



SouthZEB WP2, D2.2

**Deliverable 2.2: Specification
of the training and
certification needs for the
target groups in the target
countries**

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WP2-D2.2



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EXECUTIVE SUMMARY

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.

One of the main gaps identified towards the successful implementation of both EPBD and RED is the need for Continuous Professional Development of building sector professionals at the intermediate and senior level (engineers, architects, municipality employees and decision makers). Within this context the SouthZEB project aims to identify training needs required for a number of targeted Southern European countries (Greece, Cyprus, Italy (south) and Portugal) less advanced on the progress towards Nearly Zero-Energy Buildings and to design and develop training modules for the abovementioned professionals, focusing especially on the transfer of successful practices and knowledge from the front runners to the South EU countries.

The present document represents the output from WP2 Task 2 – “Specification of the training and certification needs for the target groups in the target countries” and based on the development of several Design Meetings with key stakeholders in each target country (chapter 1), identifies the training needs for nZEB professionals in the target countries (chapter 2), outlines a set of training modules directed towards these needs (chapter 3) with the objective of contributing towards the implementation of the EPBD and RED Directives within the European Union.

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1. INTRODUCTION

The SouthZEB project is addressing the IEE priority on Continuous Professional Development. The action supports a wide-scale roll out of recognised professional development courses for building sector professionals in the Southern European countries. The project aims to contribute in the application and successful implementation of the goals of the EPBD directive and of the RED directive in the Southern EU countries.

The project objectives are as follows:

- The main project objective is to support the building sector intermediate and senior professionals (engineers, architects, municipality employees and decision makers) in the Southern European countries (focusing on EL, CY, IT, PT) to keep up to date with the market progression;
- To design and develop 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;
- To support a large scale roll-out of the developed programmes, by training specialized trainers in their application for transferring knowledge to the stakeholders.
- To bring together engineers, architects, municipality employees and decision makers as well as their educators and certification authorities in the Southern EU countries, through a unique portal, available in five EU languages.

The project has been structured into eight work packages, as shown in Figure 1. The figure shows progressive development of the project from developing an understanding of the situation on the implementation of the relevant directives in each target country and assessing training needs and eLearning portal specifications (WP2), through development of the training courses (WP3, WP4 and WP5) and the dissemination and communication (WP7) necessary to enable their effective delivery.

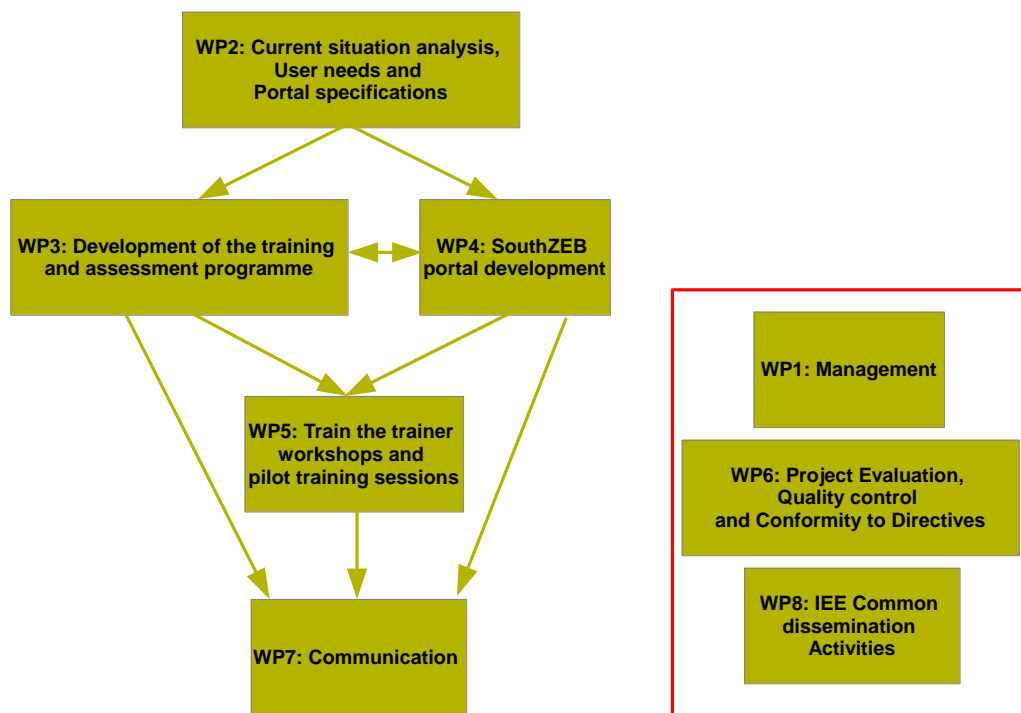


Figure 1 – SouthZEB Work Package Structure and links

The present document constitutes the Deliverable D2.2 that aims to contribute towards the “Specification of the training and certification needs for the target groups in the target countries”, within Work Package 2 (WP2), “Current situation analysis; User needs and Portal specification”.

WP2 overall goals are: 1) the definition of the current situation of EPBD and RED implementation in target and front-runner countries; 2) the specification of the training and certification needs for the target groups in the target countries, and; 3) the definition of the SouthZEB portal functional requirement needs.

To contribute towards the “Specification of the training and certification needs for the target groups in the target countries” a set of Design Meetings have been developed in the target countries with key stakeholders (engineer association representatives, energy agency representatives, architect association representatives among others) and end-users of the training courses (engineers, architects, municipality employees and decision makers) to assess training and certification needs to foster nZEB implementation in these countries.

2. DESIGN MEETINGS

As proposed in WP2, a set of design meetings (Table 1) have been organized in the four target countries (Portugal, Italy, Greece and Cyprus) to assess specific training and certification needs on each country and also the adequacy of the training modules proposed on the Grant Agreement (please see Annex A for a description of the training modules as presented on the Grant Agreement) to the local context.

Table 1 – Dates and Venues of the Design Meetings in the four target countries

Country	Venue	Date
Portugal	IST - Lisbon	19-05-2014
Italy	DTTN - Rovereto	17-06-2014
Greece	KEK - Athens	10-06-2014
Cyprus	CUT - Nicosia	04-06-2014; 03-07-2014

The design meetings were typically attended by key stakeholders on the building and energy efficiency areas and also representatives from national architects or engineer associations, energy agencies, universities, research centres and private sector companies.

In Annexes B, C, D, E and F the minutes of the design meetings carried out in the target countries are presented.

In the following tables it is presented a summary of the recommendations proposed from the design meetings and actions adopted by each country.

Table 2 – Recommendations from the Design Meetings and Actions adopted in Portugal

Nº.	Design Meeting Recommendations	Actions Taken
1	Clarify scope of training sessions (apply the EPBD to new, existing or rehabilitated buildings)	One of the modules is already focused in retrofitting towards nZEB (Module 8). All remaining modules have a large scope and refers to new, existing or rehabilitated buildings.
2	Training sessions should address non-residential and residential buildings	Training sessions address both types of buildings (non-residential and residential).
3	Target groups for the training sessions should aim for engineers, architects and municipality technicians	Target groups are aims mainly engineers, architects and municipality technicians.
4	Adaptation to each country specific context	During translation of contents, when needed contents were adapted to the Portuguese specific reality.
5	Minimum level of curricular requirements or proved experience in the area to trainees and trainers	Participants should have a degree level qualification in the appropriate areas and regarding experience the minimum experience should be 2,5 years (for trainer) whereas in case of trainee no minimum experience is required.
6	Minimum number of training sessions could be increased	Minimum number of training sessions required was increased to 4.
7	Participation of front-runner countries in training workshops	In 2 modules (3 and 7) during training the trainers the teachers were members from BRE.

