comments received by the EASME during the project on the deliverables and the financial reporting were published to all partners of the consortium in order to proceed to relevant corrections.

2.8 THE CONFORMITY TO DIRECTIVES

The SouthZEB project aims to contribute towards the application and successful implementation of the goals of the Energy Performance of Buildings (EPBD, 2010/31/EU) directive and of the Renewable Energy Directive (RED, 2009/28/EC) in the South European Union (EU) countries. Both Directives set conditions for moving towards Nearly Zero-Energy Buildings (nZEB) by 2020.

The SouthZEB project aims to support this by initiating a wide-scale roll out of accessible and recognised continuous professional development courses, focussing on the needs of the Southern European countries. A key objective is to transfer knowledge and experience from some of the front runner countries. A bespokse SouthZEB training and certification framework has been developed and initiated at the European level, based on the introduction of the Energy Performance of Buildings Directive and other Directives and Regulations. The programme of training modules and the certification framework is applicable across Cyprus, Greece, Italy and Portugal.

Each EU country is implementing measures to move towards nearly zero-energy buildings by 2020 through the transposition of the Energy Performance of Buildings (EPBD, 2010/31/EU) Directive and the Renewable Energy Sources (RED 2009/28/EC) Directive. Therefore, in addition to EU directives, implementation at the national level and thus national building regulations has formed an integral part of the training modules.

The training modules were developed to ensure that they suitably covered relevant Directives and that the developed content enabled participants to understand the principles of the relevant directives, their aims, context and national implementation. This, in turn, meant that participants could develop appropriate knowledge for use in their target countries thereby helping promote conformity to the Directives at a local level.

The tables below present a summary of Directive related content within each of the ten modules.

This summary clearly demonstrates that the SouthZEB training modules have been suitably developed with key EU and National Directives at their heart and that the module therefore ensure conformity to the aims of this work package.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 1 – "Basic module" is structured in such a way in order to provide an introduction to basic legislation and nZEB concepts, followed by a smooth transition to more advanced issues leading to a near Zero Energy Building construction.

The purpose of the training is to inform building professionals and other stakeholders about the related European Directives and mandatory legislation and regulation regarding the energy performance of buildings and demonstrate the basic concepts, physics and techniques and how these are applied in simple steps leading to the design of a near Zero Energy Building. The first two sessions relate directly to informing participants on key Directives and related issues. Most notably.

- Session 1 – Introduction and the nZEB concept (0.5h)
- Session 2 – European Directives and national legislation (3.0h)

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

Directive related pre-classroom content

Pre-classroom learning covers nZEB definitions, Standards on the Energy Performance of Buildings and a bibliography, which includes:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.
- National building regulations / standards relevant to energy performance of buildings:

Country specific pre-class reading relating directly to Directives, and their implementation, is also included. For example:

- Greek Law 4122/2013 “Energy Performance of Buildings – Transposition of Directive 2010/31/EU”, which integrated the recast EPBD Directive 2010/31/EU
- Italian Legislative Decree 28/2011 transposing the Renewable Energy Services (RES) Directive - requirements regarding the share of renewable energy for new buildings and major renovations were increased

Directive related sessions / content:

Session 1 - The module material focuses initially on the related European Directives (most notably EPBD recast and RED) and the local legislation and regulations, which are now the driving forces towards the 2019 and 2021 milestones for near Zero Energy Buildings. The module progresses to introducing concepts regarding bulding construction, building physics and energy systems considered of great importance in southern climates. Finally a practical example is presented on the design of a residential near Zero Energy Building.

The second session of the training module addresses the two most relevant EU Directives related to the energy performance of buildings in general and the nZEB concept in particular; 2010/31/EU (EPBD recast) and 2009/28/EC (RED). In particular, session 2 addresses the following:

- EPBD recast directive (2010/31/EU) and its general requirements on an EU level;
- RES directive (2009/28/EC) and its general requirements on an EU level;
- Transposition of the above EU directives on a national level in each target countries and the subsequent national legislation and regulations.

Session 2 - presents the general context of the EPBD and RES European directives and the requirements and 2020 targets emanating from these directives on an EU level, as well as how these are translated to individual key performance indicators for each Member State in general and for the four target countries in particular.

The 2020 targets on primary energy consumption, greenhouse gas emissions and utilisation of renewable energy in each target country are presented along with the national legislation regarding the promotion of renewable energy sources and the energy performance of buildings. In specific, the national legislation regarding the energy performance certification of buildings, the inspection and efficiency of heating and cooling systems, energy requirements on large scale retrofits of current building stock, efficiency of systems etc. are presented.

Directive related bibliography content::

Session 1 bibliography includes:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources
- 406/2009/EC Decision of the European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
- Official Journal of the European Union, "Climate, environment, energy and transport", E28-29, 2013
- 2006/32/EC Directive of the European Parliament and of the Council on energy end-use efficiency and energy services.

Session 2 bibliography includes:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

Country specific bibliography references relating directly to Directives, and their implementation, is also included. For example:

Cyprus

Laws

- N142(I)/2006 – On the Regulation of the Energy Performance of Buildings Law 2006
- N30(I)/2009 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2009
- N210(I)/2012 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2012

Decree Laws & Regulations

- ΚΔΠ 164/2009 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) Regulations 2009
- ΚΔΠ 39/2014 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) (Amendment) Regulations 2014
- ΚΔΠ 412/2009 - On the Regulation of the Energy Performance of Buildings (Energy Performance Certificates of Buildings) Decree 2009
- ΚΔΠ 432/2013 - On the Regulation of the Energy Performance of Buildings (Minimum Requirements on the Energy Performance of Buildings) Decree 2013
- ΚΔΠ 432/2013 - On the Regulation of the Energy Performance of Buildings (Recommendations for the Improvement of the Energy Performance of Buildings and Energy Performance Certificate of Buildings) Decree 2013
- ΚΔΠ 33/2015 - On the Regulation of the Energy Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015
- ΚΔΠ 164/2009 – The Streets and Buildings (Energy Performance of Buildings) Regulations 2009
- ΚΔΠ 61/2014 – The Streets and Buildings (Energy Performance of Buildings) (Amendment)

Regulations 2014

- ΚΔΠ 343/2013 – On the Regulation of the Energy Performance of Buildings (Methodology for the calculation of the Cost Optimal minimum Requirements on the Energy Performance of Buildings) Decree 2013
- ΚΔΠ 386/2013 – On the Regulation of the Energy Performance of Buildings (Requirements on New Technical Building Systems installed in existing buildings or building units and technical systems that are replaced or upgraded) Decree 2013
- ΚΔΠ 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB) Decree 2014
- ΚΔΠ 163/2009 - On the Regulation of the Energy Performance of Buildings (Cooling Systems Inspection) Regulations 2009
- ΚΔΠ 413/2009 - On the Regulation of the Energy Performance of Buildings (Cooling Systems Inspection) Decree
- ΚΔΠ 244/2015 - On the Regulation of the Energy Performance of Buildings (regulation and control of cooling systems of nominal power output greater than 20 kW) Decree
- ΚΔΠ 119/2011 - On the Regulation of the Energy Performance of Buildings (Inspection of boiler based Heating Systems) Regulations 2011
- ΚΔΠ 148/2013 - On the Regulation of the Energy Performance of Buildings (Inspection procedure of heating systems equipped with a boiler of nominal power between 20 kW and 100 kW) Decree 2013
- ΚΔΠ 149/2013 - On the Regulation of the Energy Performance of Buildings (Inspection procedure of heating systems equipped with a boiler of nominal power greater than 100 kW) Decree 2013
- ΚΔΠ 244/2013 - On the Regulation of the Energy Performance of Buildings (regulation and control of heating systems equipped with a boiler of nominal output power greater than 20 kW) Decree 2013.

Greece

- Greek Law 3661/2008, issued on the 19th of May 2008
- Greek Regulation for the Energy Efficiency of Buildings, issued on 2010
- The recast EPBD Directive 2010/31/EU was integrated in the Greek legislation through the Greek Law 4122/2013.
- Technical Guidelines for the implementation of the Greek Regulation for the Energy Efficiency of Buildings issued by the Technical Chamber of Greece (Official Gazette Bulletin B' 1387-2010 and 1413-2012)
- New Building Legislation 4067/2012
- Greek Law 3851/2010.

Italy

- Italian Legislative Decree 28/2011 transposing the Renewable Energy Services (RES) Directive - requirements regarding the share of renewable energy for new buildings and major renovations were increased

- The Italian Legislative Decree 192/2005 - general framework for the transposition of the EPBD at national level, setting the minimum requirements for the Energy Performance (EP), and the U-values for windows, walls, floors and roofs, in case of new buildings and major renovations.

- The Italian Presidential Decree n. 59 - calculation methodologies and minimum requirements to the summer EP of cooling and lighting systems; minimum requirements for the EP of buildings and of heating systems.

- D.L. 63/2013 Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, sulla prestazione energetica nell'edilizia per la

definizione delle procedure d'infrazione avviate dalla Commissione europea, nonche' altre disposizioni in materia di coesione sociale. (13G00107) (GU Serie Generale n.130 del 5-6-2013).

- Decreto Ministeriale 26/06/2015, Ministero dello Sviluppo Economico - Adeguamento del decreto del Ministro dello sviluppo economico, 26 giugno 2009 - Linee guida nazionali per la certificazione energetica degli edifici.

Portugal

- Portuguese Energy Strategy (NES 2020)
- Portuguese Building Thermal Legislation - Decree-Law 118/2013, Updated by Decree-Law 68 - A/2015, Decree-Law 194/2015, Decree-Law 25/2016 and related Ordinances and Mandamus.
- National Energy Efficiency Action Plans (NEEAP) and National Renewable Energy Action Plans (NREAPs).

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 2 – Advanced - presents to particpants the advanced concepts of nZEB design and building, including technical physic notions (like humidity, building materials, construction techniques, ventilation and the use of energy sources). It is presented also the passive use of renewable energy (e.g. passive solar gains). This module focuses on the elaboration on various arguments of nZEB design and building, including technical focuses on principles of bioclimatic design, passive systems, building materials, renewable energy sources, construction and measurement techniques, ventilation, natural lighting and the processes of energy audit and commissioning.

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

Directive related pre-classroom content:

- Jarek Kurnitski (ed.), “Cost Optimal and Nearly Zero-Energy Buildings (nZEB): Definitions, Calculation Principles and Case Studies”, 2013.

Directive related sessions / content:

Within this module a number of sessions, or sub-session, relate directly to informing participants on key Directives and related issues. For example.

- Session 3 – Greenbuildings materials, natural ventilation, low-E – prepared by DTTN
  1. Greenbuildings materials
     - 1.1 Life Cycle Analysis (LCA)
     - 1.2 Environmental Product Declaration (EPD)
     - 1.3 EMICODE
- Session 4 – Passive solar systems

- Renewable Technology Sources
- Session 6 – Energy audits and commissioning process
  - Energy Audits & Energy Performance Certification (including referring to the regulations and standards);

Directive related bibliography content:

- Kurnitski J., Buso T., Corgnati S.P., Derjanecz A., Litiu A., "nZEB definitions in Europe", REHVA Journal – March 2014 – http://www.nezeh.eu/assets/media/PDF/REHVA_nZEB_definitions_-in_Europe51.pdf

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 3 – building thermal performance - focusses on the increasingly important topic of building fabric performance. It presents the drivers for, and benefit of, improving building fabric performance, as well as highlighting the risks that poor building fabric design and/or construction can present. It also addresses how building fabric performance can be assessed including information on the evaluation and calculation of thermal performance.

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)

Directive related pre-classroom content:

Thermal bridges in the EPBD context http://www.asiepi.eu/wp-4-thermal-bridges.html

The Energy Performance of Buildings Directive: http://www.epbd-ca.eu/

National content includes:

Cyprus

ΚΔΠ 33/2015 - On the Regulation of the Energy Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015

ΚΔΠ 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB)

Greece

Greek Law 3851/2010 "Accelerating the Development of Renewable Energy Sources (RES) to Deal with Climate Change and Other Regulations in Topics under Authority of the Greek Ministry of Environment, Energy, and Climate Change"

Greek Law 3661/2008 "Measures to reduce energy consumption in buildings and other provisions"

Regulation for Energy Efficiency of Buildings (KENAK) issued in 2010 (Official Gazette Bulletin B' 407/09-04-2010), based on the Greek Law 3661/2008

Greek Law 4122/2013 "Energy Performance of Buildings – Transposition of Directive 2010/31/EU"

Portugal

Portuguese Building Thermal Legislation: Decree-Law 118/2013, Decree-Law 68-A/2015, Decree Law 194/2015, Decree-Law 251/2015, Decree-Law 28/2016 and respective Mandamus and Ordinances

Directive related sessions / content:

Session 1: Subject overview
The session will begin with a short introduction on the importance of high thermal performing buildings at a local context. This will involve an observation of the relevant building regulations and governmental policy within the respective country which has led to a need to consider thermal performance in greater detail. Trainees will be taught that improving thermal performance can reduce building energy consumption and greenhouse gas emissions which will be necessary for meeting EU and local government energy and environmental targets.

Session 4: Impacts
discussion of the potential impacts of poor thermal performing buildings

Session 5: Fabric Performance & ZEBs
To understand the importance of high fabric performance in contributing to nZEBs, EPBD and global greenhouse gas targets. This session looks at the relationship between building fabric performance and ZEBs. The session begins with a definition of a ZEB as defined by the EPBD and will then look at some of the key policies or actions that participating EU countries will have to adopt under the EPBD. This will include policies around Energy Performance Certificates (EPCs), inspection schemes for heating and air conditioning systems, minimum performance requirements for buildings, financial mechanisms to improve the energy efficiency of buildings.

Directive related bibliography content:

As per pre-class content.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 4 – Thermal Comfort – presents the concepts of thermal comfort, its assessment methods and the way thermal comfort is related and can be achieved in energy efficient buildings and especially in nZEB.

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)

Directive related pre-classroom content

- Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC

National content includes:

Cyprus

Laws

N142(I)/2006 – On the Regulation of the Energy Performance of Buildings Law 2006

N30(I)/2009 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2009

N210(I)/2012 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2012

Decree Laws & Regulations

KDP 164/2009 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) Regultions 2009

KDP 39/2014 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) (Amendment) Regultions 2014

KDP 412/2009 - On the Regulation of the Energy Performance of Buildings (Energy Performance Certificates of Buildings) Decree 2009

KDP 432/2013 - On the Regulation of the Energy Performance of Buildings (Minimum Requirements on the Energy Performance of Buildings) Decree 2013

KDP 432/2013 - On the Regulation of the Energy Performance of Buildings (Recommendations for the Improvement of the Energy Performance of Buildings and Energy Performance Certificate of Buildings) Decree 2013

KDP 33/2015 - On the Regulation of the Energy Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015

KDP 164/2009 – The Streets and Buildings (Energy Performance of Buildings) Regulations 2009

KDP 61/2014 – The Streets and Buildings (Energy Performance of Buildings) (Amendment) Regulations 2014

KDP 343/2013 – On the Regulation of the Energy Performance of Buildings (Methodology for the calculation of the Cost Optimal Minimum Requirements on the Energy Performance of Buildings) Decree 2013

KDP 386/2013 – On the Regulation of the Energy Performance of Buildings (Requirements on New Technical Building Systems installed in existing buildings or building units and technical systems that are replaced or upgraded) Decree 2013

KDP 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB) Decree 2014

Greece

Greek Law 3661/2008, issued on the 19th of May 2008

Regulation for Energy Efficiency of Buildings (KENAK) issued in 2010 (Official Gazette Bulletin B' 407/09-04-2010), based on the Greek Law 3661/2008

Greek Law 4122/2013 "Energy Performance of Buildings – Transposition of Directive 2010/31/EU

Italy

European Parliament and the Council of the European Parliament (2010). Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast).

D.L. 63/2013 Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, sulla prestazione energetica nell'edilizia per la definizione delle procedure d'infrazione avviate dalla Commissione europea, nonche' altre disposizioni in materia di coesione sociale. (13G00107) (GU Serie Generale n.130 del 5-6-2013)

Portugal

Decree-Law 118/2003, related Ordinances and Mandamus – Portuguese Energy Certification System; Regulation on the Energy Performance of Residential Buildings; Regulation on the Energy Performance of Office Buildings (sets the minimum quality of the envelope and indoor reference ambient temperatures to ensure the conditions for thermal comfort)

Directive related sessions / content:

- Session 3 - Building regulation and standards
    - Social and political understanding of the topic
    - Building regulations and standards related with thermal comfort
    - Current building regulations and standards in the front runner countries
    - Local context
    - Local regulations and standards
    - Local impact / issues

Directive related bibliography content:

As per pre-classroom.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 5 – Local Architectural Regulations and Certification Framework – presents the need for near zero energy buildings. It addresses the SouthZEB certification framework and how the development of standards and certification of professionals is important with regards to new construction and also the retrofitting of existing buildings.

The training addresses how nZEB implementation could overcome obstacles posed by particularities such as apartment blocks, traditional settlements, islands and listed buildings

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

Directive related pre-classroom content

UN Framework on Climate Change: http://unfccc.int/essential_background/convention/items/2627.php

Construction products regulations and guidance: http://ec.europa.eu/growth/sectors/construction/product-regulation/index_en.htm
CE Marking: http://ec.europa.eu/growth/single-market/ce-marking/index_en.htm
European Technical Approval: http://www.eota.eu/en-GB/content/home/2/185/
Energy Performance of Buildings Regulations: http://www.epbd-ca.eu/
https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings
http://www.eceee.org/policy-areas/buildings/EPBD_Recast
Thermal insulation:
http://ec.europa.eu/environment/gpp/pdf/thermal_insulation_GPP_%20background_report.pdf
http://www.ea-etics.eu/media;files/pdf/7/27.pdf
Energy efficient services: http://www.roadmap2050.eu/attachments/files/EnergySavings2020-FullReport.pdf

Directive related sessions / content:

Session 1: NZEB current position:
Addresses the current position on near zero energy buildings, in particular the following:

- European Union
- Target country (Cyprus, Greece, Italy and Portugal).
- Global, EU and national drivers
- Energy Performance of Buildings Directive.