Table 2 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Portugal

Nº.	Design Meeting Recommendations	Actions Taken
8	Availability to evaluate the certification/accreditation of the training modules by the professional associations	Was tried to involve professional associations, and some members from the organizations have participated in the training sessions.
9	Existence of a set of core training modules	Modules 1 and 2 are mandatory.
10	The training modules could be more generalist, introducing the nZEB concept and key objectives that could be mandatory and make part of that core set of training modules that would be provided to everyone	Modules 1 and 2 are mandatory.
11	Articulate SouthZEB project with the "Build-Up skills" project	"Build-Up skills" project was mentioned in some reports and some information from the project were used, namely in the D2.1
12	Specific training modules could be developed towards architects that could include contents like bioclimatic construction, vernacular architecture and Sustainable building design as well as a more generic training module that could capture the nZEB concepts	Those contents were included in the training modules and the generic training modules (1 and 2) are mandatory to all trainees.
13	Different training modules that could be provided to engineers or architects given their difference in background training.	Each participant can choose, in addition to the mandatory modules 1 and 2, the modules that best fit to their background and experience
14	Include content related with "adaptive comfort"	A new module were elaborated (Module 4 - Thermal Comfort) addressing those contents
15	The training modules should address comfort issues related with the building end-users	A new module were elaborated (Module 4 - Thermal Comfort) addressing those contents
16	Include content related with correct and sustainable use of buildings, specially of public buildings	Contents regarding the correct and sustainable use of buildings, namely the public buildings, were included in the training modules.
17	Include content related with taking into account the users behavior	Contents regarding the users' behavior were included in the training modules, namely in the module 4.
18	Include content related with "efficient equipment selection from the very beginning of a building life-cycle"	Contents regarding the importance of selecting efficient equipment from the very beginning of a building life-cycle were included in the training modules, namely in Module 8 and in Module 9.
19	Include content related with "relevance of solar gains and consequently of window solar protections"	Contents regarding the relevance of solar gains and solar protections were included in the training modules.
20	Include content related with "best architecture practices"	Examples of best architecture practices were included in the training modules.
21	Need of modules focusing life cycle cost analysis	Contents regarding the life cycle cost analysis were included in the training modules, namely in the module 8.
22	Match the nZEB concept with the content of the training sessions	In all modules the content was matched with the nZEB concept

Table 2 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Portugal

Nº.	Design Meeting Recommendations	Actions Taken
23	Legislation issues should be covered within the training modules	Contents regarding legislation issues were included in the training modules, namely in the Module 5.
24	Training modules that focus more on the rehabilitation process of existing buildings rather than on new buildings	Contents regarding rehabilitation were included in the training modules, namely in the Module 8.
25	Less relevance to the thermal bridges topic	Module 4 dedicated to thermal bridges was replaced by other content (Module 4 - Thermal Comfort).
26	Advanced modules should be more specific for each professional background	The training groups have been established (mainly engineers, architects and municipality technicians) and the contents of all modules are suitable to all of them, since the contents goes from basic to advanced.
27	Thermal comfort should be considered	A new module was elaborated (Module 4 - Thermal Comfort).
28	Attention should be provided to the cost-effectiveness of NZEB solutions	Contents regarding the cost optimal methodologies and life cycle cost analysis of nZEB were included in the training modules, namely in the module 8.
29	Analysis and discussion of different nZEB approaches for different building uses (offices, residential, public services...);	Different nZEB approaches were included in the training modules. And some nZEB buildings examples were included in different modules (e.g. Module 4 and Module 8).
30	Data acquisition, treatment and control decision (BMS, Building Management Systems) should be addressed	Contents regarding BMS were included in the training modules, namely in the Module 9.
31	Existing buildings, financing, construction are areas that should be referred	Contents regarding financing and funding schemes towards nZEB were included in Module 10.
32	Retrofitting/renovation module that should address different kind of buildings: monument heritage, old buildings and more recent buildings (from the 60's/70's/80's).	Approaches presented, namely in module 8, can be applied to any kind of buildings.
33	Less relevant modules: 3 Thermal bridging basics module development and 4. Thermal bridging advanced module development	Module 4 dedicated to thermal bridges was replaced by a module about thermal comfort.
34	Minimum number of modules required: four modules of one specific NZEB area (to be defined); Core modules: 1 and 2 (mandatory);	Minimum number of training sessions was increased to 4, being module 1 and 2 mandatory.
35	Provide to trainers an integrated vision of the nZEB concept	Both to trainers and trainees is provided an integrated vision of nZEB concept through modules 1 and 2.
36	Previous work and academic experience can be considered as equivalence to the related training modules.	Only can obtain approval in one training module if approved in the respective exam.

Table 2 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Portugal

Nº.	Design Meeting Recommendations	Actions Taken
37	<p>New modules topics proposed:</p> <ul style="list-style-type: none"> i. Adaptive Thermal Comfort; ii. User Acceptance of Technical Solutions to nZEB; iii. Cost Optimality of nZEB technical solutions; iv. Building Regulations and other relevant documentation; v. Building design (passive) –how to reduce demand by design, different building components available in PT, traditions, cost optimal solutions, etc... <p>(perhaps module 1 and 2 already deal with this);</p> <ul style="list-style-type: none"> vi. Building Technical systems (active) – Cost optimal solutions for PT; vii. Renewable energy – Different possibilities according to the buildings needs and availability of this resource; viii. Existing buildings – How to incorporate all the above into existing buildings in order to became nZEB; ix. Construction, installation and maintenance; x. Funding schemes and other incentives. 	<p>Modules that include the topics proposed, namely:</p> <ul style="list-style-type: none"> i. Adaptive Thermal Comfort → Module 4; ii. User Acceptance of Technical Solutions to nZEB → Module 8 and Module 9; iii. Cost Optimality of nZEB technical solutions → Module 8; iv. Building Regulations and other relevant documentation →Module 5; v. Building design (passive) → Module 1/ 2; vi. Building Technical systems (active) – Cost optimal solutions for PT → Module 8; vii. Renewable energy → Module 7; viii. Existing buildings – How to incorporate all the above into existing buildings in order to became nZEB → Module 8; ix. Construction, installation and maintenance →Module 9; x. Funding schemes and other incentives →Module 10.
38	<p>The most referred modules to be aggregated and consolidated to have a core training area were modules 1,2,4,5,8.</p>	<p>Module 1 and 2 are mandatory</p>
39	<p>Specific training considering the technical expertise of the trainee. Nevertheless, a global and generic NZEB concept should be always present in the training modules and as a final output of the trainings.</p>	<p>Trainees can choose the modules, only 1 and 2 that are mandatory. Global and generic nZEB concepts are present in all training modules.</p>

Table 2 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Portugal

Nº.	Design Meeting Recommendations	Actions Taken
40	<p>Trainers: a master degree (or pre-Bologna degree) and professional experience in the area for at least 5 years. Should also have training experience in the area. Engineers, architects and Energy and systems supervisors.</p> <p>Trainees: 3 years high education background and professional experience for at least 3 years or proven background education or professional experience in the area of Energy in Buildings. Also with a master degree (or pre-Bologna degree). Trainees: BSc in Civil Engineering, Architecture or Mechanical Engineering (or other equivalent education)</p>	Participants should have a degree level qualification in the appropriate areas and regarding experience the minimum experience should be 2,5 years (for trainer) whereas in case of trainee no minimum experience is required.
41	Evaluation method: Practical works during classes (based on case studies) and/or written exam.	Evaluation method: written exam

Table 3 – Recommendations from the Design Meetings and Actions adopted in Cyprus

Nº.	Design Meeting Recommendations	Actions Taken
1	Development of two major mandatory modules of 30-40 hours each. In addition, the material of the rest of the modules should be adjusted in a way that the rest of the modules would provide specialization for the various engineering disciplines	The consortium disagreed with such a prospect so the modules' duration stayed pretty much the same as initially described in the Grant Agreement
2	Two modules on thermal bridging is considered an exaggeration. One module is enough.	The consortium merged the two thermal bridging modules into one and a new module on thermal comfort has been developed
3	The module on architectural regulation should decrease in size and should focus in providing an overview of the existing regulations to the engineering disciplines (other than the architects) which are not so familiar with them	The module on "SouthZEB framework and architectural regulations" was heavily revised in order to comply with the local regulations and reality.
4	It has been suggested that more than one software should be presented in the context of Module 06 – Energy Simulations	This was not possible as the developed material has been only for Energy Plus. A few other key point software were named and described in brief during the presentations

Table 3 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Cyprus

Nº.	Design Meeting Recommendations	Actions Taken
5	It has been suggested that more material should be added to Module 08 in regards of the evaluation of the building's current situation and structural conditions. It is of great importance to have an insight of this as it might prove that retrofitting towards nZEB might be too expensive and not worth the investment if structural interventions are required in order to facilitate the energy efficiency measures	The trainer delivering the specific module in Cyprus revised part of its material towards the proposed direction, bearing in mind the 20% margin agreed by the consortium for possible changes in the material in order to accommodate local particularities.
6	A reduction of the hours allocated to module 09 was proposed	This has been applied during the delivery of module 9 but to a lesser extent than the one proposed.

Table 4 – Recommendations from the Design Meetings and Actions adopted in Italy

Nº.	Design Meeting Recommendations	Actions Taken
1	Main distinction between north and south of Italy is based on the climatic differences	This particular aspect has been taken into account while preparing the material for the trainings specifically on the Italian section
2	Real Estate market in the northern part of the country: there is an increasing demand for sustainable/green solutions within the building industry	Actions of spreading these new way of thinking and acting in the regions of the South of Italy
3	Skills and expertise has grown through the years in the north of Italy, the south still lacks behind and does not show much interest both at the supply and at the demand level, creating a market that is less prone to change, innovation and energy efficiency	Difficult in changing the behavior of the people from the South of Italy, difficult to let them understand these new technologies and new way of building. The interest in these themes is increasing but the lack is still remaining
4	Regions from the South have different climate, cultural and technical increased gap	Taken into account while preparing and adapting the slides for the specific target country
5	Trainings addressed to cover a deficit in technical competences and show international best practice successful stories coherent with the trainings	The material prepared will be enough detailed to be adapted to the audience with the possible examples of best practices to let people transmit knowledge
6	In order to ensure the participation to the trainings it would be crucial to obtain the recognition of Continue Education credits from the National professional orders, which are mandatory for the professional	The trainings will be organized with the cooperation and helpful of the local Association of Engineers and Architects in order to ensure the maximum diffusion of the trainings to their registered professionals and the recognition for the participants of the Continue Education credits (in Italian language Crediti Formativi Professionali), that each professional registered in an Association has to reach per year

Table 4 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Italy

Nº.	Design Meeting Recommendations	Actions Taken
7	It should be encouraged to deliver some parts of trainings through the e-platform in addition to face-to-face courses	In the South part of the country many professionals do not know how to manage with the e-learning platform. Probably it should have been translated in Italian language also in order to be a little bit more understandable
8	Not analyzed the duration of each trainings in detail due to the fact that the material was not ready to be delivered when the focus group met	The trainings will be organized also taking into account the expression of interest and requests from the professionals, probably the duration will be less than the one expected due to the fact that professionals do not have more time to dedicate to trainings in general

Table 5 – Recommendations from the Design Meetings and Actions adopted in Greece

Nº.	Design Meeting Recommendations	Actions Taken
1	The status-quo of existing national definitions for nearly Zero Energy Buildings should be presented. The EPBD gives large flexibility, since nZEB is not a technical standard but a policy requirement leading to tightening the future buildings' standards. Specific definitions and implementation will be decided by each Member State. There is a need for more guidance and common understanding for implementing sustainable but yet feasible nZEB definitions. Official definitions and technical standards do not exist in all project partner countries, including Greece	Each partner presented nZEB building standards which are related to the climate status of the country. None of the partners is authorized by its country technical authority to create definitions and official technical standards
2	District Heating (or Teleheating) techniques for improving energy efficiency in buildings should be included.	It was included in module 2
3	In training module 2 "nZEB Advanced module" the principles of Bioclimatic Design and Bioclimatic Architecture should be presented. Also, passive systems for heating-cooling and lighting should be included in this training module;	All of them were included in module 2
4	Based on the description provided on modules 3 and 4 it was proposed to merge these 2 modules into one single training module with 20 hours training duration	These modules are merged into one (module 3) with 20 hours training duration. Module 4 has a new description. This module is focused on the thermal environment of buildings. It will define thermal comfort for a human body and how to model it. It explains factors and values that form the perception of thermal comfort.

Table 5 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Greece

Nº.	Design Meeting Recommendations	Actions Taken
5	To be able to cover all the national building regulations and present how the nZEB concept can be harmonized with the existing architectural regulations and restrictions in Greece it is proposed that module 5 “SouthZEB framework module and local architectural regulations” could have a higher number of training hours, increasing to 30 hours;	Module 5 has 30 training hours.
6	Existing accurate simulation models representing the building structure and the subsystems should be included in training module 6 “nZEB simulation and design software module” together with a comprehensive comparative review of existing simulation tools;	This recommendation was included
7	In training module 8 “Retrofitting towards nZEB” the definition of nZEB renovation should be clearly presented. A design framework for achieving nZEB in existing buildings should be provided during the training. Also, examples of highly efficient refurbished houses and a nZEB list of renovated houses in each partner country should be presented in this training module;	This recommendation was included
8	The participants proposed an additional training module to be developed, “Energy-efficient building automation systems” that could include topics like: a) “intelligent” energy management and energy monitoring systems; b) energy storage systems; c) Building optimization and control methodologies for NZEB, among others;	This recommendation was included in module 7.
9	The minimum number of modules required so that a trainer could be awarded the “nZEB trainer” certificate is proposed to be 4. The core (mandatory) modules should be module 1 “Basic module development” and module 2 “Advanced module development”.	This recommendation was followed.
10	The minimum number of modules required so that a professional could be awarded the “nZEB designer” certificate is proposed to be 4. The core (mandatory) modules should be module 1 “nZEB Basic module” and module 2 “nZEB Advanced module”;	This recommendation was followed.

Table 5 (Cont.) – Recommendations from the Design Meetings and Actions adopted in Greece

Nº.	Design Meeting Recommendations	Actions Taken
11	<p>Modules by professional area:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engineers: 1, 2, 3, 6, 7, 8 <input type="checkbox"/> Architects: 1, 2, 3, 5, 6, 8 <input type="checkbox"/> Municipality employees: 1, 5, 8, 9, 10 <input type="checkbox"/> Decision makers: 1, 2, 5, 8, and 10. 	<p>Trainees are informed and they can choose modules to participate.</p>

3. DISCUSSION AND CONCLUSIONS

From the contributions provided by all target countries Focus Groups several adjustments were proposed from the initial training module descriptions as provided in the Grant Agreement (please see Annex A for a description of the training modules as provided in the Grant Agreement).

The main changes that have been proposed by the national support groups and then discussed by the project partners can be summarized as follows:

- 1) Training modules 1 & 2 (nZEB basic and Advanced modules) should be mandatory for all participants (trainees and trainers);
- 2) Modules recommended by professional area:
 - a) Engineers and architects: 1, 2, 3, 4, 5, 6, 7, 8;
 - b) Municipality employees: 1, 2, 5, 8, 9, 10;
 - c) Decision Makers: 1, 2, 5, 8, 10.
- 3) A minimum number of 4 training modules (out of the 10 available) with positive evaluation on the exam are needed in order to receive the “nZEB Designer” or “nZEB Trainer” certificate;
- 4) Participants should have a degree level qualification in the appropriate areas and regarding experience the minimum experience should be 2,5 years (for trainer) whereas in case of trainee no minimum experience is required.
- 5) Several nZeb related topics have been either incorporated in already existent training modules or new training modules have been created to address those suggestions like for instance “Module 4 – Thermal Comfort” and “Module 7 – “Low carbon technology and automation for nZEB”. Some of the topics mentioned by the Focus Groups that should be incorporated on the training modules were:
 - a) Adaptive Thermal Comfort;
 - b) User Acceptance of Technical Solutions to nZEB;
 - c) Cost Optimality of nZEB technical solutions;
 - d) Building Regulations and other relevant documentation;
 - e) Bioclimatic Design and Bioclimatic Architecture;
 - f) Building design (passive systems) for heating-cooling and lighting, building components available in each country, traditions, cost optimal solutions, etc.;
 - g) Building Technical systems (active systems) - Energy-efficient building automation systems like “intelligent” energy management and energy monitoring systems; energy storage systems; building optimization and control methodologies for NZEB, among others;
 - h) Renewable energy – Different possibilities according to the buildings needs and availability of this resource;
 - i) Existing buildings – How to incorporate all the above into existing buildings in order to became nZEB;
 - j) Construction, installation and maintenance;
 - k) Funding schemes and other incentives.

From the proposals presented by the Focus Groups, the final recommendation for the training modules within the SouthZEB project was finalized and presented in Annex G.