National legislation is set out in table below:

Cyprus	***Greece***
N142(I)/2006 – On the Regulation of the Energy Performance of Buildings Law 2006 N30(I)/2009 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2009 N210(I)/2012 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2012 ΚΔΠ 164/2009 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) Regultions 2009 ΚΔΠ 39/2014 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) (Amendment) Regultions 2014 ΚΔΠ 412/2009 - On the Regulation of the Energy Performance of Buildings (Energy Performance Certificates of Buildings) Decree 2009 ΚΔΠ 432/2013 - On the Regulation of the Energy Performance of Buildings (Minimum Requirements on the Energy Performance of Buildings) Decree 2013 ΚΔΠ 432/2013 - On the Regulation of the Energy Performance of Buildings (Recommendations for the Improvement of the Energy Performance of Buildings and Energy Performance Certificate of Buildings) Decree 2013 ΚΔΠ 33/2015 - On the Regulation of the Energy	Greek Law 3851/2010 “Accelerating the Development of Renewable Energy Sources (RES) to Deal with Climate Change and Other Regulations in Topics under Authority of the Greek Ministry of Environment, Energy, and Climate Change” Greek Law 3661/2008 “Measures to reduce energy consumption in buildings and other provisions” Regulation for Energy Efficiency of Buildings (KENAK) issued in 2010 (Official Gazette Bulletin B’ 407/09-04-2010), based on the Greek Law 3661/2008 Technical Guidelines for the implementation of KENAK through Official Gazette Bulletin B’ 1387-2010 and 1413-2012 Greek Law 4122/2013 “Energy Performance of Buildings – Transposition of Directive 2010/31/EU”

Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015 ΚΔΠ 164/2009 – The Streets and Buildings (Energy Performance of Buildings) Regulations 2009 ΚΔΠ 61/2014 – The Streets and Buildings (Energy Performance of Buildings) (Amendment) Regulations 2014 ΚΔΠ 343/2013 – On the Regulation of the Energy Performance of Buildings (Methodology for the calculation of the Cost Optimal minimum Requirements on the Energy Performance of Buildings) Decree 2013 ΚΔΠ 386/2013 – On the Regulation of the Energy Performance of Buildings (Requirements on New Technical Building Systems installed in existing buildings or building units and technical systems that are replaced or upgraded) Decree 2013 ΚΔΠ 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB) Decree 2014 ΚΔΠ 163/2009 - On the Regulation of the Energy Performance of Buildings (Cooling Systems Inspection) Regulations 2009 ΚΔΠ 413/2009 - On the Regulation of the Energy Performance of Buildings (Cooling Systems Inspection) Decree ΚΔΠ 244/2015 - On the Regulation of the Energy Performance of Buildings (regulation and control of cooling systems of nominal power output greater than 20 kW) Decree ΚΔΠ 119/2011 - On the Regulation of the Energy Performance of Buildings (Inspection of boiler based Heating Systems) Regulations 2011 ΚΔΠ 148/2013 - On the Regulation of the Energy Performance of Buildings (Inspection procedure of heating systems equipped with a boiler of nominal power between 20 kW and 100 kW) Decree 2013 ΚΔΠ 149/2013 - On the Regulation of the Energy Performance of Buildings (Inspection procedure of heating systems equipped with a boiler of nominal power greater than 100 kW) Decree 2013 ΚΔΠ 244/2013 - On the Regulation of the Energy Performance of Buildings (regulation and control of heating systems equipped with a boiler of nominal output power greater than 20 kW) Decree 2013	
Italy ISTAT, Report 2004	***Portugal*** Decree-Law 118/2013;

EPBD recast 2010/31 / UE D. Lgs. 63 - 4 Giugno, 2013 D. Lgs 192/05 e D. Lgs 311/06 D.P.R. 59/2009 DM Linee Guida CE 26/06/2009 D.L. 63/13 Legge 90/13 Legge 164/2014	Decree-Law 78/2006; Decree-Law 79/2006; Decree-Law 80/2006

Session 2: local architecture and development in the country - understand the building regulations and how these relate to the design, construction and operation of nZEB in each country.

Session 3: planning for nZEB - understand and be able to offer solutions to the technical, practical and logistical challenges faced in each country in achieving nZEB.

Session 4: building regulations – to understand and be able to offer solutions to the technical, practical and logistical challenges faced in each country in achieving nZEB. This session also explains to learners what changes have been brought about in the target country on building regulations since the EPBD and other relevant EU directives were introduced. The session will then address what other legislation and regulations in the target country affect the realisation of nZEBs. For example, specific EPC regulations, on their own they do not require nZEB, but the EPC rating has now to be used in property transactions at sale/rental and advertised. In some countries Climate Change legislation will soon require that existing non-domestic buildings have to have cost-effective improvement measures taken on sale or rental.

Session5: Country specific issues – to understand and be able to offer solutions to the technical, practical and logistical challenges faced in each country in achieving nZEB. This includes discussion on the topic of Member States needing to draw up national plans to increase the number of near zero-energy buildings. The national plans shall include inter alia the Member State's detailed application in practice of the definition of nearly zero-energy buildings, reflecting their national, regional or local conditions, the intermediate targets for improving the energy performance of buildings by 2015, and any policies and financial or other measures to promote nearly zero-energy buildings.

Session7: EPDB – to understand the importance of the Energy Performance of Buildings Directive (EPBD) to the development of nZEB buildings in Europe, and to learn about the areas covered by the EPBD and to understand how these are transposed into national legislation and requirements. This session includes:

- The reasons as to why the EPBD has come into force, the bigger picture issues of climate change and resource efficiency.
- The history of the EPBD, including the original version, and the recast of the EPBD. As of 31 December 2020 new buildings in the EU will have to consume 'nearly zero' energy and the energy will be 'to a very large extent' from renewable sources. Public authorities that own or occupy a new building should set an example by building, buying or renting such 'nearly zero energy building' as of 31 December 2018
- Articles 1-21 are discussed in turn

Directive related bibliography content:

Cyprus

- Mandate 2/2006 (Ministry of Interior) – Spatial distribution and installation of developments related

to the energy production from Renewable Energy Sources
- 101(I)/2006 – On the regulation of Streets and Buildings Law
- Κ.Δ.Π. 429/2006 - On the Streets and Buildings (Energy Performance of Buildings) Regulations of 2006
- Κ.Δ.Π. 61/2014 - On the Streets and Buildings (Energy Performance of Buildings) (Amendment) Regulations of 2014
- Mandate 1/2014 – Use of Renewable Energy Sources related to building developments
- 240(I)/2002 – on the listed buildings law

Greece

- Guidelines to be followed during the construction / inspection of new build buildings and fully renovated buildings. The guidelines were issued by the Technical Chamber of Greece: http://portal.tee.gr/portal/page/portal/teetkm/DRASTHRIOTHTES/SEMINARIA/
- Greek Law 4067/2012 Building legislation : http://www.ypeka.gr/LinkClick.aspx?fileticket=5nRUKLGIL8E%3D&tabid=506&language=el-GR
- General definition of nZEB concept, as per the recast EPBD Directive.Greek Law 4122/2013 : https://www.buildingcert.gr/N4122_2013.pdf
- Analytical parameters for the calculation of energy performance of buildings and issue of certificate of energy efficiency by ministry of Environment and Energy (TOTEE): http://portal.tee.gr/portal/page/portal/tptee/totee/TOTEE-20701-1-Final-%D4%C5%C5-2nd.pdf

Italy

- D. Lgs. 63 - 4 Giugno, 2013
- D. Lgs 192/05 e D. Lgs 311/06
- D.P.R. 59/2009
- DM Linee Guida CE 26/06/2009
- D.L. 63/13
- Legge 90/13
- Legge 164/2014

Portugal

- Characterization of thermal performance and nominal heating gap of the residential building stock using the EPBD-derived databases: The case of Portugal mainland: http://www.sciencedirect.com/science/article/pii/S0378778813007615

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 6 – nZEB Simulation and Design Software – presents relevant nZEB simulation and design software. Such software and building energy simulation tools are critical as they have an ability to consider energy efficiency measures in buildings by predicting their behaviour under given climatic conditions and usage patterns. The module informs and demonstrates the simulation tools available and their versatility and ability to predict and compare different design options regarding energy building consumption towards achieving nZEB buildings

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)

- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

Directive related pre-classroom content

Not directly related to Directives.

Directive related sessions / content:

- Session 2 - Net zero energy buildings (2.0 h)
  - NZEB Concept
  - What is Net Zero Energy?
  - What are solutions sets?
  - Design Approach and Strategies
  - Design Guide Hierarchy and Solution Sets
  - NZEB Case study
- Session 5 - Heating Design, Cooling Design/ Natural Ventilation (4.0 h)
- Session 6 - Renewable systems (2.0 h)
- Session 7 - NZEB concepts/scenarios analysis (2.0 h) - explains the procedure to define different scenarios analysis related with nZEB concepts in the simulation software.

Directive related bibliography content

None specifically related to Directives.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 7 – Low Carbon Technologies and Automation – presents the range of low carbon technologies crucial to helping achieve ZEBs as well as introducing how to assess the financial performance and cost effectiveness of the different systems. The module also introduces building automation systems, their purpose and classification and explains their importance in ensuring the successful integration and operation of the low carbon technologies and building energy systems. The module also introduces the concept of a cost-optimal assessment methodology and the requirement for policy-makers and designers to take into account the global lifetime costs of buildings to shape their energy design and performance. The global cost calculation method “EN 15459” is also introduced.

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

Directive related pre-classroom content:

Energy Performance of Buildings Regulations: http://www.epbd-ca.eu/
https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings
http://www.eceee.org/policy-areas/buildings/EPBD_Recast

IEE-Cense, Information paper (P160) on EN 15459 - Economic evaluation procedure for energy systems in buildings: http://www.buildup.eu/en/practices/publications/information-paper-en-15459-economic-evaluation-procedure-energy-systems
National content includes:

Cyprus

ΚΔΠ 33/2015 - On the Regulation of the Energy Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015
ΚΔΠ 343/2013 – On the Regulation of the Energy Performance of Buildings (Methodology for the calculation of the Cost Optimal minimum Requirements on the Energy Performance of Buildings) Decree 2013
ΚΔΠ 386/2013 – On the Regulation of the Energy Performance of Buildings (Requirements on New Technical Building Systems installed in existing buildings or building units and technical systems that are replaced or upgraded) Decree 2013
ΚΔΠ 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB) Decree 2014

Greece

Greek Law 3661/2008, issued on the 19th of May 2008
Regulation for Energy Efficiency of Buildings (KENAK) issued in 2010 (Official Gazette Bulletin B' 407/09-04-2010), based on the Greek Law 3661/2008
Greek Law 4122/2013 "Energy Performance of Buildings – Transposition of Directive 2010/31/EU"

Italy

European Parliament and the Council of the European Parliament (2010). Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast).
D.L. 63/2013 Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, sulla prestazione energetica nell'edilizia per la definizione delle procedure d'infrazione avviate dalla Commissione europea, nonche' altre disposizioni in materia di coesione sociale. (13G00107) (GU Serie Generale n.130 del 5-6-2013)

Directive related sessions / content:

- Session 1 - Introduction (0.5h) – provides an introduction to the EPBD2 and the challenges that it poses for the energy performance of buildings. The definition of nZEB from EPBD2 article 2 is then presented to highlights the import role that an effective energy strategy, energy efficiency and renewable energy sources has to play
- Session 6 – Cost Optimal and EN15459 (2h) - introduces the long-term decarbonisation goals of the EU. It also highlights the key requirements of the recast Energy Performance of Buildings Directive (EPBD, 2010/31/EU) in relation to new building design. It also introduces the concepts of cost-effectiveness and cost-optimality.
- Session 7 – Building Controls and Automation (2h) - introduces the need to manage energy consumption in nZEBs via the effective control of building energy systems

Directive related bibliography content:

2002: Energy Performance of Buildings Directive (EPBD), (Directive 2002/91/EC,EPBD)
2010: recast EPBD, (Directive 2010/31/EU)
European Commission PVGIS – European solar resource maps and tools: http://re.jrc.ec.europa.eu/pvgis/countries/countries-europe.htm

IEE, Technology Roadmap Solar Photovoltaic Energy - 2014 edition: https://www.iea.org/publications/freepublications/publication/TechnologyRoadmapSolarPhotovoltaicEnergy_2014edition.pdf

(IEA) Energy Performance Estimating (solar thermal systems)
EU Roadmap for moving to a competitive low carbon economy in 2050 (COM, 2011a)
The Commission Cost-Optimality Delegated Regulation (EC, 2012a)

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 8 – Retrofitting Towards nZEB – presents the way to retrofit the existing building stock towards nZEB considering both energy efficiency and indoor environmental quality.

This module focuses on how to address the existing building stock and the possibility of its conversion into nZEB. Assessment and energy audit techniques in existing buildings are also part of the training goals as well as the cost optimality of nZEB renovation technical solutions.
Module 8 includes sessions on applicable directives, regulations and standards; the concept and definition of nZEB; nZEB strategies; existing and emergent renovation solutions; integration of renewable energy sources in existing buildings and/or neighbourhoods; renovation solutions towards nZEB; cost optimality for nZEB; methodology to asses cost optimal renovation solutions; cost optimal renovation packages; the users' expectations and users' acceptance of renovation measures; co-benefits associated to renovation measures; drivers and barriers associated to renovation works; available tools to support cost-effective renovation works; energy audits; best practices and case-studies. Content includes:

- Definition of the nZEB concept in building retrofit;
- European Directives, building regulations and national and international standards related to building retrofit;
- Building traditions, local context and local impact / issues;
- nZEB renovation strategies;
- Passive and active renovation solutions towards nZEB;
- Integration of renewable energy systems;
- Cost optimal methodology applied to the renovation of buildings;
- Life cycle costs assessment;
- Cost optimal renovation solutions according to the local context;
- Users' expectations and users' acceptance of renovation measures;
- Co-benefits associated to a renovation process;
- Drivers and barriers associated to renovation works;
- Tools to support cost-effective renovation works towards nZEB;
- Energy audits. Objectives, strategies and techniques; methodology followed in energy audits; equipment used;
- nZEB best practices in renovation works.

Key Directives addressed:

- Directive 2002/91/EC on the energy performance of buildings (EPBD).
- Directive 2009/28/EC on the promotion of the use of energy from renewable sources
- Directive 2009/72/EC concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC
- Directive 2010/31/EU on the energy performance of buildings (recast).

- Directive 2012/27/EU on energy efficiency,
- European Commission (2012a). Commission Delegated Regulation (EU) No 244/2012 of 16 January 2012 supplementing Directive 2010/31/EU of European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost optimal levels of minimum energy performance requirements for buildings and building elements. Official Journal of the European Union L81/18.

Directive related pre-classroom content

European Commission (2002). Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings (EPBD).

- European Parliament and the Council of the EU (2009a): Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (RED 2009)
- European Parliament and the Council of the EU (2009b): Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC
- European Council for an Energy Efficient Economy - ECEEE (2009): Net zero energy buildings: definitions, issues and experience. Published by ECEEE, Brussels
- European Parliament and the Council of the European Parliament (2010). Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast).
- European Commission (2011). A Roadmap for moving to a competitive low carbon economy in 2050.
- European Parliament and the Council of the European Parliament (2012). Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC
- European Commission (2012a). Commission Delegated Regulation (EU) No 244/2012 of 16 January 2012 supplementing Directive 2010/31/EU of European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost optimal levels of minimum energy performance requirements for buildings and building elements. Official Journal of the European Union L81/18.
- European Commission (2012b). Guidelines accompanying the Commission Delegated Regulation (EU) Nº244/2012 of 16 January 2012, supplementing Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings. Official Journal of the European Union C115/1.
- Energy Programs Consortium (2013). Multifamily energy Efficiency Reported Barriers and Emerging Practices. Washington, DC
- European Commission - IP/14/54 22/01/2014 (2014) 2030 Climate and Energy Goals for a Competitive, Secure and Low-carbon EU Economy.
- European Commission (2014) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A policy framework for climate and energy in the period from 2020 to 2030. Brussels, 22/1/2014 (available at: http://ec.europa.eu/clima/policies/2030/documentation_en.htm).
- BPIE, (2011), Europe's Buildings under the Microscope.

(http://www.europeanclimate.org/documents/LR_%20CbC_study.pdf)

- BPIE (2013). Implementing the Cost-Optimal Methodology in EU Countries – Lessons learned from three case studies ISBN: 9789491143083
- BPIE, 2013. A Guide to Developing Strategies for Building Energy Renovation - Delivering the Energy Efficiency Directive Article 4 requirements on long term strategies for mobilising investment in renovation of national building stocks
- BPIE, (May 2014), Alleviating Fuel Poverty in the EU Investing in Home Renovation, a Sustainable and Inclusive Solution (http://bpie.eu/uploads/lib/document/attachment/60/BPIE_Fuel_Poverty_May2014.pdf)
- BPIE (2016). 2016 – Implementing the Energy Performance of Buildings Directive (EPBD). (http://www.epbd-ca.eu/ca-outcomes/2011-2015)
- IEA, (2013), Transition to Sustainable Buildings Strategies and Opportunities to 2050, http://www.iea.org/publications/freepublications/publication/Building2013_free.pdf

National Content includes:

Cyprus

Laws

N142(I)/2006 – On the Regulation of the Energy Performance of Buildings Law 2006
N30(I)/2009 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2009
N210(I)/2012 - On the Regulation of the Energy Performance of Buildings (Amendment) Law 2012

Decree Laws & Regulations

KDP 164/2009 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) Regultions 2009
KDP 39/2014 – On the Regulation of the Energy Performance of Buildings (Energy Certification of Buildings) (Amendment) Regultions 2014
KDP 412/2009 - On the Regulation of the Energy Performance of Buildings (Energy Performance Certificates of Buildings) Decree 2009
KDP 432/2013 - On the Regulation of the Energy Performance of Buildings (Minimum Requirements on the Energy Performance of Buildings) Decree 2013
KDP 432/2013 - On the Regulation of the Energy Performance of Buildings (Recommendations for the Improvement of the Energy Performance of Buildings and Energy Performance Certificate of Buildings) Decree 2013
KDP 33/2015 - On the Regulation of the Energy Performance of Buildings (Methodology on the Energy Assessment of Buildings) Decree 2015
KDP 164/2009 – The Streets and Buildings (Energy Performance of Buildings) Regulations 2009
KDP 61/2014 – The Streets and Buildings (Energy Performance of Buildings) (Amendment) Regulations 2014
KDP 343/2013 – On the Regulation of the Energy Performance of Buildings (Methodology for the calculation of the Cost Optimal Minimum Requirements on the Energy Performance of Buildings) Decree 2013
KDP 386/2013 – On the Regulation of the Energy Performance of Buildings (Requirements on New Technical Building Systems installed in existing buildings or building units and technical systems that are replaced or upgraded) Decree 2013
KDP 366/2013 – On the Regulation of the Energy Performance of Buildings (Requirements and Specifications to be met by the near Zero Energy Building - nZEB) Decree 2014

Greece

Decree Laws:

Greek Law 3661/2008 “Measures to reduce energy consumption in buildings and other provisions”, which

integrates the Directive 2002/91/EC
Greek Law “New Hellenic Regulation on the Energy Performance of Buildings”
Greek Law 4067/2012 “Greece's New Building Regulations”
Greek Law 4122/2013
National Plan issued on December 2014 referring to Article 24 of the Directive

Portugal

Portuguese Building Thermal Legislation: Decree-Law 118/2013, Decree-Law 68-A/2015, Decree-Law 194/2015, Decree-Law 251/2015, Decree-Law 28/2016 and respective Mandamus and Ordinances

Directive related sessions / content:

- Session 1 – Definition of the nZEB concept (1.0h); -

  The presentation explains the definition of nZEB concept, according to EPBD recast (2010/31/EU., Different approaches are presented (considering: the quantity and also the quality of the energy; the variety in the period of time used for calculation; the diversity of energy use; the renewable energy supply options). The session continues with the presentation of the international context regarding the building stock and its characteristics, and energy consumption to emphasize the importance of building renovation in the global context.

  The session goes on with the social and political understanding of the retrofitting towards nZEB, presenting the fuel poverty problem in Europe and the contribution of nZEB renovation to the mitigation of fuel poverty, quality of life of the population, energy savings. The benefits of nZEB renovation to health, well-being, energy savings, and property valuations are also presented.
- Session 2 – Building regulations and standards and local construction traditions (2.0h);

  This session starts with the nZEB definition and nZEB renovation in accordance with the EPBD recast and the Energy Efficiency Directive 2012/27/EU as well as the international standards related to the topic.
- Session 4 – Cost optimal renovation solutions (2.0h);

  The learning objectives of Session 4 are related to the understanding of the requirements of the EPBD-recast and of the Commission delegated Regulation (EU) Nº 244/2012 concerning the cost-optimal methodology and its framework.
- Session 6 – Tools to support cost-effective renovation works towards nZEB (3.0h);

  Presents tools to support the calculation of the primary energy consumption and the life cycle costs of the retrofitting solution.

Directive related bibliography content:

IEA EBC Annex 56 "Cost effective energy and carbon emissions optimization in building renovation"; http://www.iea-annex56.org/.
IEA. Spreading the net - The Multiple Benefits of Energy Efficiency Improvements; 2012.
Websites with important information:
http://www.bpie.eu/eu_buildings_under_microscope.html#.VUEBepPiog4
http://bpie.eu/pub_principles_for_n_zeb.html#.VUEB85Piog4
http://iet.jrc.ec.europa.eu/energyefficiency/system/tdf/eur26888_buildingreport_online.pdf?file=1&type=node&id=9069
http://www.buildup.eu/publications/38183
http://www.entranze.enerdata.eu/share-of-dwellings-built-before-1980-in-total-stock.html

http://buildupskills.eu/sites/default/files/Status_Quo_Report_October_2012.pdf
http://www.ecofys.com/files/files/bpie_ecofys_2012_implementing_nzeb_in_bulgaria.pdf
http://bpie.eu/documents/BPIE/Developing_Building_Renovation_Strategies.pdf
https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings/nearly-zero-energy-buildings
http://bpie.eu/documents/BPIE/Developing_Building_Renovation_Strategies.pdf

National content regulations and guidance as noted in pre-classroom material.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 9 – Construction Management and Field Supervision – presents the concepts of building information modelling, building envelope, mechanical, electrical and plumbing systems, renewable energy and energy storage and building automation systems. It is structured in a way to approach the design and construction of these processes of a near Zero Energy Building.

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

Directive related pre-classroom content

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)

Directive related sessions / content includes:

- Session 1 – Building Information Modeling (5.0h)
  - The Basics
  - Global Adoption, Codes & Standards
  - Building Information Modeling in Zero Energy Buildings
- Session 2 – The building envelope (6.0h)
  1. Policies, Codes & Regulations
- Session 3 – Mechanical, Electrical & Plumbing Systems (7.0h)
- Session 4 – Renewable Energy & Energy Storage (7.0h)
  - Construction Management and Renewable Energy implementation: Electrical energy, thermal energy
- Session 5 – Building Automation Systems (5.0h) - prepared by EEG Cyprus
  - Building automation to near Zero Energy Building
  - Standards & Regulations

Directive related bibliography content:

1. European Commission. (2013). REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Progress by Member States towards Nearly Zero-Energy

Buildings. Brussels. http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0483:FIN:EN:PDF
2. International Energy Agency. (2008). ENERGY EFFICIENCY REQUIREMENTS IN BUILDING CODES, ENERGY EFFICIENCY POLICIES FOR NEW BUILDINGS. France.
3. Energy statistics in this roadmap come from the IEA energy balances, IEA Energy Efficiency Indicators Database, and the IEA Buildings Model unless otherwise stated (IEA 2013a).
4. CA-EPBD, Implementing the Energy Performance of Buildings Directive – Featuring country reports 2010.
5. Buildings Performance Institute Europe, Europe's Buildings under the Microscope – a country by country review of the energy performance of buildings, 2011.

Module overview (please refer to D3.2 – module descriptions for extended details):

Module 10 – Funding and Incentives – presents a range of tools, mechanisms and incentive schemes designed to facilitate the increased uptake of energy efficiency and low carbon technologies and/or green improvement plans for buildings. These mechanisms can potentially inform the design of similar measures, by policymakers in the Southern countries, to assist the development of energy efficient design and nZEB solutions

Key Directives addressed:

- 2010/31/EU Directive of the European Parliament and of the Council on the energy performance of buildings (recast)
- 2009/28/EC Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

Directive related pre-classroom content:

- European Commission website – financing energy efficiency (including "Smart financing for smart buildings imitative") - https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency
- (Report) Financial support for energy efficiency in buildings, European Commission, COM (2013) 225 - https://ec.europa.eu/energy/sites/ener/files/documents/report_financing_ee_buildings_com_2013_225_en.pdf
- European Commission website – financing renovations - https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings/financing-renovations
- National Government (or delegated parties e.g. regulators) websites, guides or regulations relevant to incentives for energy efficiency design, implementation and improving the energy performance of buildings.

Directive related sessions / content:

Session 1: Context and Background – to introduce attendees to background, context and key EU policy and legislation issues surrounding the need for increasing energy efficiency, decarbonising the building environment and developing nZEBs. Also to draw attention to the need for effective finance mechanisms, regulation or incentives to facilitate the move to a low carbon built environment.

Session 2: Funding and Incentive Schemes (by type) (including examples) - To introduce attendees to, and

develop their understanding of, a range of energy efficiency obligation schemes, funding schemes, and other related incentives that can support low energy building design and operation and the development of nZEBs. Also, to provide attendees with an overview of the structure, operation, benefits and risks of a variety of schemes and mechanisms.

Session 3: Local country specific mechanisms – to introduce attendees to, and develop their understanding of, selected country-specific mechanisms that support low energy building design and operation and the development of nZEBs.

Directive related bibliography content:

- European Commission website – financing energy efficiency – https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency
- (Website) De-risking Energy Efficiency Platform (DEEP) - An open-source initiative to up-scale energy efficiency investments in Europe through the improved sharing and transparent analysis of existing projects in Buildings and Industry - https://deep.eefig.eu/

Cyprus

- National Strategy in mobilizing investments in the sector of buildings' energy retrofits.

Greece

- Report regarding the longterm strategy for stimulation of the incentives for the renovation of the existing building stock, by Energy Ministry - http://84.205.246.56/LinkClick.aspx?fileticket-=XLqxHeSJDdA%3d&tabid=282&language=el-GR
- Measures on energy efficiency and renewable energy in buildings by Odyssee-Mure - http://www.measures-odyssee-mure.eu/topics-energy-efficiency-policy.asp
- News regarding energy efficient policies - http://84.205.246.56/Default.aspx?tabid=281&language=el-GR

Italy

- Nevin Cohen (a cura di) (2011), *Green Business: An A-to-Z Guide*, SAGE Publications
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- Antonella Antonelli (2013), *I Finanziamenti della Comunità Europea. I consigli e le informazioni utili per attingere ai fondi stanziati dalla Comunità Europea*, B2corporate

Portugal

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- Energy Efficiency Fund (FEE - Fundo de Eficiência Energética) - https://dre.pt/application/file/485568
- Portugal 2020 – https://www.portugal2020.pt/Portal2020/Media/Default/Docs/1.%20AP_Portugal-%202020_28julho.pdf
- Promoting Efficiency in Electricity Consumption (PPEC - Plano de Promoção da Eficiência no Consumo) - http://www.erse.pt/pt/legislacao/diplomas/Documents/Efici%C3%AAncia%20Energ%C3%A9tica/Portaria%2026_2013.pdf

3. CONCLUSIONS

As a conclusion of the work done under WP6, it appears that the indications explained in the Grant Agreement and in the Annex I of the project have been strictly followed from all the partners of the consortium, who have contributed in the monitoring of the quality of the project.

The quality control within the project has been a procedure implemented from the start of the project throughout the rest of the WPs and tasks of the project. Specific templates to be used for the documents produced during the project have been prepared and implemented; a closed supervision of the data displayed in the deliverables to check their compliance with the requirements set by the EASME was done.

Furthermore, the quality of the deliverables was controlled through the reviewing procedure that was implemented from the Coordinator, the WP leader of each WP and the rest of the partners, whereas in parallel the monitoring of the performance indicators of the project and a control on other crucial aspect was being realized:

- Control of data collected and analysed on each phase's requirements;
- Control to the materials, tools, software and resources related to the project;
- Control of important steps of each phase in order to continually review and implement corrective actions;
- Control of the results and feedbacks received in order to know if the needs were met;
- Control of the reporting procedures;
- Control of the timetable with the identification of time and specific actions to be taken before the deadlines.

The SouthZEB project did not face any major problem. Probably the most critical aspect of the whole set of activities performed was related to the need to reach the high target number for some country partners, plus the local context which sometimes has been not so active in answering to trainings proposals and offers.

Despite this aspect, the main factor of success of the SouthZEB project was the achievement of the target number both for trainers and trainees to be trained on specific and important topics of nZEB building, regulations and directives specific for Southern European countries.

The overall quality of the trainings delivered in all the target countries was very satisfying and let a medium score of:

- 3,03 (scale from 0 – strongly disagree – to 4 – strongly agree) for the "Train the trainer workshops";
- 2,89 (scale from 0 – strongly disagree – to 4 – strongly agree) for the "Pilot training seminars".

As a result, it must be pointed out that the SouthZEB project has evidenced the existence of a demand of knowledge share and seminars' organization on specific themes and topics related to the nZEB buildings. The answer and the fulfilment of this demand could be lead to an awareness on buildings with more sustainable criteria, and to oblige to the local, national and European directive and legislation which are actually in effect.

APPENDICES

APPENDIX A

System Integration Test performed by BEST

S/N	Checklist	YES	NO
1	Existence of E-learning platform.	X – if this refers to 'courses'*	
2	Existence of nZEB simulation and design tools section.		x
3	Existence of forum.	X – within "courses"	X – on top level
4	Existence of funding opportunities section.	x	
5	Complaints section	As contact us – but did not work to send an email to coordinator	

* South Zeb 1 shows; but why is there a number?

Test to be performed:

S/N	Tests	Pass	Fail
1	Connect to the portal through the defined portal's name.	x	
2	Enter to all the sub-menu categories to ensure they are accessible.	X those available	
3	Forum testing:		
	Create a new subject in the forum and post a question.		X as Master; possible as NC e.g.
	Answer in the question you have posted.		
	(Enter with a different ID) Delete the question / answer of the new subject or somehow modify the question / answer (it should fail)		x
	Upload a file in the forum (.jpg, .doc, .pdf)		x
	Delete the new subject (as administrator-> it should pass)		x
	Delete the new subject (rest categories -> it should fail)		
4	nZEB simulation and design tools section:		
	Modify (add, delete) the data of the section (as administrator -> it should be pass)		X
	Modify (add, delete) the data of the section (rest categories -> it should be fail)		x
5	Funding opportunities section:		
	Modify (add, delete) the data of the section (as administrator-> it should be pass)		x
	Modify (add, delete) the data of the section (rest categories -> it should be fail)		X**
6	Enter the complaints section and write a complaint.		Not available – other than contact or message
	Modify the data on this section (as administrator-> it should be pass)		
	Modify the data on this section (rest categories -> it should be fail)	X	X not possible as Master Admin

			x
7	E-learning platform:		
	(As a student) Enter the platform and access the material in the training modules.	x	
	(As a student) Access the tests / quizzes of the training modules and perform one.		x
	(As a student) Modify (add, delete) in any way the material provided.		x
	(As a student) Monitor the performance in the training module.		x
	(As a student) Send a message to the teacher of a training module.	X only as reply	x
	(As a student) Download the material provided in the platform.	X own	X other
	(As a student) Edit own credentials.		X (no permission)
	(As a teacher) View / score / comment on the students' assignments/ replies to quizzes of the specific training module.	X own	X other
	(As a teacher) Edit your own and your students' credentials.		x
	(As a teacher) Edit credentials of other students (it should be fail)	x	
	(As a teacher) Reply to the message sent previously (sent as student).	x	
	(As a teacher) Send message to the coordinator.		x
	(As a teacher) Monitor the progress of your student (progress of previously entered as student)		x
	(As a teacher) Assign a quiz to one of your students.	x	
	(As a National Coordinator) Read message sent by teacher and reply.	x	
	(As a National Coordinator) Send message to the administrator.	x	
	(As a National Coordinator) Modify credentials and info of teachers / students of different countries (it should be fail)		
	(As a National Coordinator) Modify credentials and info of teachers / students of your own country (it should be pass)	x	
	(As a National Coordinator) Modify information of training modules of your own country (it should be pass)	x	
	(As a National Coordinator) Modify information of training modules of other countries (it should be fail)	x	
	(As a National Coordinator) View the progress of training modules of your country.		x
	(As Administrator) Read and reply to message sent by national coordinator.		x
	(As Administrator) Modify teachers' / students' credentials.		x
	(As Administrator) Modify input of teachers/ students in portal.		x
	(As Administrator) Download / Print some of the material uploaded in portal.		x
	(As Administrator) Comment on the quiz performed previously by the student.		x
	(As Administrator) Create and extract report regarding progress in the training modules.		x
	(As Administrator) Backup the files uploaded.		x
	(As Master Administrator) Edit administrator's credentials.		x
	(As Master Administrator) Edit other's (national coordinator / teacher / student) credentials. (it should be fail)	x	
	(As Master Administrator) Edit administrator's rights.		x
		X download	X print

** Link to funding must open as new link

NB other aspects not considered in template but need to be revised:

Only small letters allowed for user registration at moment – should be capital as well.

Courses – only show description and duration/target users at this stage (except in module 4 where there are 358 (!!!) slides as contents without break nor quiz nor questions nor reflection); when in courses and modules, the letter size of SOUTHZEB1 (i.e. as top course title) should be smaller as reader should first see navigation and understand where s/he is at moment (i.e. top navigation bar should be more feasible than top title).

Once replied to a message of anyone via contacts of southzeb course, could not go back.

New course created – no one could enroll; could not be found (seen) when rolled into SouthZeb.

Events (in calender) from users should not be seen by others; could not find where to have privacy settings for this.

Could not post in nearly all profiles.