ANNEXES

Annex A – Description of Training modules as per the Grant Agreement

1) Basic module development

The basic module will present the South EU nZEB concept and the principles of a near zero energy construction: applied physics basics, thermal insulation, materials and construction. Furthermore, the basic module will present the requirement for the minimum percentage of renewable energy sources of nearly Zero-Energy Buildings (nZEB), according to existing EU definitions, standards and roadmaps (such as the Energy Performance of Buildings Directive-EPBD). Active renewable energy supply systems will be presented such as solar systems, PV systems, heat pumps solutions, biomass solutions, pellet boilers etc. It will be divided in sub-modules, according to the abovementioned categories. The total duration of this module should be about 20 hours. The module will be addressed mainly to engineers and architects.

2) Advanced module development

The advanced module will elaborate further on various arguments of nZEB design and building, including technical physics with respect to humidity, building materials, construction techniques, measurement techniques, ventilation and use of renewable energy sources. The passive use of renewable energy, e.g. passive solar gains, will be presented. The module will include a practical workshop for the trainees. This practical workshop will provide hands on experience to the trainees on how to use renewable energy sources in the nZEB design and building. The estimated duration of the training is about 40 hours. The module will be addressed mainly to engineers and architects.

3) Thermal bridging basics module development (BRE)

This module will focus on the evaluation and calculation of thermal bridges, through practical exercises. It will include sub-modules on the definition of thermal bridges, thermal losses through bridging, isothermal curves, surface temperatures, humidity, active directives and regulations. The module will include a practical workshop for the trainees. The estimated duration of the training is about 20 hours. The module will be addressed mainly to engineers and architects.

4) Thermal bridging advanced module development (UMINHO)

This module will elaborate further on thermal bridging issues, including the calculation of the surface temperature and the linear thermal bridge of various points. The module will include a practical workshop for the trainees. The estimated duration of the training is about 20 hours. The module will be addressed mainly to engineers and architects.

5) SouthZEB framework module and local architectural regulations (BRE)

This module will aim at presenting to architects, engineers and municipality employees the SouthZEB approach for the verification and certification of nZEB in the target countries. Emphasis will be given on the special provision that SouthZEB has for building traditions and local architectural regulations. This module will be based on different training material for each target country, following though the common framework and directions. It is addressing the needs of engineers, architects and municipality employees. The estimated training duration is 10 hours.

6) nZEB simulation and design software module (IST-ID)

This module will present to the participants the best simulator tools for the design of nZEB and energy efficient buildings. Engineering design tools for nZEB will also be presented by the partners from the front runner countries and especially BRE and DTTN. The module will include a practical workshop for the trainees. The estimated duration of the training is 30 hours. The module will be addressed mainly to engineers and architects.

7) “Production, distribution and regulation of energy in nZEB” training module (BRE)

This module will train architects and engineers in learning the technologies of the various sub-systems and installations as well as their cost and effectiveness. As in all modules, emphasis is paid to the technologies

most suitable for the target countries. Design and dimensioning issues will also be addressed. Additionally, the financial performance of the energy efficiency measures on nearly zero-energy buildings will be presented. These costs will include installation, maintenance and operating costs as well as earnings from energy produced and disposal costs (if applicable). The global cost calculation method, which is described in EN 15459: Energy performance of buildings – economic evaluation procedure for energy systems in buildings, will also be presented to the trainees. The estimated duration of the training is about 20 hours.

8) “Retrofitting towards nZEB” training module (UMINHO)

The aim of this training module will be to educate all interested parties in the way to address existing building stock and its possibilities for transformation into nZEB. Assessment and energy audit techniques in existing buildings are also part of the training goals. It is addressing the needs of engineers, architects and municipality employees. The estimated duration of the training is about 40 hours.

Additionally two special training modules will be developed addressing construction managers and decision makers (national authorities, technical chambers, city councils, etc.). Collaboration with some of the associated partners is foreseen, while the expert advisory board will provide its input.

9) Development of the training module for construction management and field supervision of nZEB (GARNET)

The aim of the training module will be to train the participants into Construction Management and field supervision according to the latest construction standards for Nearly Zero Energy Buildings and Zero Energy Buildings. A Greek company with significant expertise in the area of sustainable building construction management and energy will also be subcontracted by UPATRAS for assisting in the development of this module. Techniques will also be transferred from the participating front runners and especially BME. Obviously, the programs will have to be adapted to the South European buildings and the outputs of WP2. The estimated duration of the training is approximately 40 hours.

10) Development of the training module for decision makers - Preparation of funding schemes and other incentives for nZEB (BRE)

This training module is aimed at local and national authorities' representatives that will participate in the corresponding sessions. It will include policy and legislation issues, financing energy efficiency retrofitting issues, citizens' engagement issues and nZEB successful practices issues. The associated partners will be engaged in the development of this module. The aim is to make sure that the decision makers that will follow the course will be able to design new funding/promotion schemes for nZEB for the South European participating countries (EL, CY, PT, IT).

Annex B – SouthZEB, 1st Design Meeting in Portugal (Minutes of Meeting)**1st Portuguese National Support Group meeting****Venue:** IST, Lisbon, Portugal**Date:** May 19th, 2014**Meeting Participants:**

ADENE (National Energy Agency) – Rui Fragoso, Jorge Marques

LNEC (National Civil Engineering Laboratory) – Pina dos Santos

LNEG (National Laboratory of Energy and Geology) – Laura Aelenei

Lisboa E-Nova (Municipal Company) – Miguel Águas

iiSBE-PT (International Initiative for a Sustainable Built Environment – Portuguese chapter) – Luís Bragança

IST (University of Lisbon) – Manuel Guedes, Miguel Carvalho, Ricardo Gomes

Ordem dos Arquitetos (National Association of Architects) – Carmo Caldeira

Ordem dos Engenheiros (National Association of Engineers) – Cristina Machado

Ordem dos Engenheiros Técnicos (National Association of Technical Engineers) – José Manuel Sousa

UMinho (University of Minho) – Manuela Almeida

MEETING MINUTES

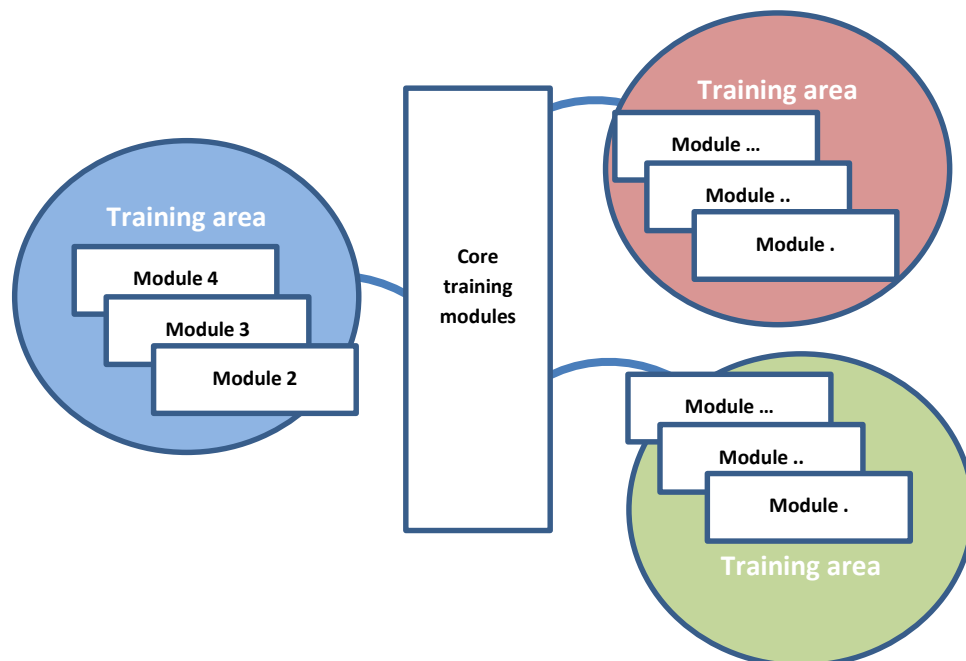
The meeting started with a presentation about the SouthZEB project scope and objectives from Manuela Almeida (UMinho) and Miguel Carvalho (IST-ID).

During this meeting all the members of the panel contributed significantly to the discussion on what training sessions should be tailored to the Portuguese context towards the implementation of the EPBD.