System Integration Test performed by CUT

S/N	Checklist	YES	NO
1	Existence of nZEB simulation and design tools section.		X
2	Complaints section		X

S/N	Tests		Pass	Fail
2	**Enter to all the sub-menu categories to ensure they are accessible.**			X
3	**Forum testing:** it is not possible to post a topic for discussion in the forum			
	a	Create a new subject in the forum and post a question.		X
	b	Answer in the question you have posted.		X
	c	(Enter with a different ID) Delete the question / answer of the new subject or somehow modify the question / answer (it should fail)		X
	d	Upload a file in the forum (.jpg, .doc, .pdf)		X
	e	Delete the new subject (as administrator-> it should pass)		X
	f	Delete the new subject (rest categories -> it should fail)		X
4	**nZEB simulation and design tools section:** the section does not exist			
	a	Modify (add, delete) the data of the section (as administrator -> it should be pass)		X
	b	Modify (add, delete) the data of the section (rest categories -> it should be fail)		X
5	**Funding opportunities section:** the information provided for Cyprus is missing			
	a	Modify (add, delete) the data of the section (as administrator-> it should be pass) do not have this option		X
	b	Modify (add, delete) the data of the section (rest categories -> it should be fail) do not have this option		X

Figure 1: System Integration Test by CUT (1st page)

7	**E-learning platform:**			
	b	(As a student) Access the tests / quizzes of the training modules and perform one. Quiz section does not exist		X
	c	(As a student) Modify (add, delete) in any way the material provided. do not have this option		X
	d	(As a student) Monitor the performance in the training module. not clear if one can has this option at all with current portal status		X
	h	(As a teacher) View / score / comment on the students' assignments/ replies to queries of the specific training module.		X
	i	(As a teacher) Edit your own and your students' credentials. do not have the option of editing own students' credentials	√	X
	m	(As a teacher) Monitor the progress of your student (progress of previously entered as student) – do not have this option		X
	n	(As a teacher) Assign a quiz to one of your students. – do not have this option		X
	r	(As a National Coordinator) Modify credentials and info of teachers / students of your own country (it should be pass) – do not have this option		X
	s	(As a National Coordinator) Modify information of training modules of your own country (it should be pass) – do not have this option		X
	u	(As a National Coordinator) View the progress of training modules of your country. – do not have this option		X
	w	(As Administrator) Modify teachers' / students' credentials – do not have this option		X
	x	(As Administrator) Modify input of teachers/ students in portal. – do not have this option		X
	z	(As Administrator) Comment on the quiz performed previously by the student.		X
	aa	(As Administrator) Create and extract report regarding progress in the training modules – do not have this option		X
	bb	(As Administrator) Backup the files uploaded. – do not have this option		X
	ee	(As Master Administrator) Edit administrator's rights. – do not have this option		X

Other Comments:

- The message button does not work. If someone has no messages, he cannot go to the messaging section.
- The "send message" button should be fixed below the text box provided to enter a message and not overlaid above the page.
- How does one enroll to a specific module. It is not clear at all.
- It seems that the current accounts created for testing have all the same privileges so one cannot distinguish the user permission rights between a simple trainee account, trainer or administrator etc.
- The "CAPTCHA" in the registration page is not placed correctly and is not well visible.

Figure 2: System Integration Test by CUT (2nd page)

APPENDIX B

Tests for Students

S/N	Tests	Pass	Fail	Level of Difficulty		
1	Connect to the portal through the defined portal's name.			EASY	MEDIUM	DIFFICULT
2	Enter to all the sub-menu categories. (*Comments are required regarding the ease of the menu, its format. Is it easy to move from one topic of the menu to another? Can you find easily the subject you want? Do you find the topics / sub-menus presented useful?)*					
3	Forum:					
	Create a new subject in the forum and post a question.			EASY	MEDIUM	DIFFICULT
	Answer in a question of a different subject.			EASY	MEDIUM	DIFFICULT
	Delete the question / answer of a subject or somehow modify the question / answer (it should fail)			EASY	MEDIUM	DIFFICULT
	Upload a file in the forum (.jpg, .doc, .pdf)			EASY	MEDIUM	DIFFICULT
	Delete the new subject (it should fail)			EASY	MEDIUM	DIFFICULT
4	nZEB simulation and design tools section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	Modify (add, delete) the data of the section (it should be fail)			EASY	MEDIUM	DIFFICULT
5	Funding opportunities section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	(*comments are required regarding the easiness and usefulness of the information provided)*					
	Modify (add, delete) the data of the section (it should be fail)			EASY	MEDIUM	DIFFICULT
6	Enter the complaints section and write a complaint.			EASY	MEDIUM	DIFFICULT
	Modify the data on this section (it should be fail)			EASY	MEDIUM	DIFFICULT
7	E-learning platform:					
	Enter the platform and access the material in the training modules.			EASY	MEDIUM	DIFFICULT
	Access the tests / quizzes of the training modules and perform one.			EASY	MEDIUM	DIFFICULT
	Modify (add, delete) in any way the material provided. (it should fail)			EASY	MEDIUM	DIFFICULT
	Monitor the performance in the training module.			EASY	MEDIUM	DIFFICULT
	Send a message to the teacher of a training module.			EASY	MEDIUM	DIFFICULT
	Download the material provided in the platform.			EASY	MEDIUM	DIFFICULT
	Edit own credentials.			EASY	MEDIUM	DIFFICULT

Tests for Teachers

S/N	Tests	Pass	Fail	Level of Difficulty		
1	Connect to the portal through the defined portal's name.			EASY	MEDIUM	DIFFICULT
2	Enter to all the sub-menu categories. (*Comments are required regarding the ease of the menu, its format. Is it easy to move from one topic of the menu to another? Can you find easily the subject you want? Do you find the topics / sub-menus presented useful?)*					
3	Forum:					
	Create a new subject in the forum and post a			EASY	MEDIUM	DIFFICULT

	question. Answer in a question of a different subject. Delete the question / answer of a subject or somehow modify the question / answer (it should fail) Upload a file in the forum (.jpg, .doc, .pdf) Delete the new subject (it should fail)			EASY EASY EASY EASY	MEDIUM MEDIUM MEDIUM MEDIUM	DIFFICULT DIFFICULT DIFFICULT DIFFICULT
4	nZEB simulation and design tools section: View the information uploaded in the section. Modify (add, delete) the data of the section (it should be fail)			EASY EASY	MEDIUM MEDIUM	DIFFICULT DIFFICULT
5	Funding opportunities section: View the information uploaded in the section. (*comments are required regarding the easiness and usefulness of the information provided)* Modify (add, delete) the data of the section (it should be fail)			EASY EASY	MEDIUM MEDIUM	DIFFICULT DIFFICULT
6	Enter the complaints section and write a complaint. Modify the data on this section (it should be fail)			EASY EASY	MEDIUM MEDIUM	DIFFICULT DIFFICULT
7	E-learning platform: View / score / comment on the students' assignments/ replies to quizzes of the specific training module. Edit your own and your students' credentials. Send a message to a student. Send message to the coordinator. Monitor the progress of your student. Assign a quiz to one of your students.			EASY EASY EASY EASY EASY EASY	MEDIUM MEDIUM MEDIUM MEDIUM MEDIUM MEDIUM	DIFFICULT DIFFICULT DIFFICULT DIFFICULT DIFFICULT DIFFICULT

Tests for National Coordinator

S/N	Tests	Pass	Fail	Level of Difficulty		
1	Connect to the portal through the defined portal's name.			EASY	MEDIUM	DIFFICULT
2	Enter to all the sub-menu categories. (*Comments are required regarding the ease of the menu, its format. Is it easy to move from one topic of the menu to another? Can you find easily the subject you want? Do you find the topics / sub-menus presented useful?)*					
3	Forum: Create a new subject in the forum and post a question. Answer in a question of a different subject. Delete the question / answer of a subject or somehow modify the question / answer (it should fail) Upload a file in the forum (.jpg, .doc, .pdf) Delete the new subject (it should fail)			EASY EASY EASY EASY EASY	MEDIUM MEDIUM MEDIUM MEDIUM MEDIUM	DIFFICULT DIFFICULT DIFFICULT DIFFICULT DIFFICULT
4	nZEB simulation and design tools section: View the information uploaded in the section. Modify (add, delete) the data of the section (it should be fail)			EASY EASY	MEDIUM MEDIUM	DIFFICULT DIFFICULT
5	Funding opportunities section: View the information uploaded in the section. (*comments are required regarding the easiness and usefulness of the information provided)* Modify (add, delete) the data of the section (it			EASY	MEDIUM	DIFFICULT

	should be fail)			EASY	MEDIUM	DIFFICULT
6	Enter the complaints section.			EASY	MEDIUM	DIFFICULT
	Modify the data on this section (it should be fail)			EASY	MEDIUM	DIFFICULT
7	E-learning platform:					
	Read message sent by teacher and reply.			EASY	MEDIUM	DIFFICULT
	Send message to the administrator.			EASY	MEDIUM	DIFFICULT
	Modify credentials and info of teachers / students of different countries (it should be fail)			EASY	MEDIUM	DIFFICULT
	Modify credentials and info of teachers / students of your own country (it should be pass)			EASY	MEDIUM	DIFFICULT
	Modify information of training modules of your own country (it should be pass)			EASY	MEDIUM	DIFFICULT
	Modify information of training modules of other countries (it should be fail)			EASY	MEDIUM	DIFFICULT
	View the progress of training modules of your country.			EASY	MEDIUM	DIFFICULT

Tests for Administrator

S/N	Tests	Pass	Fail	Level of Difficulty		
1	Connect to the portal through the defined portal's name.			EASY	MEDIUM	DIFFICULT
2	Enter to all the sub-menu categories. (*Comments are required regarding the ease of the menu, its format. Is it easy to move from one topic of the menu to another? Can you find easily the subject you want? Do you find the topics / sub-menus presented useful?)*					
3	Forum:					
	Create a new subject in the forum and post a question.			EASY	MEDIUM	DIFFICULT
	Answer in a question of a different subject.			EASY	MEDIUM	DIFFICULT
	Delete the question / answer of a subject or somehow modify the question / answer (it should fail)			EASY	MEDIUM	DIFFICULT
	Upload a file in the forum (.jpg, .doc, .pdf)			EASY	MEDIUM	DIFFICULT
	Delete the new subject			EASY	MEDIUM	DIFFICULT
4	nZEB simulation and design tools section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	Modify (add, delete) the data of the section			EASY	MEDIUM	DIFFICULT
5	Funding opportunities section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	(*comments are required regarding the easiness and usefulness of the information provided)*					
	Modify (add, delete) the data of the section			EASY	MEDIUM	DIFFICULT
6	Enter the complaints section.			EASY	MEDIUM	DIFFICULT
	Modify the data on this section.			EASY	MEDIUM	DIFFICULT
7	E-learning platform:					
	Read and reply to message sent by national coordinator.			EASY	MEDIUM	DIFFICULT
	Modify teachers' / students' credentials.			EASY	MEDIUM	DIFFICULT
	Modify input of teachers/ students in portal.			EASY	MEDIUM	DIFFICULT
	Download / Print some of the material uploaded in portal.			EASY	MEDIUM	DIFFICULT
	Comment on the quiz performed previously by the student.			EASY	MEDIUM	DIFFICULT
	Create and extract report regarding progress in the training modules.			EASY	MEDIUM	DIFFICULT
	Backup the files uploaded.			EASY	MEDIUM	DIFFICULT

Tests for Master Administrator

S/N	Tests	Pass	Fail	Level of Difficulty		
1	Connect to the portal through the defined portal's name.			EASY	MEDIUM	DIFFICULT
2	Enter to all the sub-menu categories. (*Comments are required regarding the ease of the menu, its format. Is it easy to move from one topic of the menu to another? Can you find easily the subject you want? Do you find the topics / sub-menus presented useful?)*					
3	Forum:					
	Create a new subject in the forum and post a question.			EASY	MEDIUM	DIFFICULT
	Answer in a question of a different subject.			EASY	MEDIUM	DIFFICULT
	Delete the question / answer of a subject or somehow modify the question / answer (it should fail)			EASY	MEDIUM	DIFFICULT
	Upload a file in the forum (.jpg, .doc, .pdf)			EASY	MEDIUM	DIFFICULT
	Delete the new subject			EASY	MEDIUM	DIFFICULT
4	nZEB simulation and design tools section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	Modify (add, delete) the data of the section			EASY	MEDIUM	DIFFICULT
5	Funding opportunities section:					
	View the information uploaded in the section.			EASY	MEDIUM	DIFFICULT
	(*comments are required regarding the easiness and usefulness of the information provided)*					
	Modify (add, delete) the data of the section			EASY	MEDIUM	DIFFICULT
6	Enter the complaints section.			EASY	MEDIUM	DIFFICULT
	Modify the data on this section.			EASY	MEDIUM	DIFFICULT
7	E-learning platform:					
	Edit administrator's credentials.			EASY	MEDIUM	DIFFICULT
	Edit other's (national coordinator / teacher / student) credentials. (it should be fail)			EASY	MEDIUM	DIFFICULT
	Edit administrator's rights.			EASY	MEDIUM	DIFFICULT

Questionnaire

Feature of ID provided (student, teacher etc): …….
Open Questions:

1. Do you find the portal easy to be used?
2. From 1 (very easy) to 10 (very difficult) provide a mark regarding the easiness of using the portal. Please provide also comment for your answer especially if your answer is greater than 5.
3. Do you have any former experience with the use of a computer?
4. Do you have any former experience with the use of an E-learning platform?
5. Do you find the portal useful? Does it include all the topics that you expected to find?
6. Which test was the most difficult to implement? Why? Do you have any recommendations to provide in order to facilitate the specific procedure?
7. Are there any features you would propose to be added?
8. General comments:

APPENDIX C

In Appendix C the main assumptions as occurred from the majority of the tests received after the 3rd design meeting are provided, based on the relevant report prepared by the University of Patras.

Assumptions		
	Section	**Comment**
1	SouthZEB portal	The access to the SouthZEB portal and to all menu and submenu categories (for those existed) was easily to be performed for all user categories.
2	"Forum" section	It was not possible for the majority of the user categories to edit a subject, thus the relevant tests were unsuccessful.
3	"nZEB simulation and design tools" section	The section was not accessible (in some tests it was recorded as empty, in others it was recorded as inaccessible), thus the relevant tests were unsuccessful.
4	"Funding opportunities" section	The expected outcome for the Student / Teacher / National Coordinator occurred, but not for the Administrator and the Master Administrator, since they were not capable of modifying the data.
5	"Complaints" section	It was not possible to perform any of these tests, since it was not able to be found by the focus group.
	"E-learning platform" section	
6	General comments	It was not possible to find the quizzes and all the relevant tests could not be executed by all relevant user categories.
	- Students	It was only possible to enter the section, access the material, edit own credentials and download the material. Also, it was not possible (as it should) to modify the data in anyway. It was not possible though to monitor own performance, access the quizzes and send message to the teacher (the majority of the participants). The participants able to send a message mentioned the high difficulty of it.
	- Teachers	In Italy and Greece all tests were unsuccessful. In Cyprus, the only successful test was the edition of own credentials, whereas in Portugal it is possible to send message to student / coordinator, view grades and edit own credentials.
	- National Coordinator	It was possible to read/reply to a message from teacher and send message to administrator and to modify the information of training modules in own country. However, it should be stated that in Portugal and Italy it was recorded that the National Coordinator had administrator's privileges. In Portugal, it is stated that the National Coordinator can edit every page and the credentials of all user categories, even those of the Administrator's and Master Administrator's. Also, in Portugal it was stated that it was not possible to find the section with information on training modules of other countries. The view of progress has been recorded only in Italy.
	- Administrator	It was possible only to read/reply to message sent by the coordinator and download/print the material uploaded in the platform. In Italy it was also stated that it was possible to back-up the files and create and extract a report regarding the progress in the training module. The rest of the tests were unsuccessful.
	- Master Administrator	In Italy and Greece it was recorded that the tests were successful, however in Cyprus it was not possible to edit the administrator's rights.
	Additional Comments	
i	A session for clarifying the tools, organization of the platform and the grades' and certification procedure should be developed. Also, instructions should be prepared for the enrollment procedure.	
ii	The functionality and purpose of "flagging" some contents of the training modules should be clarified.	

iii	Translation in local language was requested / proposed for several texts / sections of the SouthZEB portal in the majority of the 3rd Design meetings and improvements in translation have been provided for the Portuguese.
iv	The title “SOUTHZEB 1” should be changed to “SOUTHZEB”.
v	Regarding the “Funding opportunities” section, proposals were made concerning mainly the format of it.
vi	The menu at the bottom of the website is not working (“News”, “Partner location”, “Contact us”)
vii	It was proposed to have a direct link for the SouthZEB application form. (Portugal)
viii	It was proposed the opening image and description to be of something related with the modules and the e-learning platform instead of the solar building example. (Portugal)
ix	The trainers and National Coordinators should not have badges and probably students should not be allowed to upload files. Also, the customization of the dashboard should not be available to students and should appear with all the relevant blocks at the beginning and should only be allowed to minimize them. (Portugal)
x	During the procedure of login as “Guest” nothing happens since the participants still have access to the same information they had before. There should be an alert saying that for now there is no information available if we login as “Guest”. (Portugal)
xi	In the creation of a new account there was an error in the “send an email of confirmation”: “Failed to send the email. Maybe due to an error in the SMTP server”. As a consequence, with this error it was impossible for the participants to proceed with the same “Username” and “Email”. There should be a “resend confirmation email” option. (Portugal) Also, in the registration page, the “CAPTCHA” is not placed correctly and is not well visible. (Cyprus)
xii	Format changes regarding the uniformity of the SouthZEB portal and the E-learning portal (Portugal).
xiii	Addition of a search button in SouthZEB portal (Portugal).
xiv	It is also recommended to allow the trainers to post at the forum, and even trainees (appearing after teacher or national coordinator approval), both of them should easily access to a table with all students’ grades and the teachers should be able to provide these grades to students and the trainer should be able to upload content to the respective module (Portugal).
xv	The message button does not work properly and the location of the “Send message” button should be changed (Cyprus).
xvi	It is not clear if the different user categories have different privileges (Cyprus).

APPENDIX D

0. Scope of Work

The scope of this document is to evaluate the workshops and seminars that will be implemented within the Work Package 5 of the SouthZEB project. More specifically, the evaluation shall consist of a questionnaire to be fulfilled by each participant, observation and most likely interview. **The terms "teacher" and "workshop" will be used during the "train the trainers" phase, whereas the terms "trainer" and "seminar" will be used during the "train the trainees" phase**.

1. Report

Evaluation Questionnaire

Workshop / Seminar: (TYPE) – (DATE)

Please fulfill the following questions and deliver the questionnaire to the responsible person of the workshops. Please be candid in your responses.

Name of the teacher/trainer:.....

(*1: Strongly Disagree, 2: Disagree, 3: Agree, 4: Strongly Agree*)

S/N	Question	1	2	3	4
1	I find the workshop/ seminar really interesting.				
2	The content was as described in website or generally in publicity materials.				
3	The workshop / seminar was applicable to my job.				
4	I will recommend this workshop / seminar to other professionals.				
5	The teacher / trainer was a good communicator.				
6	The teacher / trainer had knowledge of the workshop / seminar he/she provided.				
7	The teacher / trainer was well prepared.				
8	The teacher/trainer could give a clear answer to the questions.				
9	The material was presented in an organized manner.				
10	The activities in this workshop / seminar gave me sufficient practice and feedback.				
11	The workshop / seminar is well facilitated.				

12	The logistics for the workshop / seminar were well executed.				
13	The overall rating of the quality of the workshop / seminar.				

14. Difficulty level of the workshop / seminar: ☐ High ☐ Medium ☐ A little ☐ Not at all

15. Pace of the workshop / seminar: ☐ Fast ☐ Medium ☐ Slow

16. New knowledge gained: ☐ No new knowledge ☐ Some new knowledge ☐ A lot of new knowledge

17. Are you satisfied with the workshop / seminar, given the time spent for attending? ☐ No ☐ Yes

Please use this space if you want to add any other comments on the training procedure in general.

The following questions (17-20) should be fulfilled by the teacher / trainer of the workshop / seminar, by summarizing the opinions of the participants of the workshops / seminars.

18. What aspects of the workshop / seminar were the most and least valuable for you? And why?

19. Was there something unclear during the workshop / seminar? If yes, please specify.

20. What would you propose as an improvement in this workshop/ seminar?

21. Was there something you had expected to learn, but it was not covered by the syllabus of the workshop / seminar?

Please deliver the questionnaire fulfilled to the responsible teacher / trainer or workshop coordinator.

Observation

Observation
Workshop / Seminar: (TYPE) – (DATE)

Please fulfil the following questions and prepare a corresponding report to be delivered to the coordinator of the workshops / seminars. Please be candid in your responses.

Name of the teacher / trainer:……

Questions:

1. How is the training procedure set up by the teacher / trainer?
2. What are the main queries of the participants to the teacher / trainer?
3. How did the teacher / trainer respond to the participants?
4. How is time used (distribution of time)?
5. In case of exercises / practical aspects:

5.1. How is the exercise set by the teacher / trainer (relevant examples, use of equipment in classroom etc)?

5.2. Do all participants understand the exercise? (*Fulfill with an indicative percentage*)

5.3. How many participants knew its solution?

5.4. What were the main questions of the participants regarding the exercise?

6. Was there lively interaction during the workshop / seminar (questions of teacher / trainer to the participants)?
7. Do the participants seem bored or interesting in the workshop/ seminar?
8. Have the participants expressed discomfort in something?

Additional comments:

Interview

If feasible, it is expected approximately 10% of the total number of trainers (during the workshops) and 10% of the total number of trainees (during the seminars) to be interviewed. The interview shall endure about 2-3 minutes and the participant will be free to express any comment or answer the following questions:

Questions:

1. Which workshop / seminar did you like most?
2. Whish workshop / seminar did you find more interesting or difficult to understand?
3. Has the seminar / workshop changed your way of thinking while designing buildings?
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
5. Additional comments

APPENDIX E

Review by Mr Giannadakis

Review – SouthZEB project
The review was performed based on the deliverables sent from the Coordinator of the project on February 2016 in order to be included in the evaluation report of the project. The deliverables in whole are considered satisfactory regarding the depth of analysis and knowledge provided.

More specifically, the D2.1 provide in depth the current status in each country regarding the implementation of the European energy efficiency legislation and its incorporation in each country, referring not only to the countries participating in the project, but to other front-runner countries too. The facts are presented in clarity, thus a comparison between the countries is quite easy to be performed. The D2.2 and D2.3 are considered to be well-established presenting the main characteristics of the SouthZEB portal based on the view of the focus groups and provide a general idea in the way that the portal will be developed.

In WP3, the main deliverables refer to the training modules. The development of the training modules in power-point slides is considered slightly more difficult in terms of comprehension, thus it would be proposed if possible to develop a slightly more extensive document file that would present in a small-scale analysis the information presented in the slides. Besides the information presented in the training modules is of high quality and according to the level of the students. The information at the beginning of the modules may seem quite basic, however it is necessary since the students that will follow the seminars are of different specialization in the field of engineering, thus the basic terms should be provided in order all students to be able to follow. As far as the D3.1 is considered, the framework developed is adequate, covering all fields of participation and certification in the SouthZEB, however may seem quite optimistic to be performed especially regarding the period after the completion of the SouthZEB project. It was mentioned by the Coordinator that there will be a sustainability report in which the status of the SouthZEB project after its completion will be presented in detail, however this will be developed at the end of the project. The assessment tests developed for each training module are also found to be adequate for examining the real knowledge gained.

Regarding the deliverable of WP4, that refers to the SouthZEB portal it is found quite satisfactory, based on the description and the images of the deliverable. The E-learning platform has been developed in order to be user-friendly and incorporating all the tools that are necessary for the training of the students remotely. The forum is also a great tool to be used among people exchanging views on the energy efficiency measures for nZEBs. The funding section is also important, however it requires to be updated quite often.

The procedure mentioned in the D6.1 regarding the evaluation of the training material, the portal development and the workshops is considered to be well-justified and provide a means of ensuring the quality of the main outcomes of the project.
All deliverables that have been sent for review are considered to be of high quality, offering well-justified and aggregated information for each subject. Especially regarding the material developed for the training modules it is stated that it adds value to the knowledge already existing.

Review by Mr Michaelides

Review of Deliverables of SouthZEB project (IEE/13/393/SI2.675576)

By Prof. Ioannis Michaelides

Introduction

In my capacity as member of the Expert Advisory Board (EAB) of the SouthZEB project (IEE/13/393/SI2.675576), I had the opportunity to follow up the progress of the project through its website, the review of training modules, the activities that took place in Cyprus, as well as through follow-up discussions with the project leader in Cyprus. Following is a review of the project outcomes based on the above sources.

Comments

The SouthZEB project was successful in meeting its main objective to develop training modules focused on the needs of nZEB professionals in the Southern European countries. The project delivered its main products in full compliance with the description given in the proposal and the work packages. As a matter of fact, the project managed to develop ten (10) training modules and assessment schemes for professionals involved in nZEB building process, compatible with European Qualification Framework at EQF level 4. The Pilot training seminars have been successfully implemented in all partner countries; in a first phase to trainers and in a second phase to trainees. Assessment examinations (one for each training module) have also been implemented as foreseen in the project description.

The PPT presentations related to each training module are well organized and structured, including appropriately selected diagrammatic layouts, pictures and photos, to better illustrate the theoretical concepts concerned. The quantity of the stuff is adequate for the time allocated and the quality of the content is high. In addition to the theoretical issues and principles, the presentations include data and information which concern the local context and the local regulations and standards. There is a logical sequence of the topics elaborated and appropriate emphasis is given to each one of them. Special emphasis is also given to practical aspects. Each presentation also includes a list of useful bibliography. Major topics are adequately covered in depth and width. Overall, the presentations of all sessions are more than appropriate for the purpose proposed.

The deliverable reports reviewed (D2.1, D2.2, D3.1, D3.2, D3.3, D4.1, D5.1, D6.1, D7.1 and D7.2) are of high quality. They follow a uniform layout and are well organised, appropriately structured and very comprehensive. They bear the deliverable number and title, the name(s) of the author(s) and the LLP action logo. They all include an executive summary, table of contents, list of tables, list of figures, introduction, main content, discussion and conclusions; some of them also include Glossary of Terms. The reports are illustrated with figures and diagrams that complement the text and they are appropriately documented by a sufficient number of references and bibliography where needed. They also provide concrete conclusions concerning the subject analysed.

The project website (http://www.southzeb.eu/) is very well structured, properly organised and very rich in content. It is available in the partners' languages, namely English, Deutsch, Italian, Portuguese and Greek. It is user friendly and provides adequate information about the project structure and content (aims, objectives, partners, etc.), including 9 project deliverables. It has links to the partners' organisations and it also bears the LLP action logo and mention of funding. Contact information is also available. All pages on the website follow the same style structure for consistency and ease of content accessibility. Its weak point is the "News" section which is not duly updated to include activities after September 2015. The project website also hosts the SouthZEB portal and its content. This portal (D4.1) is well organised and constitutes a very useful tool for nZEB professionals. It contains project-related information, an e-learning platform, links and information on a large number of available nZEB simulation tools and information material on EU-wide, national or other funding opportunities for nZEB.

20 January 2017

Review by Mr Clarke

Review of Deliverables of the SouthZEB Project

Professor Joe Clarke, 21/02/17

The project ambition is to establish continuous professional development (CPD) courses that focus on the needs of practitioners concerned with low energy building design in southern European countries. The aim is to ensure the readiness of practitioners to respond to the recast EU Energy Performance of Buildings Directive relating to near-zero energy buildings. What follows is a review of the materials presented on the SouthZEB project Web site (http://www.southzeb.eu). This material gives the impression of a substantial body of high quality work that augurs well for the delivery of training that will have a noticeable impact on practitioner capability and challenge readiness. My overall conclusion is that the project met its objectives and represents a valuable contribution to the field.

Work Package 2

Deliverable 2.1 reports the present status of near-zero energy building design in southern European countries (Greece, Cyprus, South Italy and Portugal) and benchmarks this against so-called front runner countries (United Kingdom, Austria, Germany, North Italy and France). The analysis is based on collected data that indicates the nature of the building stock, the progress being made in the implementation of EPBD and RED directives, and the need for new training and certification support for practitioners. The review material is generally of high quality and is presented in a manner that facilitates a useful comparison of needs across jurisdictions. In relation to the areas where target countries lag behind front-runner countries, the deliverable usefully identifies the training needs of the former and how the best practice approaches of the latter may be encapsulated in new CPD provision.

Deliverable 2.2 provides a specification for the content and delivery of the targeted CPD modules – as agreed by all partners based on physical meetings and other exchanges. The deliverable comprises a fair and professional attempt to coalesce the inevitably disparate but complementary views of the project partners.

Work Package 3

Deliverable 3.1 preposes a training and certification framework targeted on “building and associated professionals in the countries of Cyprus, Greece, Italy and Portugal who have undertaken certain levels of training and satisfactorily completed the relevant course assessments”. The envisaged framework applies to all building types and the spectrum of practitioner types, and prescribes educational prerequisites, progression requirements, and outcome certification levels. Most significantly, suggestions are made for a quality assurance process for the selection and delivery of an envisaged 150 trainers. The deliverable then summaries the form and content of the 10 training modules covering building physics, thermal bridges, thermal comfort, local building regulations, performance assessment tools, construction management and the like. The contents of these modules appear to be well-conceived and, given the quality of the delivery partnership, likely to be impactful in practice.

Deliverable 3.2 provides substantial additional detail on the content of the training modules covering such issues as purpose, learning objectives, target audience, delivery structure, content and assessment in each case. This is presented in a thorough manner and gives confidence that the CPD material is well conceived, devised and structured.

Deliverable 3.3 presents the procedure for module assessment, which is principally by formal examination. This is illustrated by giving a breakdown of the topics to be examined for each taught module and then presenting typical questions for each topic. This is an appropriate way to ensure that partners adhere to a common approach as they develop their assigned CPD module.

Work Package 4

Deliverable 4.1 describes the SouthZEB Web portal which gives access to all learning materials. This gives good insight into the form and functionality of the CPD resource and the procedures for future updating and quality assurance. A visit to the published Web site (http://www.southzeb.eu) confirmed its

operational status and provided access to information on the available CPD modules and other support materials all of which seem appropriate and well progressed.

Work Package 6

Deliverable 6.1 describes an assessment and development plan intended to ensure the quality of the training portal and its encapsulated materials, as well as its conformity to the needs of near-zero energy building design. Significantly, it identifies a consensus set of underlying learning principles and the related key requirements of each learning module. This deliverable also usefully suggests the preferred approach to teaching and learning material development.

Work Package 7

Deliverable 7.1 is the SouthZEB CPD Web portal, which appears to be well constructed, adheres closely to the project plan, and encapsulates an impressive range and depth of material.

Deliverable 7.2 presents the SouthZEB project communication plan whereby potential trainee awareness can be realised. Several approaches are detailed relating to the identification of the target audience, appropriate geographical coverage, alternative dissemination channels, industry engagement, and communication monitoring. As described, these approaches come across as both appropriate and thorough.

APPENDIX F

SOUTH ZEB

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Evaluation Procedure – WP5-Task3

0. Scope of Work

The scope of this document is to evaluate the workshops and seminars that will be implemented within the Work Package 5 of the SouthZEB project. More specifically, the evaluation shall consist of a questionnaire to be fulfilled by each participant, observation and most likely interview. **The terms "teacher" and "workshop" will be used during the "train the trainers" phase, whereas the terms "trainer" and "seminar" will be used during the "train the trainees" phase**.

1. Report

Evaluation Questionnaire

Workshop / Seminar: (TYPE) – (DATE)

Please fulfill the following questions and deliver the questionnaire to the responsible person of the workshops. Please be candid in your responses.

Name of the teacher/trainer:.....

(1: Strongly Disagree, 2: Disagree, 3: Agree, 4: Strongly Agree)

S/N	Question	1	2	3	4
1	I find the workshop/ seminar really interesting.				
2	The content was as described in website or generally in publicity materials.				
3	The workshop / seminar was applicable to my job.				
4	I will recommend this workshop / seminar to other professionals.				
5	The teacher / trainer was a good communicator.				
6	The teacher / trainer had knowledge of the workshop / seminar he/she provided.				
7	The teacher / trainer was well prepared.				
8	The teacher/trainer could give a clear answer to the questions.				
9	The material was presented in an organized manner.				
10	The activities in this workshop / seminar gave me sufficient practice and feedback.				
11	The workshop / seminar is well facilitated.				

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12	The logistics for the workshop / seminar were well executed.				
13	The overall rating of the quality of the workshop / seminar.				

14. Difficulty level of the workshop / seminar: ☐ High ☐ Medium ☐ A little ☐ Not at all

15. Pace of the workshop / seminar: ☐ Fast ☐ Medium ☐ Slow

16. New knowledge gained: ☐ No new knowledge ☐ Some new knowledge ☐ A lot of new knowledge

17. Are you satisfied with the workshop / seminar, given the time spent for attending? ☐ No ☐ Yes

Please use this space if you want to add any other comments on the training procedure in general.

The following questions (17-20) should be fulfilled by the teacher / trainer of the workshop / seminar, by summarizing the opinions of the participants of the workshops / seminars.

18. What aspects of the workshop / seminar were the most and least valuable for you? And why?

19. Was there something unclear during the workshop / seminar? If yes, please specify.

20. What would you propose as an improvement in this workshop/ seminar?

21. Was there something you had expected to learn, but it was not covered by the syllabus of the workshop / seminar?

Please deliver the questionnaire fulfilled to the responsible teacher / trainer or workshop coordinator.

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Observation

Workshop / Seminar: (TYPE) – (DATE)

Please fulfil the following questions and prepare a corresponding report to be delivered to the coordinator of the workshops / seminars. Please be candid in your responses.

Name of the teacher / trainer:.....

Questions:

1. How is the training procedure set up by the teacher / trainer?
2. What are the main queries of the participants to the teacher / trainer?
3. How did the teacher / trainer respond to the participants?
4. How is time used (distribution of time)?
5. In case of exercises / practical aspects:
   - 5.1. How is the exercise set by the teacher / trainer (relevant examples, use of equipment in classroom etc)?
   - 5.2. Do all participants understand the exercise? (*Fulfil with an indicative percentage*)
   - 5.3. How many participants knew its solution?
   - 5.4. What were the main questions of the participants regarding the exercise?
6. Was there lively interaction during the workshop / seminar (questions of teacher / trainer to the participants)?
7. Do the participants seem bored or interesting in the workshop/ seminar?
8. Have the participants expressed discomfort in something?

Additional comments:

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1.3. Interview

If feasible, it is expected approximately 10% of the total number of trainers (during the workshops) and 10% of the total number of trainees (during the seminars) to be interviewed. The interview shall endure about 2-3 minutes and the participant will be free to express any comment or answer the following questions:

Questions:

1. Which workshop / seminar did you like most?
2. Whish workshop / seminar did you find more interesting or difficult to understand?
3. Has the seminar / workshop changed your way of thinking while designing buildings?
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
5. Additional comments

-end of document-

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TCF-WORKSHOP EVALUATION – AGENDA

0. Scope of Work

The scope of this document is to present the subjects that will be discussed in the tcf that will be organized between the responsible person of each workshop/training module and the Coordinator for the SZEB project in terms of Task3 – Work Package 5. The minutes will be sent to BEST.

1. Agenda

1. Main comments received (negative / positive).
2. Level of participation from participants during the workshop.
3. Level of satisfaction from the participants.
4. Personal view - Quality of the module's (-s') content & in general quality of the workshops (technical resources etc).
5. Personal view – suggestions for improvements.