Some transversal considerations were made by the panel participants so as to outline the scope and objectives of the training sessions within the SouthZEB project objectives:

- a) Scope of the training sessions: Should the training sessions be orientated for applying the EPDB in new, existing or rehabilitated buildings? It was consensual between all panel members that the training modules should vary accordingly not only with the type of the building but also with the building end-use and thus the scope of each training module needs to be better clarified;
- b) Target building typology of the training sessions: Should the training sessions be targeted to non-residential or residential buildings or both? It was acknowledged that different skills and best practices may apply to non-residential or residential buildings. UMinho and IST stated that, in this topic and based on the kick-off meeting in Athens, it had been defined that the training sessions should address both types of buildings (non-residential and residential).
- c) target groups for the training sessions: It was agreed that the target groups of professionals should aim for engineers, architects and municipality technicians;
- d) Adaptation to each country specific context: All panel participants acknowledged and agreed on the need to evaluate the contents and scope of each training module based on each country contextual specificities. This may even lead to the proposal of new modules or the removal of others to reach a coherent set of training modules addressed for a specific country needs;
- e) Minimum level of curricular requirements: This issue was raised by LNEG and iiSBE and agreed by all panel participants, recognizing that both trainers and trainees level should have a minimum set of curricular requirements or proved experience in the area, in order to participate in the training sessions;
- f) Minimum number of training sessions attended: All partners demonstrated some degree of concern regarding the minimum number of training modules that should be provided to both “trainers” and “professionals” in order to receive, respectively the “nZEB trainer” certificate and the “nZEB designer” certificate. Eventually the limit of 3 modules needs to be adjusted or some rules be created, not to allow that a non-coherent set of modules be provided to a trainer or professional that can award him with a nZEB certificate;
- g) Participation of front-runner countries in training workshops: it was recognized by all panel participants the usefulness of having front-runner countries specialists to participate in some of the training modules. It also was acknowledged that front-runner partners did not have the financial capacity to accommodate this effort within the allocated budget. As such, it was proposed that a possible solution could be to use video-conference facilities that could facilitate this participation.
- h) Availability to evaluate the certification/accreditation of the training modules: All panel participants recognized the importance of having the nZEB training modules accredited within the organizations and are available to discuss how that can be implemented and even to participate on the training sessions. This is even more relevant for the professional associations represented (Ordem dos Arquitectos, Ordem dos Engenheiros and Ordem dos Engenheiros Técnicos, as well as ADENE).

- i) Core training modules: One consensual concept by all the partners about the training sessions is the existence of a set of core training modules that could include a conceptual approach for the nZEB implementation. From this set of core training modules other specific modules with more specific technical contents should be considered and selected from the trainers/trainees.



Below the panel participants' remarks are highlighted, regarding more technical and specific issues about the training modules already foreseen on the SouthZEB proposal document:

ADENE (National Energy Agency)

- ADENE made reference to an ongoing project "Build-Up skills". This project - whose partners are LNEG, DGEG, ADENE and ANQ – provides training to Blue collar workers regarding nZEB, and involves the national stakeholders from industry and social partners, as well as training institutions and crafts associations. Although more focused in training professional installers and other field technicians, the "Build-Up skills" will certainly provide relevant outputs that will constitute an important help to improve SouthZEB training sessions. It was suggested that both projects could be somehow articulated.
- As a possible solution, about the issue raised in the discussion regarding the minimum number of training modules (3) to be awarded the "nZEB designer" or "nZEB trainer" certificate, it could be required that this minimum number of training modules could be increased as a way to guarantee that both the trainers and trainees have access to the best possible training.
- As another possible solution about the issue raised in the discussion regarding the minimum number of training modules (3) to be awarded the "nZEB designer" or "nZEB trainer" certificate, it could be to have a competence matrix in which the trainer/trainee would already possess a number of skills that are complementary to the training received within the proposed modules and thus is apt to understand and teach the remaining modules.

National Association of Architects

- It was recognized the importance of providing nZEB training to Architects given their role on the design phase of the project. It is suggested that specific training modules could be developed towards architects that could include contents like bioclimatic construction,

vernacular architecture and Sustainable building design as well as a more generic training module that could capture the nZEB concepts.

LNEC (National Civil Engineering Laboratory)

The main concerns and training suggestions are related with the following points:

- Adaptive comfort (essential issue to achieve nZEB)
- Correct and sustainable use of buildings, specially of public buildings;
- Take into account the users behaviour;
- Efficient equipment selection from the very beginning of a building life-cycle;
- Relevance of solar gains and consequently of window solar protections;
- Emphasis on identifying best architecture practices.

Lisboa E-nova (Municipal Company)

- Concerns about the economic viability of the measures and solutions provided in the training sessions resulting in the need of modules focusing life cycle cost analysis;
- Questions about the scope of the nZEB concept and how does it match with the content of the training sessions.

National Association of the Technical Engineers

Main concerns raised in what regards the training modules were:

- The training modules should address comfort issues related with the building end-users;
- Legislation issues should be covered within the training modules;
- Given the present Portuguese context, an emphasis should be placed on providing training modules that focus more on the rehabilitation process of existing buildings rather than on new buildings.

National Association of Engineers

- Concerns were raised regarding the need of having different training modules that could be provided to engineers or architects given their difference in background training. This was seen as a positive proposal by all panel participants;
- It would be important to guarantee that one of the training modules could be more generalist, introducing the nZEB concept and key objectives that could be mandatory and make part of that core set of training modules that would be provided to everyone.

As a way to collect additional information from the National Support Group participants a questionnaire was prepared and sent by email to each member with the objective to assess the adequacy of the training modules proposed in the SouthZEB Grant Agreement to the Portuguese context and to find possible improvement areas. The questionnaire, along with the answers from the members of the National Support Group is presented on section 2 below. The questionnaire on section 2 below makes reference to the training modules description as per the SouthZEB Grant Agreement.

The recommendations from the National Support Group will be condensed into a revised training module description to be made available to all project members.

QUESTIONNAIRE PRESENTED TO EACH MEMBER OF THE NATIONAL SUPPORT GROUP PANEL AND ANSWERS PROVIDED

11) From your understanding what are the main training gaps found today in the nZEB area for professionals like engineers, architects, municipality employees and decision makers?

- Technical knowledge gap of the older graduated engineers that still don't have background on NZEB area;
- Technical knowledge of the stakeholders to design, build and operate NZEB;
- An overall and cohesive perspective of NZEB by the stakeholders and not only a specialization in a particular area;
- Special attention to new construction technologies, all building life cycle but also to vernacular architecture.

12) Do you consider that the training modules presented in Annex A are well suited to the Portuguese specific context both in terms of the existing built environment and professionals?

Modules should be revised according to the following points:

- Too much relevance is given to the thermal bridges topic;
- Advanced modules should be more specific for each professional background;
- Thermal comfort should be considered;
- Attention should be provided to the cost-effectiveness of NZEB solutions;
- Analysis and discussion of different nZEB approaches for different building uses (offices, residential, public services...);
- Data acquisition, treatment and control decision (BMS, Building Management Systems) should be addressed;
- Existing buildings, financing, construction are areas that should be referred;
- Special attention should be taken on the retrofitting/renovation module that should address different kind of buildings: monument heritage, old buildings and more recent buildings (from the 60's/70's/80's).

13) Based on the training module description provided in Annex A which do you consider the more and less relevant modules?

Most relevant:

1. Basic module development
2. Advanced module development
5. SouthZEB framework module and local architectural regulations (BRE)
6. nZEB simulation and design software module (IST-ID)
7. "Production, distribution and regulation of energy in nZEB" training module (BRE)

Less relevant

3. Thermal bridging basics module development (BRE)
4. Thermal bridging advanced module development (UMINHO)

14) What should be the minimum number of modules required to so that a trainer could be awarded the "nZEB trainer" certificate and which should be compulsorily attended?

The panel members' opinion is not consensual. Even so, it is possible to highlight the following topics:

- Minimum number of modules required: four modules of one specific NZEB area (to be defined);
- Core modules: 1 and 2 (mandatory);

- The panel members raised questions about how to provide to trainers an integrated vision of the nZEB concept;
- Previous work and academic experience can be considered as equivalence to the related training modules.

15) What should be the minimum number of modules required to so that a professional be awarded the “nZEB designer” certificate and which should be compulsorily attended?