-end of document-

APPENDIX G

Evaluations from target countries

Evaluations from Cyprus

Table 1: Cyprus – trainees' evaluations overall averages

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop**	3,3	3,0	3,3	3,8	3,5	3,3	3,8	3,7	3,8	3,5
2	**Quality of the contents/materials**	3,5	3,2	2,9	3,7	3,3	2,8	3,8	3,4	3,4	3,4
3	**Applicability to my job**	3,1	3,0	3,3	3,5	3,4	2,9	3,7	3,7	3,6	3,5
4	**Recommendation to other professionals**	3,5	2,8	3,2	3,6	3,4	2,7	3,7	3,6	3,7	3,5
5	**Trainer/teacher's communication skills**	3,8	2,3	2,5	4,0	3,1	3,0	4,0	3,8	3,6	3,5
6	**Trainer/teacher's knowledge**	3,9	3,1	3,7	4,0	3,1	3,6	3,9	3,7	3,8	3,5
7	**Trainer/teacher's preparation**	3,9	2,9	3,5	4,0	3,1	3,1	4,0	3,7	3,8	3,5
8	**Trainer/teacher's feedback**	3,8	2,5	3,5	4,0	3,3	3,4	4,0	3,7	3,8	3,6
9	**Presentation of contents/materials**	3,7	2,8	3,2	3,6	3,1	2,7	3,8	3,2	3,7	3,1
10	**Practical aspects of the workshop**	3,1	2,8	2,9	3,3	3,1	2,3	3,6	3,4	3,2	3,3
11	**Facilities for the workshop**	3,7	2,9	3,1	3,4	3,1	2,6	3,6	3,7	3,4	3,3
12	**Logistics for the workshop**	3,6	3,2	3,3	3,4	3,4	2,7	3,6	3,6	3,8	3,5
13	**Overall quality of the workshop**	3,5	2,6	3,0	3,4	3,3	2,6	3,7	3,4	3,7	3,5
14	**Difficulty level of the workshop (1-3)**	2,5	2,5	2,6	3,0	2,4	3,4	2,7	2,6	2,5	2,1
15	**Pace of the workshop (1-3)**	2,3	1,6	1,3	2,4	2,0	2,7	2,1	2,4	2,4	2,0
16	**New knowledge gained with the workshop (1-3)**	2,1	2,1	2,1	2,5	1,9	2,4	2,2	2,2	2,1	1,9
17	**Satisfaction with the workshop (1-2)**	2,0	1,9	1,7	2,0	2,0	1,3	2,0	1,8	1,8	2,0

Evaluations from Greece

Table 2: Greece – trainees' evaluations overall averages

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop**	3,5	3,3	3,5	3,1	3,1	3,1	3,5	3,3	3,2	3,3
2	**Quality of the contents/materials**	3,5	3,3	3,5	3,4	3,3	2,9	3,4	3,2	3,2	3,1
3	**Applicability to my job**	3,4	3,3	3,6	3,0	3,1	2,9	3,3	3,0	3,2	3,1
4	**Recommendation to other professionals**	3,6	3,4	3,5	2,8	3,7	3,0	3,3	3,3	3,3	2,9
5	**Trainer/teacher's communication skills**	3,7	3,5	3,7	3,0	3,4	3,3	3,3	3,5	3,2	3,1
6	**Trainer/teacher's knowledge**	3,7	3,5	3,5	3,2	3,4	3,4	3,5	3,5	3,4	3,3
7	**Trainer/teacher's preparation**	3,5	3,4	3,4	3,2	3,3	3,4	3,4	3,2	3,4	3,3
8	**Trainer/teacher's feedback**	3,6	3,4	3,4	3,2	3,4	3,3	3,4	3,4	3,4	3,1
9	**Presentation of contents/materials**	3,3	3,3	3,4	3,2	3,3	2,8	3,3	3,0	3,3	3,1
10	**Practical aspects of the workshop**	3,3	3,4	3,4	2,9	3,4	2,7	3,4	3,1	3,2	2,9
11	**Facilities for the workshop**	3,4	3,4	3,6	3,0	3,2	2,9	3,2	3,2	3,3	3,4
12	**Logistics for the workshop**	3,6	3,4	3,4	3,3	3,3	3,1	3,2	3,2	3,3	3,3
13	**Overall quality of the workshop**	3,6	3,4	3,5	3,1	3,2	3,0	3,4	3,3	3,4	3,2
14	**Difficulty level of the workshop (1-3)**	1,9	2,1	2,9	2,5	1,8	2,7	1,7	1,7	1,5	1,4
15	**Pace of the workshop (1-3)**	2,4	2,3	2,5	2,4	1,9	2,3	2,3	2,5	2,2	2,3
16	**New knowledge gained with the workshop (1-3)**	1,7	1,7	1,7	2,0	2,2	2,1	2,1	2,0	1,9	2,1
17	**Satisfaction with the workshop (1-2)**	2,0	2,0	2,0	1,9	2,0	2,0	2,0	2,0	2,0	2,0

Evaluations from Italy

Table 3: Italy – trainees' evaluations overall averages

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop**	3,5	3,3	3,3	3,4	1,8	3,6	3,5	3,6	3,6	3,2
2	**Quality of the contents/materials**	3,3	3,3	3,2	3,3	1,9	3,3	3,3	3,1	3,4	2,9
3	**Applicability to my job**	3,5	3,4	3,5	3,7	1,8	3,7	3,5	3,6	3,6	3,2
4	**Recommendation to other professionals**	3,6	3,7	3,5	3,5	1,8	3,5	3,4	3,5	3,7	3,2
5	**Trainer/teacher's communication skills**	3,6	3,7	3,6	3,7	1,8	3,8	3,5	3,5	3,7	3,3
6	**Trainer/teacher's knowledge**	3,6	3,5	3,6	3,5	1,8	3,7	3,5	3,6	3,7	3,2
7	**Trainer/teacher's preparation**	3,7	3,7	3,6	3,6	1,7	3,7	3,5	3,6	3,8	3,5
8	**Trainer/teacher's feedback**	3,5	3,6	3,5	3,5	1,8	3,6	3,6	3,7	3,8	3,3
9	**Presentation of contents/materials**	3,3	3,5	3,5	3,5	1,8	3,6	3,5	3,6	3,6	3,5
10	**Practical aspects of the workshop**	3,4	3,4	3,5	3,5	1,9	3,6	3,6	3,6	3,6	3,4
11	**Facilities for the workshop**	3,4	3,4	3,5	3,6	1,9	3,6	3,6	3,7	3,7	3,6
12	**Logistics for the workshop**	3,4	3,3	3,2	3,2	1,9	3,2	3,2	3,2	3,6	3,2
13	**Overall quality of the workshop**	3,5	3,3	3,3	3,1	1,8	3,3	3,1	2,9	3,5	2,8
14	**Difficulty level of the workshop (1-3)**	3,0	2,9	2,9	3,0	3,1	3,1	3,0	2,9	3,1	2,8
15	**Pace of the workshop (1-3)**	2,0	1,9	1,9	2,0	1,8	2,0	1,8	1,7	1,9	1,5
16	**New knowledge gained with the workshop (1-3)**	2,2	2,2	2,2	2,1	1,9	2,2	2,0	2,0	2,6	2,1
17	**Satisfaction with the workshop (1-2)**	2,0	2,0	2,0	1,9	1,0	2,0	1,8	1,7	1,9	1,3

Evaluations from Portugal

Table 4: Portugal – trainees' evaluations overall averages

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop**	2,8	3,5	3,1	3,3	3,2	3,5	3,3	3,0	3,3	3,0
2	**Quality of the contents/materials**	3,1	2,9	3,2	3,3	3,1	3,5	3,3	2,7	2,8	2,9
3	**Applicability to my job**	3,4	3,5	3,3	3,5	3,4	3,3	3,3	3,2	3,2	3,1
4	**Recommendation to other professionals**	2,9	3,4	3,0	3,2	3,2	3,2	3,3	2,8	2,8	2,8
5	**Trainer/teacher's communication skills**	3,5	3,7	2,7	3,6	3,7	3,8	3,6	3,2	3,3	3,7
6	**Trainer/teacher's knowledge**	3,4	3,6	3,5	3,5	3,5	3,8	3,5	3,0	3,4	3,6
7	**Trainer/teacher's preparation**	3,2	3,6	3,5	3,4	3,5	3,8	3,6	2,9	3,3	3,4
8	**Trainer/teacher's feedback**	3,1	3,5	3,4	3,3	3,4	3,8	3,5	2,9	3,4	3,4
9	**Presentation of contents/materials**	2,6	3,1	3,3	3,2	3,2	3,6	3,4	2,5	2,9	2,7
10	**Practical aspects of the workshop**	2,5	3,0	2,8	2,9	2,8	3,1	3,2	2,3	2,8	2,7
11	**Facilities for the workshop**	2,7	3,0	3,0	3,1	2,9	3,4	3,2	2,2	2,7	2,5
12	**Logistics for the workshop**	2,7	3,1	3,2	2,9	3,1	3,5	3,2	2,7	2,7	2,8
13	**Overall quality of the workshop**	3,0	3,4	3,0	3,2	3,3	3,3	3,2	2,9	3,1	3,1
14	**Difficulty level of the workshop (1-3)**	2,6	2,8	2,9	3,1	2,6	3,4	3,2	2,8	2,8	2,7
15	**Pace of the workshop (1-3)**	2,3	2,2	2,0	2,1	2,2	2,9	2,2	2,3	2,0	2,1
16	**New knowledge gained with the workshop (1-3)**	1,8	2,1	1,9	2,1	1,9	2,3	2,2	2,0	2,0	2,0
17	**Satisfaction with the workshop (1-2)**	1,7	2,0	1,9	1,9	1,8	2,0	1,9	1,7	1,8	1,9

APPENDIX H

Evaluation procedure

SOUTH ZEB

Co-funded by the Intelligent Energy Europe Programme of the European Union

Evaluation Procedure – WP5-Task3

0. Scope of Work

The scope of this document is to evaluate the workshops and seminars that will be implemented within the Work Package 5 of the SouthZEB project. More specifically, the evaluation shall consist of a questionnaire to be fulfilled by each participant, observation and most likely interview. The terms "teacher" and "workshop" will be used during the "train the trainers" phase, whereas the terms "trainer" and "seminar" will be used during the "train the trainees" phase.

1. Report

Evaluation Questionnaire

Workshop / Seminar: (TYPE) – (DATE)

Please fulfill the following questions and deliver the questionnaire to the responsible person of the workshops. Please be candid in your responses.

Name of the teacher/trainer:.....

(1: Strongly Disagree, 2: Disagree, 3: Agree, 4: Strongly Agree)

S/N	Question	1	2	3	4
1	I find the workshop/ seminar really interesting.				
2	The content was as described in website or generally in publicity materials.				
3	The workshop / seminar was applicable to my job.				
4	I will recommend this workshop / seminar to other professionals.				
5	The teacher / trainer was a good communicator.				
6	The teacher / trainer had knowledge of the workshop / seminar he/she provided.				
7	The teacher / trainer was well prepared.				
8	The teacher/trainer could give a clear answer to the questions.				
9	The material was presented in an organized manner.				
10	The activities in this workshop / seminar gave me sufficient practice and feedback.				
11	The workshop / seminar is well facilitated.				

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12	The logistics for the workshop / seminar were well executed.				
13	The overall rating of the quality of the workshop / seminar.				

14. Difficulty level of the workshop / seminar: ☐ High ☐ Medium ☐ A little ☐ Not at all

15. Pace of the workshop / seminar: ☐ Fast ☐ Medium ☐ Slow

16. New knowledge gained: ☐ No new knowledge ☐ Some new knowledge ☐ A lot of new knowledge

17. Are you satisfied with the workshop / seminar, given the time spent for attending? ☐ No ☐ Yes

Please use this space if you want to add any other comments on the training procedure in general.

The following questions (17-20) should be fulfilled by the teacher / trainer of the workshop / seminar, by summarizing the opinions of the participants of the workshops / seminars.

18. What aspects of the workshop / seminar were the most and least valuable for you? And why?

19. Was there something unclear during the workshop / seminar? If yes, please specify.

20. What would you propose as an improvement in this workshop/ seminar?

21. Was there something you had expected to learn, but it was not covered by the syllabus of the workshop / seminar?

Please deliver the questionnaire fulfilled to the responsible teacher / trainer or workshop coordinator.

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1.3. Interview

If feasible, it is expected approximately 10% of the total number of trainers (during the workshops) and 10% of the total number of trainees (during the seminars) to be interviewed. The interview shall endure about 2-3 minutes and the participant will be free to express any comment or answer the following questions:

Questions:

1. Which workshop / seminar did you like most?
2. Whish workshop / seminar did you find more interesting or difficult to understand?
3. Has the seminar / workshop changed your way of thinking while designing buildings?
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
5. Additional comments

-end of document-

APPENDIX I

Evaluations from Cyprus

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop (1-4)**	3.4	3.7	3.0	3.3	3.5	3.6	3.1	3.2	3.8	3.5
2	**Quality of the contents/materials (1-4)**	3.5	3.6	3.2	3.5	3.6	3.7	3.1	3.2	3.6	3.6
3	**Applicability to my job (1-4)**	3.4	3.5	3.3	3.3	3.2	3.3	3.3	3.2	3.6	3.2
4	**Recommendation to other professionals (1-4)**	3.4	3.7	3.1	3.4	3.4	3.6	3.1	3.3	3.7	3.4
5	**Trainer/teacher's communication skills (1-4)**	3.2	3.7	2.5	3.4	3.6	3.9	2.8	3.2	3.8	3.6
6	**Trainer/teacher's knowledge (1-4)**	3.4	3.8	2.9	3.6	3.7	3.9	2.9	3.4	3.9	3.7
7	**Trainer/teacher's preparation (1-4)**	3.4	3.8	2.7	3.6	3.6	3.9	2.9	3.3	3.9	3.6
8	**Trainer/teacher's feedback (1-4)**	3.2	3.7	2.5	3.5	3.7	3.9	3.0	3.3	3.9	3.7
9	**Presentation of contents/materials (1-4)**	3.4	3.7	2.9	3.4	3.6	3.7	3.0	3.2	3.8	3.6
10	**Practical aspects of the workshop (1-4)**	3.0	3.5	2.8	3.2	3.3	3.6	2.9	3.0	3.6	3.3
11	**Facilities for the workshop (1-4)**	3.5	3.6	3.7	3.6	3.7	3.7	3.4	3.6	3.7	3.7
12	**Logistics for the workshop (1-4)**	3.2	3.7	3.1	3.5	3.6	3.7	3.0	3.4	3.8	3.6
13	**Overall quality of the workshop (1-4)**	**3.3**	**3.6**	**2.8**	**3.3**	**3.6**	**3.6**	**3.1**	**3.3**	**3.8**	**3.6**
	variance	*0.5*	*0.3*	*0.7*	*0.3*	*0.3*	*0.2*	*0.6*	*0.6*	*0.2*	*0.3*
	min	*1.2*	*2.5*	*1.4*	*2.5*	*2.5*	*2.8*	*1.1*	*1.5*	*2.5*	*2.5*
	max	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*
	range	*2.8*	*1.5*	*2.6*	*1.5*	*1.5*	*1.2*	*2.9*	*2.5*	*1.5*	*1.5*
14	**Difficulty level of the workshop (1-4)**	2.8	2.6	2.5	3.0	2.2	3.1	2.7	2.8	2.5	2.2
15	**Pace of the workshop (1-3)**	2.3	1.9	2.2	2.3	2.2	2.1	2.6	2.1	2.2	2.2
16	**New knowledge gained with the workshop (1-3)**	2.2	2.5	2.2	2.5	2.2	2.8	2.2	2.4	2.7	2.2
17	**Satisfaction with the workshop (1-2)**	1.9	1.9	1.7	2.0	1.9	1.9	1.9	1.8	2.0	1.9

Evaluations from Greece

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop (1-4)**	3.7	3.8	3.6	3.5	3.9	4.0	3.6	4.0	4.0	3.6
2	**Quality of the contents/materials (1-4)**	3.6	3.7	3.6	3.5	3.5	3.9	3.5	3.4	3.9	3.5
3	**Applicability to my job (1-4)**	3.6	3.7	3.8	3.6	3.4	4.0	3.4	3.2	3.9	3.3
4	**Recommendation to other professionals (1-4)**	3.7	3.8	3.7	3.6	3.8	3.9	3.6	4.0	3.9	3.3
5	**Trainer/teacher's communication skills (1-4)**	3.7	3.8	3.6	3.6	3.7	3.8	4.0	3.7	3.8	3.4
6	**Trainer/teacher's knowledge (1-4)**	3.7	3.8	3.6	3.6	4.0	3.5	4.0	4.0	3.8	3.6
7	**Trainer/teacher's preparation (1-4)**	3.8	3.8	3.6	3.6	4.0	3.8	3.9	4.0	3.8	3.6
8	**Trainer/teacher's feedback (1-4)**	3.8	3.8	3.7	3.6	4.0	3.7	3.9	4.0	3.8	3.5
9	**Presentation of contents/materials (1-4)**	3.5	3.5	3.5	3.6	3.3	3.7	3.4	3.4	3.8	3.5
10	**Practical aspects of the workshop (1-4)**	3.7	3.7	3.7	3.6	3.9	3.9	3.4	4.0	3.7	3.4
11	**Facilities for the workshop (1-4)**	3.7	3.7	3.7	3.5	3.9	3.7	3.4	4.0	3.7	3.4
12	**Logistics for the workshop (1-4)**	3.7	3.7	3.8	3.6	3.9	3.6	3.5	4.0	3.8	3.4
13	**Overall quality of the workshop (1-4)**	3.7	3.7	3.7	3.6	3.9	3.8	3.6	4.0	3.8	3.6
	variance	*0.2*	*0.2*	*0.2*	*0.3*	*0.2*	*0.2*	*0.2*	*0.1*	*0.2*	*0.3*
	min	*2.7*	*2.5*	*2.0*	*2.5*	*2.8*	*3.0*	*3.1*	*3.5*	*3.0*	*2.7*
	max	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*
	range	*1.3*	*1.5*	*1.1*	*1.5*	*1.2*	*1.0*	*0.9*	*0.5*	*1.0*	*1.3*
14	**Difficulty level of the workshop (1-4)**	2.8	2.9	2.5	2.6	2.9	3.0	2.8	3.0	3.0	2.5
15	**Pace of the workshop (1-3)**	2.0	2.1	2.0	2.2	2.0	2.1	2.1	2.0	2.0	1.8
16	**New knowledge gained with the workshop (1-3)**	2.3	2.3	2.4	2.3	2.3	2.1	2.6	2.0	2.1	2.2
17	**Satisfaction with the workshop (1-2)**	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Evaluations from Italy