Again the panel members’ opinion is not consensual. Even so, it is possible to highlight the following topics:

- Minimum combination of 4 modules of one specific NZEB area (to be defined);
- Core modules: 1 and 2 (mandatory);
- nZEB designer – Modules 1 to 5;
- Additional module 6 for those who build or maintain buildings;
- Additional module 7 for those on the policy making;
- Questions about how to provide to trainers an integrated vision of the nZEB concept;
- Previous work and academic experience can be considered to replace the related training modules.

16) On your opinion (considering other training modules not mentioned on Annex A, if needed) what should be the most effective module composition for the mentioned professionals (engineers, architects, municipality employees, decision makers)?

New modules topics proposed:

- i. Adaptive Thermal Comfort;
- ii. User Acceptance of Technical Solutions to nZEB;
- iii. Cost Optimality of nZEB technical solutions;
- iv. Building Regulations and other relevant documentation;
- v. Building design (passive) –how to reduce demand by design, different building components available in PT, traditions, cost optimal solutions, etc... (perhaps module 1 and 2 already deal with this);
- vi. Building Technical systems (active) – Cost optimal solutions for PT;
- vii. Renewable energy – Different possibilities according to the buildings needs and availability of this resource;
- viii. Existing buildings – How to incorporate all the above into existing buildings in order to became nZEB;
- ix. Construction, installation and maintenance;
- x. Funding schemes and other incentives.

Modules by professional area (reference to Annex A):

Engineers: 1, 2, 3, 6, 7, 8

Architects: 1,2,5,6,8

Municipality employees: 1, 5, 8, 9

Decision makers: 1, 2,5, 8, and 10

17) Which training modules (existent or non-existent in Annex A) should be consolidated in order to have a core training area to be provided to all trainers and professionals

The most referred modules to be aggregated and consolidated to have a core training area were modules 1,2,4,5,8.

18) Do you think that different training modules should be provided based on the technical expertise of the recipients (e.g. engineers or architects)? If so what specific modules should be addressed to each one?

Most answers point out to a more specific training considering the technical expertise of the trainee. Nevertheless, a global and generic NZEB concept should be always present in the training modules and as a final output of the trainings.

19) What in your opinion should be the minimum curricular level (or proven professional experience) that should be asked for the trainees/trainers that are attending the training modules and the Workshops?

Trainers: a master degree (or pre-Bolonha licence) and professional experience in the area for at least 5 years. Should also have training experience in the area.
Engineers, architects and Energy and systems supervisors.

Trainees: 3 years high education background and professional experience for at least 3 years or proven background education or professional experience in the area of Energy in Buildings.
Also with a master degree (or pre-Bolonha licence).

Trainees: BSc in Civil Engineering, Architecture or Mechanical Engineering (or other equivalent education)

20) How should be the training evaluation method and how trainers and nZEB designers should obtain the training diploma?

Evaluation method: Practical works during classes (based on case studies) and/or written exam.

21) Should a minimum number of participants be mandatory for each module and/or training area? Should this number of participants different accordingly to each module? If so what should be the modules with a higher number of participant's?

This question is not yet consolidated between the panel members, however the following topic can be highlighted:

- There should be awarded trainers for all the modules but the number could be different (more for modules 1, 2, 5 and 8).
- The minimum number of participants could be 20.
- Depending on the teaching methodology, the adequate number of participants can be 30 or 50. This should be defined taking into consideration the teaching materials and the teaching methodology.

PHOTOS FROM THE NATIONAL SUPPORT GROUP MEETING



MEETING ATTENDANCE LIST



Universidade do Minho

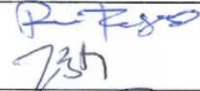

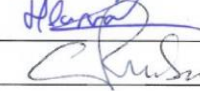

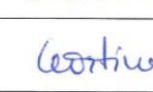

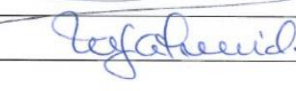


SouthZEB
National Advisory Group meeting
Lisbon, May 19th, 2014

SouthZEB - training in the Southern EU countries – Maintaining building traditions

NATIONAL SUPPORT GROUP

1st Meeting – Lisbon - 19th May 2014

Attendance List

Institution	Name	Signature
ADENE	Rui Fragoso Nuno Climaco	
iiSBE	Luís Bragança	
IST	Manuel Guedes Miguel Carvalho	
LNEC	Pina dos Santos	
LNEG	Hélder Gonçalves Laura Aelenei	
Lisboa e-Nova	Miguel Águas	
Ordem dos Arquitectos	Carmo Caldeira	
Ordem dos Engenheiros	Cristina Machado	
Ordem dos Engenheiros Técnicos	José Manuel Sousa	
UMinho	Manuela Almeida	

Annex C – SouthZEB, 1st Design Meeting in Greece (Minutes of Meeting)

FIRST DESIGN MEETING IN GREECE

Venue: KEK EUROTRAINING, Address: Veranzerou 1, Athens

Date: 10th June 2014

PARTICIPANTS LIST

Name	Surname	Expertise
Aris	Dimeas	PhD Electrical Engineer, Member of Technical Chamber of Greece, member of IEEE Working Group for Multi Agent Systems on Power System Applications, Research assistant at department of Electrical and Computer Engineering of National Technical University of Athens
Lambros	Manasis	MSc Mechanical Engineer, Trainer of Energy inspectors, Member of Technical Chamber of Greece, Research assistant at Laboratory of Steam Boilers and Thermal Plants of National Technical University of Athens
Nick	Christofilos	Mechanical Engineer, Co-owner of Technical company CPC Engineering, Member of Technical Chamber of Greece
Marina	Zotaki	Architect, Energy inspector, Co-owner of technical company SFAIRA (associated partner), Member of Technical Chamber of Greece
Stefanos	Vagenas	MSc Electrical Engineer, Energy inspector, Member of Technical Chamber of Greece
Zotakis	Vasileios	MSc Electrical Engineer, Co-Owner of technical company SFAIRA (associated partner), Member of Technical Chamber of Greece
Iakovos	Kalaitzoglou	PhD Mechanical Engineer, Member of Technical Chamber of Greece
Maria	Betsi	Electrical Engineer, Member of Technical Chamber of Greece
Spyros	Provolisianos	Mechanical Engineer, Member of Technical Chamber of Greece

MEETING MINUTES:

- **Welcome and Introductions**

All participants introduced themselves to each other for the first time. Each one made a brief presentation about his/her existing knowledge, skills and professional experience regarding the nZEB concept.

- **SouthZEB project presentation**

A short presentation of the SouthZEB project was made. The presentation went through the objectives and main activities of the project to make sure everyone had the same understanding of what the project is trying to achieve and the prospective role of the focus group.

- **Training modules presentation**

The 10 training modules of the SouthZEB project were presented in detail and in addition a written description of each training module was handed over to the participants accompanied with a list of questions regarding their views and opinion over the project outcome.

- **Discussion-Round table**

In this session, a fruitful discussion took place. The participants expressed their thoughts for all training modules. **The comments of the focus groups can be found as Appendix1 to the minutes:**

The meeting closed with the participants stating their positive attitude towards the SouthZEB project and each one committed to attend a follow up design meeting to further elaborate their input towards the organizing of the training modules and the material to be included.

FOCUS GROUP COMMENTS ON TRAINING MODULES

22) Basic module development

The basic module will present the South EU nZEB concept and the principles of a near zero energy construction: applied physics basics, thermal insulation, materials and construction. Furthermore, the basic module will present the requirement for the minimum percentage of renewable energy sources of nearly Zero-Energy Buildings (nZEB), according to existing EU definitions, standards and roadmaps (such as the Energy Performance of Buildings Directive-EPBD). Active renewable energy supply systems will be presented such as solar systems, PV systems, heat pumps solutions, biomass solutions, pellet boilers etc. It will be divided in sub-modules, according to the abovementioned categories. The total duration of this module should be about 20 hours. The module will be addressed mainly to engineers and architects.

Focus group comments:

- The status-quo of **existing national definitions for nearly Zero Energy Buildings** should be presented. The EPBD gives large flexibility, since nZEB is not a technical standard but a policy requirement leading to tightening the future buildings' standards. Specific definitions and implementation will be decided by each Member State. There is a need for more guidance and common understanding for implementing sustainable but yet feasible nZEB definitions. Official definitions and technical standards do not exist in all project partner countries, including Greece.
- **District Heating (or Teleheating) techniques** for improving energy efficiency in buildings should be included in this module.

23) Advanced module development

The advanced module will elaborate further on various arguments of nZEB design and building, including technical physics with respect to humidity, building materials, construction techniques, measurement techniques, ventilation and use of renewable energy sources. The passive use of renewable energy, e.g. passive solar gains, will be presented. The module will include a practical workshop for the trainees. This practical workshop will provide hands on experience to the trainees on how to use renewable energy sources in the nZEB design and building. The estimated duration of the training is about 40 hours. The module will be addressed mainly to engineers and architects.

Focus group comments:

- In this module the principles of **Bioclimatic Design and Bioclimatic Architecture** should be presented. Specifically,
 - Heat protection of the buildings in winter as well as in summer, using appropriate techniques which are applied to the external envelope of the building, especially by adequate insulation and air tightness of the building and its openings.
 - Use of solar energy for heating buildings in the winter season and for daylighting all year round. This is achieved by the appropriate orientation of the buildings and especially their openings (preferably towards the south), by the layout of interior spaces according to their heating requirements, and by passive solar systems which collect solar radiation and act as “natural” heating as well as lighting systems.
 - Protection of the buildings from the summer sun, primarily by shading but also by the appropriate treatment of the building envelope (i.e. use of reflective colours and surfaces).
 - Removal of the heat which accumulates in summer in the building to the surrounding environment using by natural means (passive cooling systems and techniques), such as natural ventilation, mostly during nighttime.
 - Improvement – adjustment of environmental conditions in the interiors of buildings so that their inhabitants find them comfortable and pleasant (i.e. increasing the air movement inside spaces, heat storage, or cool storage in walls).
 - Ensuring insolation combined with solar control for daylighting of buildings, in order to provide sufficient and evenly distributed light in interior spaces.
 - Improvement of the microclimate around buildings, through the bioclimatic design of exterior spaces and in general, of the built environment, adhering to all of the above principles.
- **Passive systems for heating-cooling and lighting** should be included in this training module:
 - Passive Solar Heating Systems
 - Passive (Natural) Cooling Systems and Techniques
 - Systems and Techniques for Natural Lighting
- The duration of this module should be increased. The proposed duration is 60 hours.

24) Thermal bridging basics module development (BRE)

This module will focus on the evaluation and calculation of thermal bridges, through practical exercises. It will include sub-modules on the definition of thermal bridges, thermal losses through bridging, isothermal curves, surface temperatures, humidity, active directives and regulations. The module will include a practical workshop for the trainees. The estimated duration of the training is about 20 hours. The module will be addressed mainly to engineers and architects.

Focus group comments:

- The training modules 3 and 4 can be unified in a single training module. The proposed duration of the unified training module can be 20 hours.

25) Thermal bridging advanced module development (UMINHO)

This module will elaborate further on thermal bridging issues, including the calculation of the surface temperature and the linear thermal bridge of various points. The module will include a practical workshop for the trainees. The estimated duration of the training is about 20 hours. The module will be addressed mainly to engineers and architects.

Focus group comments:

- The training modules 3 and 4 can be unified in a single training module. The proposed duration of the unified training module can be 20 hours.

26) SouthZEB framework module and local architectural regulations (BRE)

This module will aim at presenting to architects, engineers and municipality employees the SouthZEB approach for the verification and certification of nZEB in the target countries. Emphasis will be given on the special provision that SouthZEB has for building traditions and local architectural regulations. This module will be based on different training material for each target country, following though the common framework and directions. It is addressing the needs of engineers, architects and municipality employees. The estimated training duration is 10 hours.

Focus group comments:

- There are many building regulations that the Greek government has introduced into law through years. In an effort to put an end to confusing building laws, the Greek government adopted new legislation in 2010 which aimed to radically change the status quo when dealing with construction issues. These changes lead to the enactment of Greece's New Building Regulations. These came into effect in early July 2011. The most important reforms concern these five categories:
 1. Issuing building permits
 2. Energy performance of buildings
 3. Supervision of construction works
 4. Record Keeping
 5. Tackling illegal building activity
- Another issue to consider is that in Greece there are a lot of differences on building regulations and Architecture depending on location. Thus, in order to cover all these issues and present how the nZEB concept can be harmonized with the existing architectural regulations and restrictions in Greece an increase in the training module duration is needed. The proposed duration for this training module is 30 hours.

27) nZEB simulation and design software module (IST-ID)

This module will present to the participants the best simulator tools for the design of nZEB and energy efficient buildings. Engineering design tools for nZEB will also be presented by the partners from the front runner countries and especially BRE and DTTN. The module will include a practical workshop for the trainees. The estimated duration of the training is 30 hours. The module will be addressed mainly to engineers and architects.

Focus group comments:

- The duration of this training module can be reduced. The proposed duration is 10 hours.
- Attention is needed in the preparation of the training content so as not to advertise specific commercial software tools.
- Existing accurate simulation models representing the building structure and the subsystems should be included in this module together with a comprehensive comparative review of existing simulation tools.

28) "Production, distribution and regulation of energy in nZEB" training module (BRE)

This module will train architects and engineers in learning the technologies of the various sub-systems and installations as well as their cost and effectiveness. As in all modules, emphasis is paid to the technologies most suitable for the target countries. Design and dimensioning issues will also be addressed. Additionally, the financial performance of the energy efficiency measures on nearly zero-energy buildings will be presented. These costs will include installation, maintenance and operating costs as well as earnings from energy produced and disposal costs (if applicable). The global cost calculation method, which is described in EN 15459: Energy performance of buildings – economic evaluation procedure for energy systems in buildings, will also be presented to the trainees. The estimated duration of the training is about 20 hours.

29) “Retrofitting towards nZEB” training module (UMINHO)

The aim of this training module will be to educate all interested parties in the way to address existing building stock and its possibilities for transformation into nZEB. Assessment and energy audit techniques in existing buildings are also part of the training goals. It is addressing the needs of engineers, architects and municipality employees. The estimated duration of the training is about 40 hours.

Focus group comments:

- The definition of nZEB renovation should be clearly presented.
- A design framework for achieving nZEB in existing buildings should be provided during the training.
- The requirements for major renovation in both residential and non-residential buildings should be presented in this training module.
- The criteria to track nZEB housing renovation should be presented.
- Examples of highly efficient refurbished houses should be included in this training module.
- A nZEB list of renovated houses in each partner country should be presented.

30) Development of the training module for construction management and field supervision of nZEB (GARNET)

The aim of the training module will be to train the participants into Construction Management and field supervision according to the latest construction standards for Nearly Zero Energy Buildings and Zero Energy Buildings. A Greek company with significant expertise in the area of sustainable building construction management and energy will also be subcontracted by UPATRAS for assisting in the development of this module. Techniques will also be transferred from the participating front runners and especially BME. Obviously, the programs will have to be adapted to the South European buildings and the outputs of WP2. The estimated duration of the training is approximately 40 hours.

31) Development of the training module for decision makers - Preparation of funding schemes and other incentives for nZEB (BRE)

This training module is aimed at local and national authorities’ representatives that will participate in the corresponding sessions. It will include policy and legislation issues, financing energy efficiency retrofitting issues, citizens’ engagement issues and nZEB successful practices issues. The associated partners will be engaged in the development of this module. The aim is to make sure that the decision makers that will follow the course will be able to design new funding/promotion schemes for nZEB for the South European participating countries (EL, CY, PT, IT).

Focus group comments:

- An extra training module about Energy-efficient building automation systems should be added in the SouthZEB training curricula or the main topics of this module should be included in an existing training module (e.g. training module 7):
The main topics covered by this new module will be:
 - The use of “intelligent” energy management, i.e., advanced sensors, energy control (zone heating and cooling) and monitoring systems.
 - The management on the supply side, which involves optimization techniques of the energy produced, e.g. use of maximum power point tracking system for photovoltaics and wind generators, energy storage management or feeding the extra energy produced to the grid.