		M1	M2	M4	M6	M7	M8	M9
1	**Interest of the workshop (1-4)**	3.2	3.2	3.2	3.2	3.0	3.2	2.9
2	**Quality of the contents/materials (1-4)**	3.2	3.2	3.2	3.3	3.1	3.2	3.0
3	**Applicability to my job (1-4)**	3.2	3.1	3.1	3.2	2.7	3.2	3.0
4	**Recommendation to other professionals (1-4)**	3.3	3.3	3.3	3.3	3.1	3.3	3.2
5	**Trainer/teacher's communication skills (1-4)**	3.4	3.3	3.3	3.3	3.2	3.3	3.0
6	**Trainer/teacher's knowledge (1-4)**	3.4	3.4	3.4	3.4	3.3	3.3	2.9
7	**Trainer/teacher's preparation (1-4)**	3.4	3.4	3.4	3.3	3.3	3.2	2.7
8	**Trainer/teacher's feedback (1-4)**	2.0	2.0	2.1	1.9	2.3	2.0	2.1
9	**Presentation of contents/materials (1-4)**	3.1	3.1	3.2	3.1	3.0	3.0	2.9
10	**Practical aspects of the workshop (1-4)**	3.2	3.2	3.3	3.3	3.0	3.2	3.2
11	**Facilities for the workshop (1-4)**	3.2	3.3	3.2	3.3	2.9	3.2	3.0
12	**Logistics for the workshop (1-4)**	3.2	3.2	3.2	3.3	3.1	3.3	2.8
13	**Overall quality of the workshop (1-4)**	3.3	3.2	3.3	3.3	3.0	3.2	3.1
	variance	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.3*
	min	*1.2*	*1.1*	*1.2*	*1.0*	*1.2*	*1.0*	*1.9*
	max	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*3.9*
	range	*2.8*	*2.9*	*2.8*	*3.0*	*2.8*	*3.0*	*2.0*
14	**Difficulty level of the workshop (1-4)**	2.3	2.2	2.5	2.3	2.7	2.2	1.7
15	**Pace of the workshop (1-3)**	1.8	1.8	1.9	1.8	2.1	1.7	1.6
16	**New knowledge gained with the workshop (1-3)**	2.4	2.3	2.3	2.4	2.2	2.5	2.2
17	**Satisfaction with the workshop (1-2)**	2.0	2.0	2.0	2.0	1.9	2.0	2.0

Evaluations from Italy

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
1	**Interest of the workshop (1-4)**	3.1	3.2	3.5	3.2	3.3	3.6	3.0	3.2	3.0	2.7
2	**Quality of the contents/materials (1-4)**	2.8	2.8	3.2	3.1	3.1	3.1	2.9	3.1	3.0	2.9
3	**Applicability to my job (1-4)**	3.3	3.3	3.5	3.3	3.4	3.4	3.2	3.4	3.2	2.9
4	**Recommendation to other professionals (1-4)**	3.0	3.0	3.5	3.2	3.2	3.4	3.0	3.1	3.0	2.7
5	**Trainer/teacher's communication skills (1-4)**	3.5	3.5	3.6	3.4	3.6	3.8	3.4	3.6	3.4	3.3
6	**Trainer/teacher's knowledge (1-4)**	3.5	3.6	3.6	3.4	3.6	3.8	3.3	3.6	3.3	3.2
7	**Trainer/teacher's preparation (1-4)**	3.3	3.4	3.5	3.2	3.4	3.7	3.3	3.5	3.2	3.2
8	**Trainer/teacher's feedback (1-4)**	3.4	3.5	3.6	3.3	3.5	3.7	3.3	3.5	3.2	3.2
9	**Presentation of contents/materials (1-4)**	2.8	2.8	3.4	3.0	3.2	3.3	2.9	2.9	2.9	2.9
10	**Practical aspects of the workshop (1-4)**	2.6	2.7	3.3	2.8	2.9	2.9	2.6	2.8	2.7	2.4
11	**Facilities for the workshop (1-4)**	2.7	2.7	3.4	2.9	3.0	3.3	2.6	2.9	2.7	2.8
12	**Logistics for the workshop (1-4)**	2.8	3.0	3.4	3.1	3.2	3.2	3.0	3.1	3.0	3.0
13	**Overall quality of the workshop (1-4)**	**3.1**	**3.0**	**3.5**	**3.1**	**3.2**	**3.4**	**2.9**	**3.1**	**3.0**	**2.8**
	variance	*0.5*	*0.4*	*0.3*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.5*
	min	*1.0*	*1.0*	*2.2*	*1.5*	*1.4*	*1.9*	*1.2*	*1.2*	*1.1*	*1.0*
	max	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*
	range	*3.0*	*3.0*	*1.8*	*2.5*	*2.6*	*2.1*	*2.8*	*2.8*	*2.9*	*3.0*
14	**Difficulty level of the workshop (1-4)**	2.8	2.8	2.9	2.9	2.8	3.1	2.7	2.8	2.8	2.7
15	**Pace of the workshop (1-3)**	2.3	2.2	2.2	2.4	2.1	2.3	2.2	2.1	2.2	2.1
16	**New knowledge gained with the workshop (1-3)**	2.1	2.2	2.3	2.2	2.1	2.5	2.1	2.2	2.1	2.1
17	**Satisfaction with the workshop (1-2)**	1.8	1.8	2.0	1.9	1.9	1.9	1.7	1.8	1.8	1.7

APPENDIX J

Interviews from target countries

Interviews from Cyprus

Interview 1

1. Which workshop / seminar did you like most?
   Workshop on Module 04 and the Module 08
2. Which workshop / seminar did you find more interesting or difficult to understand?
   Workshop on Module 03 was the most difficult to understand
3. Has the seminar / workshop changed your way of thinking while designing buildings?
   No
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
   Yes
5. Additional comments
   More preparation and organization is necessary prior the delivery of the training. A lot of modules overlap.

Interview 2

1. Which workshop / seminar did you like most?
   Module 07 and then Module 04
2. Which workshop / seminar did you find more interesting or difficult to understand?
   The most difficult to understand was the Workshop on Module 03
3. Has the seminar / workshop changed your way of thinking while designing buildings?
   Yes
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
   Yes
5. Additional comments
   It is unfair that we have to teach more hours than the duration o the workshop for the trainers. There was more than necessary material in some modules

Interview 3

1. Which workshop / seminar did you like most?
   Workshop on Module 08 and then Module 07
2. Which workshop / seminar did you find more interesting or difficult to understand?
   The most difficult to understand was the Workshop on Module 03
3. Has the seminar / workshop changed your way of thinking while designing buildings?
   No
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
   Yes
5. Additional comments
   The English text differed greatly from the Greek text and there were many errors in the translation of technical terms

Interview 4

1. Which workshop / seminar did you like most?
   Most interesting workshops in order of preference: Module 03, Module 05 and Module 10
2. Which workshop / seminar did you find more interesting or difficult to understand?
   The most difficult to understand was the Workshop on Module 09
3. Has the seminar / workshop changed your way of thinking while designing buildings?
   Yes
4. Do you think the knowledge gained in this seminar / workshop will be applicable to real life?
   Yes
5. Additional comments
   The pace was too fast in most workshops

Interviews from Greece

Interview 1

1. Which workshop did you like most?
   Most appreciated was Module 2 because it involves a lot of things.
2. Whish workshop did you find more interesting or difficult to understand?
   Most interesting :Types of constructions because it is important for me to be updated
3. Has the workshop changed your way of thinking while designing buildings?
   Yes.But we still need to clarify the rates that describe a building as an nZEB building.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes. But we should wait for a long period of time here in Greece to see the results on a large scale.
5. Additional comments
   No additional comments. I enjoy the opportunity to join a free training program that updates my knowledge.

Interview 2

1. Which workshop did you like most?
   The workshop that I liked the most was the Module about Thermal insulation.
   I am interesting in all types of contractions and various materials involved.
2. Whish workshop did you find more interesting or difficult to understand?
   The most difficult (but not most interesting) workshop was about funding schemes and other incentives.
3. Has the workshop changed your way of thinking while designing buildings?
   Yes. My way of thinking changed, but not my client's mentality.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes, but not at the moment. Due to the financial problems people don't spend a lot of money to maintain their buildings or invest into nzeb constructions.
5. Additional comments
   Too much information about other countries. These countries invest and build under very different conditions.

Interview 3

1. Which workshop did you like most?
   The most: Passive Systems – Bioclimatic design – renewable energy systems – comfort internal conditions
2. Whish workshop did you find more interesting or difficult to understand?
   It was interesting and difficult (at the same time) the 6th module. I like to learn software tools.
3. Has the workshop changed your way of thinking while designing buildings?
   No. I am an energy inspector and I already design passive houses.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes. Already clients ask me to design low energy efficiency buildings.
5. Additional comments
   The example case (6ht module) with the use of software tool was good and interesting. We should do more cases like that.

Interviews from Italy

Interview 1

1. Which workshop did you like most?
   Most appreciated Module 2 on Bioclimatic topics and for the chance to have a global vision of what is designing through passive systems. Less appreciated Module 5, due to the difficult of understanding most of the concepts explained and particularly referred to the final assessment exam (too difficult and translation of both the exams and the slides should be reviewed).
2. Which workshop did you find more interesting or difficult to understand?
   More complex each part regarding HVAC systems which is presented in different modules. I found very hard Module 5 which should be repeated with more time and after reviewing the contents both in English and Italian language.
3. Has the workshop changed your way of thinking while designing buildings?
   The workshops contributed to consolidate my way of thinking about the design of buildings through nZEB concepts.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   I think that this was a great chance to know something more about what you learn from typical Italian courses on passive systems and nZEB buildings.
   I am an engineer and I wanted to get more familiar with some details of these modules.
5. Additional comments
   Some contents should be reviewed better because different theme have been presented in different modules with some discontinuities and sometimes expressing different numerical values. Great availability from both the teacher and the company which has organized everything in explaining better the project and giving advices on the contents of the modules.

Interview 2

1. Which workshop did you like most?
   Nr. 2.
2. Which workshop did you find more interesting or difficult to understand?
   Each module was interesting to follow.
3. Has the workshop changed your way of thinking while designing buildings?
   Not at all but it has helped me in getting familiar with some “green topics” and nZEB buildings
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Probably yes.
5. Additional comments

Interview 3

1. Which workshop did you like most?
   The most interesting was Module 6 and the less was the Module 5.
2. Which workshop did you find more interesting or difficult to understand?
   The module more accessible was the basic module (Module 1), whereas more complex was Module 5
3. Has the workshop changed your way of thinking while designing buildings?
   Nice project spreading free knowledge on technical concepts like passive houses, bioclimatic design, comfort, designing tools. These lessons reinforced my wish to know more about the design of buildings.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   I suppose that the majority of the concepts is possible to be applied in some cases of real life.
5. Additional comments
   Difficult to present such amount of concepts in few days. It would be better to attend the next part of the project due to the fact the many hours will be probably spent on some topics and trainers will be able to teach “not in a hurry”.

Interview 4

1. Which workshop did you like most?
   The module I liked most was nr. 2, the one I didn’t like so much was module nr. 5.
2. Which workshop did you find more interesting or difficult to understand?

I consider more interesting module 2 (I am an architect who wants to be specialized in bioclimatic and passive systems) and the more complex module 5, due to difficulties in understanding topics and the explanation from the teacher.

3. Has the workshop changed your way of thinking while designing buildings?
   It has reinforced my way of knowing more about nZEB building especially in the South of the country, which is less oriented in building and renovating through these systems.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes, why not?
5. Additional comments
   The number of hours of the modules should be reconsidered and probably reduced. Some contents are doubly expressed in different modules. The slides should be reviewed better in order to avoid misunderstandings or repetitions of themes and topics. It could be stressful also for the next trainers who will be the teacher and need to learn from the slides presented in this “10-days workshops”.

Interview 5

1. Which workshop did you like most?
   I really liked module 6 which focused on different simulation tools for designing nZEB buildings.
2. Which workshop did you find more interesting or difficult to understand?
   Some concepts expressed in each module were difficult to be understood well also due to the lack of time from the teacher to explain in detail all the topics presented in each module.
3. Has the workshop changed your way of thinking while designing buildings?
   It has interested me in going understanding better some topics, which could be useful for my work.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Some concepts could be applied if adapted to the reality of South of Italy, which is completely different from the North of the country.
5. Additional comments

Interview 6

1. Which workshop did you like most?
   I have to say that in general all the trainings have satisfied me. If I have to say which module I liked most I can say that it was nr. 6 and the one I didn’t appreciate so much was module nr. 5.
2. Which workshop did you find more interesting or difficult to understand?
   Module 5 needs to be reviewed better in terms of contents and slides, both in English and Italian language. The teacher was not well prepared to answer to some questions regarding the contents of the slides: I found some discrepancies in terms of numbers and contents but I didn’t personally want to create difficulties to the teacher (who was nice to try to explain the reason of some contents explained in the slides).
3. Has the workshop changed your way of thinking while designing buildings?
   I am familiar with some contents explained in these modules, so it has reinforced my way of working within these schemes.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes of course, these contents are surely applicable to my job. I think I will go deepen in detail of some topics for my personal knowledge and probably I will ask the organization of the courses to be a trainer for the next part of the project.
5. Additional comments
   The assessment exam of module 5 needs to be reviewed better: some questions have been directly taken from the slides without an apparent logic (maybe there’s a logic behind but this was not explained to us).

Interview 7

1. Which workshop did you like most?
   Module 6 was the one I most appreciated.
2. Which workshop did you find more interesting or difficult to understand?
   Very difficult nr 5 due to the difficulties in understanding some contents and also the teacher (who tried to do her best in presenting the contents anyway).
3. Has the workshop changed your way of thinking while designing buildings?
   Good to know some new contents, not specifically from only one module, but from overall the SouthZEB workshops.
4. Do you think the knowledge gained in this workshop will be applicable to real life?

I think that the contents explained can surely help in viewing things in a different way, focusing in particular to the nzEB vision.

5. Additional comments

Interview 8

1. Which workshop did you like most?
   I really liked the organization and the contents of modules 2 and 6, in particular for the bioclimatic themes and for the software presentation (the young teacher was really smart in explaining things in a very useful way).
2. Which workshop did you find more interesting or difficult to understand?
   Very interesting nr.6 for the good involvement thanks to the teacher, who provided practical examples of the use of some software.
3. Has the workshop changed your way of thinking while designing buildings?
   I had studies some contents which have been presented during these days and I was oriented to these themes before the workshops.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   It should be so, I strongly believe that we need to do something to change our vision and our way to build new constructions.
5. Additional comments

Interview 9

1. Which workshop did you like most?
   Module 9 kept my attention because I didn't know much about BIM technique and process and the trainer was good in explaining contents.
2. Which workshop did you find more interesting or difficult to understand?
   Difficult module 5, I hope to have the chance to attend it again in the future.
3. Has the workshop changed your way of thinking while designing buildings?
   Of course the introduction of a theme like BIM can upgrade the view of thinking building.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   The knowledge gained in each training course should be applicable in real life, because it is always a good chance to upgrade yourself and your work.
5. Additional comments

Interview 10

1. Which workshop did you like most?
   I can't properly say that there's a module that I liked most of all, every module had a specific part which interested me.
2. Which workshop did you find more interesting or difficult to understand?
   Taken into account the fact that it is very difficult to explain many contents in few hours, each module has "plus and minus" inside it. Some contents were new and some others well known, but anyway it has been a great opportunity to know something more.
3. Has the workshop changed your way of thinking while designing buildings?
   I can't use the word "changed" because this workshop didn't change my way of doing things. I am an engineer who is still working with green technologies and with a glance to nZEB techniques. This workshop has a little bit upgraded my knowledge.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   For sure it may help in defining things and projects in a different and green way.
5. Additional comments

Interviews from Portugal

Interview 1

1. Which workshop did you like most?
   Most appreciated Module 2 and the less appreciated Module 1, due to the excessive component of topics related to HVAC systems
2. Whish workshop did you find more interesting or difficult to understand?
   More accessible module 5 and more complex Module 1, due to the excessive component of topics related to HVAC systems.
3. Has the workshop changed your way of thinking while designing buildings?
   The training contributed to consolidate my way of thinking regarding the design of buildings.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes, since I am working in the area of energy and environmental sustainability of buildings in a municipality, having to deal directly with a large number of cross-cutting areas (urban planning, buildings management and maintenance, etc.) this training will contribute positively to the monitoring the future developments and natural implications that this issue will have in the sphere of responsibilities, duties and services of local administration.
5. Additional comments
   In the four training modules I have attended, we found out the existence of some miscommunications between the organization and the trainers, which in my opinion was a major constraint, since it opened the door to different points of views, perspectives and criticisms, which did not contribute to the awakening of trainees interest which had been established in the dissemination of the course.

Interview 2

1. Which workshop did you like most?
   The module I liked most was the Module 6 and the less was the Module 1.
2. Whish workshop did you find more interesting or difficult to understand?
   The module more accessible was Module 1, more complex was Module 6.
3. Has the workshop changed your way of thinking while designing buildings?
   Only reinforced my thinking regarding the design of buildings.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes, it will.
5. Additional comments
   Should be reduced the number of hours in the modules 1 and 2 in order to increase it on the number of hours in module 6. There is, in the module 6, the opportunity to demonstrate the great advantages of the adoption of passive measures to reduce the energy requirements and improve the buildings thermal comfort and the reduction of the number of hours in modules 1 and 2 is justified, in my opinion, because the future trainees will be professionals or persons interested in the topic and these kind of knowledge will already acquired knowledge or, at least, be easily learned in a short time.

Interview 3

1. Which workshop did you like most?
   The module I liked most was the 6 and the least liked was module 1.
2. Whish workshop did you find more interesting or difficult to understand?
   I consider more accessible module 1 and the more complex module 6.
3. Has the workshop changed your way of thinking while designing buildings?
   The training confirms my concerns about the building design.
4. Do you think the knowledge gained in this workshop will be applicable to real life?
   Yes.
5. Additional comments
   I think the number of hour s of the modules should be reconsidered. I think that the modules 6 and 7, but mostly 6, should see have a significantly increase of the number of hours.
   There should be presented more "case studies" and "real cases" with which will be more easy to understand and accept the larger forthcoming requirements.

APPENDIX K

Teleconferences from target countries

Teleconferences from Cyprus

Main Data

Location	Teleconference
Dates	30/03/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Agis PAPADOPOULOS	Cyprus – Responsible person for Mod. 4 & 7

Minutes

Mr Agis Papadopoulos was responsible for delivering Modules 4 and 7 during the workshops in Cyprus.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). For Module 4 it was stated that the module was well structured and the participants were satisfied from the content. It was mentioned that the time was limited and the course material was too extended, however it gathered the interest of the participants. For Module 7 it was mentioned that some of the technologies were well known to the participants and they felt more familiar with them whereas in other sessions of the modules clarification in detail was needed. More specifically it was stated that the automation session was quite difficult and in general the module was interesting however it contained many different topics.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that the participation was really high in every module and all participants had great experience.

3. Level of satisfaction from the participants. Regarding the satisfaction of the participants it was mentioned that it was high in both modules.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. Mr Papadopoulos mentioned that the time was quite limited for the course material however the content of the Modules was in general of high-quality and well-prepared.

5. Suggestions for improvements based on the personal view of the teacher. The suggestions were based on the time limitation of the workshops and it was proposed each workshop to be divided in 2 smaller ones.

After these, the teleconference successfully ended.

Main Data

Location	Teleconference
Dates	1/04/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS

02	Carlotta COCCO	Cyprus – Responsible person for Mod. 2

Minutes

Ms Carlotta Cocco was responsible for delivering Module 2 during the workshops in Cyprus.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). Mainly the comments received well positive and all participants were very interested in the course. No negative comments were stated.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that the participation was really high, as well as the interaction between the teacher and the participants however not from the beginning and that the participants were high-level professionals.

3. Level of satisfaction from the participants. Regarding the satisfaction of the participants it was mentioned that it was high mainly due to the fact that the discussed on practical examples.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. Regarding the workshop and the organization it was mentioned that it was generally good. Concerning the quality of the content it was stated that it was high-level although some of the sections were duplicated in the module.

5. Suggestions for improvements based on the personal view of the teacher. The suggestions were based on the time limitation of the workshops and it was proposed to have one more day for the implementation of the workshop. Moreover it was proposed to devote some more time on the sustainable building certification schemes which were considered quite interesting by the participants.

After these, the teleconference successfully ended.

Main Data

Location	Teleconference
Dates	4/04/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Ronald DIAB	Cyprus – Responsible person for Mod. 9

Minutes

Mr Ronald Diab was responsible for delivering Module 9 during the workshops in Cyprus.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). It was mentioned that a great interest in attendance was given, however the main negative comments expressed were the duplicates of subjects that exist in different training modules.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that it was tried to keep an open discussion so as not to make the presentation tiring and it was achieved in many subjects presented.

3. Level of satisfaction from the participants. Regarding the satisfaction of the participants it was mentioned that the commissioning session was satisfactory and in overall the participants were satisfied.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. Regarding the quality of the module's content it was stated that it was comprehensive and provided a lot of information, whereas concerning the quality of the workshops it was mentioned that everything was good. It was mentioned though that there was material included in the presentation already covered in previous presentations, thus it was proposed to make proper adjustments or inform the interested parties so as not to lose time in these sections.

5. Suggestions for improvements based on the personal view of the teacher. The suggestions were based on the duplicates and it was suggested to read all presentations if possible and track down and edit the duplicated chapters. Also it was proposed to edit the title of the module to include the word "commissioning" since this is of major concern to the engineers.

After these, the teleconference successfully ended.

Main Data

Location	Teleconference
Dates	7/04/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Ioannis Michaelidis	Cyprus – Responsible person for Mod. 1

Minutes

Mr Ioannlis Michaelidis was responsible for delivering Module 1 during the workshops in Cyprus.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). It was mentioned that mainly positive comments were received from the participants and their interest was quite high. The negative comment was mainly the time limitation in order to deliver the slides of the presentation which was very extended.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that the interaction between the teacher and the attendees was quite high. The participants were encouraged to discuss freely, debate and exchange information.

3. Level of satisfaction from the participants. Regarding the satisfaction of the participants it was mentioned that in overall the participants were satisfied.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. Regarding the quality of the module's content it was stated that it was high level and quite comprehensive. Also the organization of the workshop was excellent and the technical resources provided by the hotel where it was organized were adequate. In general it was stated that the workshop was successful.

5. Suggestions for improvements based on the personal view of the teacher. Mr Michaelidis mentioned that the duration of the workshop was quite limited however the participants had experience thus the time was adequate.

After these, the teleconference successfully ended.

Teleconference from Greece

Main Data

Location	Teleconference
Dates	27/04/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Antonios KONTADAKIS	Greece – Responsible person for Mod. 4, 6 & 8

Minutes

Mr Antonios Kontadakis was responsible for delivering Modules 4, 6 and 8 during the workshops in Greece.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). For Module 1 mainly positive comments were received for the teacher, who exhibited great knowledge in all subjects presented. As for negative comments it was mentioned that some of the issues discussed were mainly superficial and the time was limited in order to present them all in detail. For Module 2 it was mentioned that the main comments received referred to clarifications for passive houses and renewable energy and the responsible person stated that the time was limited however he received positive comments as he was capable of clarifying and answering the questions of the participants. For Module 3 mainly positive comments were received although it was mentioned that the presentation should have greater relation to Greek reality. For Module 4 it was mentioned that the main questions received referred to the prevailing standards for Thermal Comfort (ASHRAE and EN) and it was found interesting from the participants although difficult. For Module 5 mainly positive comments were received by the participants, however it was also mentioned that the presentation should have a greater relation to Greece. For Module 6 mainly positive comments were received for the teacher, whereas no negative comment was received. For Module 7 the main comments received referred to the cost of the different technologies and renewable energy and the module was considered of moderate difficulty. For Module 8 it was mentioned that mainly positive comments were received and the participants were satisfied, however it was mentioned that there should be more focus on Greece. For Module 9 it was considered of moderate difficulty from the participants and the main comments and questions referred to the energy management and the construction standards for nZEBs. Also it was mentioned that some sections were overanalyzed with no special purpose for that. For Module 10 it was mentioned that it other countries should be included in the presentation besides UK, however it was considered interesting to learn for UK (as general knowledge). The level of the module was considered moderate.

2. Level of participation from participants during the workshops. For Module 1 it was stated that there was participation, however not at a great extent due to the fact that the module was not so interactive. For Module 2 it was mentioned that the level of participation was high (approximately 30% asked questions for case studies presented and 70% of the participants knew the answers in the questions posed by the teacher). For Module 3 it was mentioned that the participation was also high, since 85% of the participants participated in the case studies that were presented by the teacher, whereas only 25% knew the answers in the questions posed by the teacher. For Module 4 it was mentioned that case studies were not presented to the participants, thus the participation

was moderate. For Module 5 it was stated that although case studies were not presented the participation was high (approximately 80% of the participants), due to questions that were posed to the teacher mainly for the status in Greece. For Module 6 there was great interaction with the participants and approximately 80-90% of the attendees participated in the example that the teacher performed. For Module 7 the participation was also high (approximately 75% of the attendees) and interaction with the teacher existed. For Module 8 the participation was moderate. For Module 9 almost 80% of the attendees participated and 20% knew the answers in questions posed by the teacher. For Module 10, no case – studies were presented thus the participation was moderate.

3. Level of satisfaction from the participants. For Module 1 the majority of the participants (almost 90%) were satisfied by the workshop. For Module 2 the participants were considered satisfied as well as for Module 3. For Module 4 the participants were satisfied although the difficulty of the Module was mentioned once more. For Modules 5, 6, 7, 8 and 9 the participants were very satisfied by the workshop, whereas for Module 10 the level of satisfaction was considered moderate.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. For Module 1 regarding the content of the module it was mentioned that it covered many different issues and the time was limited, whereas the difficulty of the presentation was average. For Module 2 it was mentioned that the presentation was well-within the scope of the module. For Module 3 the content of the presentation was considered adequate and for the organization of the workshop it was stated that is was satisfactory. For Module 4 the quality of the content of the presentation was satisfactory, however it was mentioned that there should be a review regarding the Greek translation. For Module 5 it was mentioned that the presentation should be more focused on the Greek reality. For Module 6 it was mentioned that the content was quite difficult however interesting. For Module 7 the quality of the content of the module was considered adequate. For Module 8 the quality of the content of the presentation was considered adequate, as well as for Module 9. For Module 10 it was mentioned once more that the content should be more focused on Greece, however the quality of the content was considered adequate. For all Modules it was stated that the organization of the workshop was satisfactory.

5. Suggestions for improvements based on the personal view of the teacher. For Module 1 it was stated that more time was needed for the presentation. For Modules 2 and 3 no suggestions were received. For Module 4 it was suggested to review the Greek translation of the presentation. For Module 5 it was proposed to be more focused on Greece. For Module 6 it was suggested to have practical sessions for the software presented. For Module 7 it was proposed to have 2 days in order to present the module's content since the time was too limited. For Module 8 no comments were made. For Module 9 it was mentioned that there were duplicated sections, thus a relevant review should be performed. For Module 10 it was proposed to have more sections focused on Greece and not so many for other countries and perhaps present also funding schemes currently running in Greece.

After these, the teleconference successfully ended.

Teleconference from Italy

Main Data

Location	Teleconference
Dates	24/03/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Carlo ROSSINI	ITALY – Responsible person

Minutes

It should be stated that the partner of the consortium for Italy (DTTN) stated to the UPATRAS that Mr Carlo Rossini had conducted 4 out of 10 modules during the workshops, however was informed for the rest of the modules too and could also comment respectively for the rest of the modules. Therefore for Italy 1 tcf was conducted for all Modules with Mr Carlo Rossini.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). For Module 1 the positive was that the teacher was very good in presenting the contents of the module (Ms Cocco), however the negative was that the presentation was quite difficult in terms of comprehension thus clarifications were required by the teacher. For Module 2 the negative comment was the same as in Module 1 and the positive comment referred to the teacher who was mentioned as a really good communicator. For Module 3 the positive comment was the great interest of this topic (thermal bridges), however the negative was the difficulty to understand the U-value of the building assembly and the relevant question, thus more explanation were requested by the teacher at that point. For Module 4 the positive comment was the great interaction between the teacher and the participants and the great interest of the topic, however the negative was that the ASHRAE standard that is highly mentioned in the Module is not used and not known in Italy. For Module 5 the main comment was negative and more specifically it referred to the teacher who was not adequately prepared for this presentation. For Module 6 the positive comment was that the topic presented was very interesting and there was interaction with the participants, as many questions were posed regarding the software, whereas the negative comment referred to the fact that it was quite difficult to present this module through a presentation. For Module 7 the positive comment was that it was an interesting module, whereas the negative is that they could not understand through the presentation how to design the technologies presented. For Module 8 the positive comment was that it was also very interesting whereas the negative comment referred to the fact that it was not so easy to concentrate everything in one training module and the participants thought that some of the technology presented was far from the present day. For Module 9 the positive comment was the information regarding BIM, which is a top-art design however the negative comment referred also to BIM regarding the fact that it seemed for the participants to be too far from now and not for the common design. Moreover it was mentioned that some of the content of the training module addresses mainly mechanical engineers and thus it was not of high interest to all participants. For Module 10 it was mentioned as a “strange” module due to the fact that it contained much information regarding the UK and other countries and this was interesting at first however it was not focused on Italy, thus it was not so interesting at the end.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that the participation was really high in every module.

3. Level of satisfaction from the participants. Regarding the satisfaction of the participants it was mentioned that it was high because the topic of nZEBs is not quite known, however it was mentioned that some of the modules could be more specific.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. Mr Rossini mentioned that the workshops were really well prepared, the level of interest was quite high and the interaction between the teacher and the participants was possible. Regarding the content of the modules it was stated that the slides were too many for the available duration of each workshop, however it was mentioned that the quality was very high and there was too much information included that sometimes it was difficult to be comprehended by non-specialized professionals.

5. Suggestions for improvements based on the personal view of the teacher. The suggestions were based on the comment regarding the amount of slides in comparison to the duration of the workshops and referred to the presentations being more general and not in-detail.

After these, the teleconference successfully ended.

Teleconference from Portugal

Main Data and Participants

Location	Teleconference
Dates	09/05/2016

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Nuno MATEUS	Portugal – Responsible person for Mod. 6

Minutes

Mr Nuno Mateus was responsible for delivering Module 6 during the workshops in Portugal.

The teleconference included the following:

1. Main comments that were received during the workshops from the participants (positive and negative). It was mentioned that the most important issue was the limited time to talk. The participants in general liked the course and the practical exercises with the use of software.

2. Level of participation from participants during the workshops. During the tcf it was mentioned that many questions were set and the level of participation was high.

3. Level of satisfaction from the participants. The level of satisfaction was high and with it was mentioned that with the model provided through the course the participants would be able to begin working with the software.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops. It was mentioned that the quality of the contents of the module was considered high, however it would require more time in order to adequately explain to the participants and to make simulations, since no exercises besides the use of the computes could be used. The organization of the workshop was also considered adequate.

5. Suggestions for improvements based on the personal view of the teacher. The only suggestion made referred to the limited time for the conduction of the workshop.

After these, the teleconference with Mr Nuno Mateus successfully ended.

Main Data

Location	Written Answers
Dates	18/05/2016 (Received)

Participants

ID	Name	Organization
01	Maria BETSI	UPATRAS
02	Colin SINCLAIR	Portugal – Responsible person for Mod. 3 & 7

Due to unavailability of Mr Colin Sinclair to join a tcf with the Coordinator it was proposed by IST-ID to provide the answers based on the Agenda of the tcf in a written form. The following are the answers received by the Coordinator:

Module 3:

1. Main comments that were received during the workshops from the participants (positive and negative).

-This can hopefully be analysed from the feedback forms. Comments from participants would have been recorded on the participant feedback forms completed at the end of the training. BRE have no knowledge of participant feedback via the forms.

-No other feedback (positive or negative) was received directly by BRE from the participants.

2. Level of participation from participants during the workshops.

-this varied, most likely due to the participants coming from a variety of backgrounds and having different levels of existing knowledge regarding U-values i.e. some appeared to have lots of knowledge in the subject matter and others less knowledge.

-more generally, "participation" could have perhaps been improved by having participants undertake some worked examples, although there was not enough time

3. Level of satisfaction from the participants.

-This can hopefully be analysed from the feedback forms. BRE have no knowledge of participant feedback via the forms.

-BRE think that participants were satisfied - because participants did not raise any concerns during the training.

4. Personal view of the teacher regarding the quality of the modules' content and the quality of the workshops.

-BRE belives the quality of the modules and the workshop to be good. A small technical issue was that (when it was most sunny outside) that it may have been difficult for participants near the rear of the room to read the projected presentation.

5. Suggestions for improvements based on the personal view of the teacher.

- had more time been available then a possible suggestion for improvement would be to include some "break-out" or "workshop" sessions where participants could form small groups and be given some problems and asked to discuss the issues, processes, solutions, etc. This would help break up the session, as otherwise all of the content is presentation.

Module 7:

1. Main comments received from participants (negative / positive).

- This can hopefully be analysed from the feedback forms. Comments from participants would have been recorded on the participant feedback forms completed at the end of the training. BRE have no knowledge of participant feedback via the forms.

-No other feedback (positive or negative) was received directly by BRE from the participants.

2. Level of participation of trainees during the workshop.

-this varied, most likely due to the participants having a variety of background and existing knowledge regarding some of the renewable energy technologies. In particular, most participants seemed to have most knowledge (and thus were more likely to participate with questions etc.) regarding solar thermal systems; some knowledge regarding PV and least knowledge regarding controls, cost optimality, wind turbines and heat pumps.

-more generally, "participation" could have been improved (and knowledge more accurately assessed) by having participants undertake some worked examples, although there was not enough time.

3. Level of satisfaction of participants.

-this can hopefully be analysed from the feedback forms. BRE have no knowledge of participant feedback via the forms.

-BRE think that participants were satisfied - a few participants said (at the end) that there was a lot of information/detail to absorb within the timeframe, however participants did not raise any other specific concerns during the training.

4. Personal view - Quality of the modules content & quality of the workshops (technical resources etc).

-BRE believes the quality of the modules and the workshop to be good. A small technical issue was that (when it was most sunny outside) that it may have been difficult for participants near the rear of the room to read the projected presentation.

5. Personal view – suggestions for improvements.

- had more time been available, then an improvement would have been be to include some "break-out", "workshop" or "worked example" sessions where participants could form small groups and be given some problems and asked to discuss the issues, processes, solutions, etc. This would help break up the sessions, as otherwise all of the content is presentation.

- the "cost optimal" session was perhaps too detailed / difficult for participants to understand? This is however a complex topic. Participants were very quiet through most of this session, which may suggest that they found it complex?

APPENDIX L

Template of the document