- Energy storage technologies. These technologies are a central element of designing, operating an intelligent NZEB and they are needed for efficient use of the renewable energy and for significant reduction in energy demand. Energy storage technologies can act as a coordinator between the supply and the demand side and in some aspects even to the distribution.
- Potential role of wireless communication in NZEB. Wireless applications including building automation, indoor environmental monitoring and emerging technologies will be presented.
- Building optimization and control methodologies for NZEB. Building Optimization and Control (BO&C) tools can contribute to the efficient operation of a nZEB. BO&C tools use building networking inputs and thermal models to evaluate potential scenarios, and take (almost) in real-time decisions for the operation of the building subsystems with the goal of maximization of the selected performance indicators (e.g. NEP or NER) while retaining building conditions at user-acceptable comfort levels.
- Energy Hubs: A key element in the vision of future energy networks project is the so-called energy hub. An energy hub is considered as a unit where multiple energy carriers can be converted, conditioned, and stored. It represents an interface between different energy infrastructures and/or loads. Energy hubs consume power at their input ports connected to e.g. electricity and natural gas infrastructures, and provide certain required energy services such as electricity, heating, cooling, compressed air, etc. at the output ports. Within the hub, energy is converted and conditioned using e.g. combined heat and power technology, transformers, power-electronic devices, compressors, heat exchangers, and other equipment. The components within the hub may establish redundant connections between inputs and outputs.
- Minimum number of modules required to so that a trainer could be awarded the “nZEB trainer” certificate:
 - Minimum number of modules required: Four modules
 - Core (mandatory) modules: 1 “Basic module development” and 2 “Advanced module development”
- Minimum number of modules required to so that a professional could be awarded the “nZEB designer” certificate:
 - Minimum combination of 4 modules
 - Core (mandatory) modules: 1 “Basic module development” and 2 “Advanced module development”
- Modules by professional area:
 - Engineers: 1, 2, 3, 6, 7, 8
 - Architects: 1, 2, 3, 5, 6, 8
 - Municipality employees: 1, 5, 8, 9, 10
 - Decision makers: 1, 2, 5, 8, and 10

MEETING ATTENDANCE LIST

Intelligent Energy – Europe (IEE)

Full title of the project: nZEB training in the Southern EU countries – Maintaining building traditions

Acronym of the project: SouthZEB

First design meeting in Greece

WP2-Task 2.1

Venue: KEK EUROTRAINING, Address: Veranzerou 1, Athens

Date: 10th June 2014

Time: 11:00 am

Participants list

No.	Name	Surname	Expertise	Telephone	e-mail	Signature
1	NIKOS	KALAITZAKIS	MECH. AND AERO. ENG.	210-969443	j.kalaitzak@upatol.gr	
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10						
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Annex D – SouthZEB, 1st Design Meeting in Cyprus (Minutes of Meeting)**1ST DESIGN MEETING IN CYPRUS - CUT****WP2-Task 2.1****Venue:** Scientific & Technical Chamber Cyprus Headquarters, 8 Cerberus Street, 1016 Nicosia, Cyprus**Date:** 4th June 2014**PARTICIPANTS**

Christodoulos Hadjiodyseos – Director of the Technical & Scientific Chamber of Cyprus
Dinos Nicolaides – Representative of Cyprus Mechanical Engineers Association
Panayiotis Panayi – Representative of Architecture Engineers Association
Anna Iacovou – Representative of Architecture Engineers Association
Kyriakos Mavrikios – Representative of Architecture/Town Planners Association
George Demetriou – Representative of Civil Engineers Association
Damianos Kleanthous – GARnet Energy Savings Ltd
Polyvios Eleftheriou – Cyprus University of Technology
Flouris Xenii – Cyprus University of Technology

MEETING MINUTES

Representatives from almost every association of engineers involved in the design/construction of buildings attended the 1st design meeting in Cyprus, held at the headquarters of the Scientific & Technical Chamber of Cyprus. Dr. Polyvios Eleftheriou made a small presentation regarding the SouthZEB project overall, as well as the proposed training modules in particular.

The 10 training modules proposed in the project's contract were presented in detail and in addition Dr. Eleftheriou explained to the participants the necessity of their feedback in order for the training modules to be fully adapted to cover the needs of the Cyprus local community of engineers, municipality employees and policy makers.

A written brief description of each training module was handed over to the participants accompanied with a list of questions regarding their views and opinion over the project outcome.

A fruitful discussion took place with the participants expressing their concerns over some minor details regarding the persons participating in the training modules and their level of education and expertise regarding nZEB buildings, points to be addressed over the training modules, etc. However, all participants stated that their view on the project is very positive and committed themselves in transferring today's discussion and the SouthZEB project details to their colleagues (each at the association which they represent) and come back with more feedback regarding the material to be used in the training modules.

Furthermore, the participants committed themselves in completing the questions form that was handed out to them (and also distributing it amongst the members of their association) and return it within a two weeks' time from the date of the meeting.

The meeting closed with the participants stating their positive attitude towards the SouthZEB project and each one committed to attend a follow up design meeting to further elaborate their input towards the organizing of the training modules and the material to be included.

MEETING ATTENDANCE LIST

Intelligent Energy – Europe (IEE)

(nZEB training in the Southern EU countries – Maintaining building traditions)

First Design Meeting

Wed June 4, 2014

Cyprus Scientific Technical Chamber

11-12.30

	Last Name	First Name	Specialization	Phone	e-mail
1	Ioannides	Dimitris	Mechanical Eng.	99603630	ndimitris@technet.com.cy
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4	Eleftherios	Dimitrios	Electrical Eng.	99463344	dimitrios@ener-group.com
5	Xeni	Florentia	Arch. Eng.	25002897	Florentia.Xeni@cellsc.com.cy
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9	Eleftherios	Polyvios	Arch. Eng.	9961891	polyvios.eleftherios@cellsc.com
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Annex E – SouthZEB, 2nd Design Meeting in Cyprus (Minutes of Meeting)**2nd Design Meeting in Cyprus - CUT****WP2-Task 2.1****Venue:** Scientific & Technical Chamber Cyprus Headquarters, 8 Cerberus Street, 1016 Nicosia, Cyprus**Date:** July 3rd, 2014**PARTICIPANTS**

Dinos Nicolaides – Representative of The Cyprus Mechanical Engineers Association
Anna Iacovou – Representative of The Architecture Engineers Association
Kyriakos Mavrikios – Representative of The Architecture/Town Planners Association
George Demetriou – Representative of The Civil Engineers Association
Damianos Kleanthous – GARnet Energy Savings Ltd
Polyvios Eleftheriou – Cyprus University of Technology
Flouris Xenii – Cyprus University of Technology

MEETING MINUTES

The Cypriot 2nd design meeting has concluded to the following:

1. There should be two large training modules at the start. These modules should be refreshing of the material and cover the basics of the theory. These two modules should be prerequisites for the subsequent modules and especially the one having to do with the "Construction Management and field Supervision" training module (present 9th module),
2. There should be advanced specializing courses for engineers of particular specialty, the idea is to have two common modules for all the engineering disciplines and special advanced modules for the various disciplines,
3. With the current system of building code and the future trends, there is no need to train engineers from the municipalities, and
4. The seminars/modules should be spread over a period allowing time for work (offered possibly only in the afternoons).

In Detail

1. The first seminar should last longer; cover the needs, the legislation, directives, international norms, technical material such as losses, new and traditional building materials, energy and related terms, renewables, management systems, introduction to economics of energy savings, etc.
2. The second seminar should be a follow-up of the first, covering more advance material, but the seminar should be general covering the material without the need of calculations and specialties. Advance calculations and training should be left for a later stage and for the interested professionals. This module could also accommodate automation for energy savings as suggested by Stefanos).
3. The two courses on thermal bridges are not required and some of this material should be covered in module 4. The idea proposed by the Portuguese partners' proposal, in substituting this material with thermal comfort, is welcomed.

4. The fifth module on the architectural regulations is very well known to the architects and should be addressed to other disciplines if needed. This should be of lesser duration and for the purpose of giving the rest of the disciplines the general idea of the regulations and their application.
5. The 6th module on the simulations and the introduction of popular software tools is of particular interest. This should include a number of different software programs, their use, their capabilities and advantages. The number of hours for this module should be around 20.
6. The 7th module on energy should be of 20 hours and should be very targeting of the material. The module should also cover economics of near zero energy buildings, automation and other forms of energy savings as well as their applications to real examples.
7. There is a need to add material on the evaluation of the existing situation in the 8th module. There is a great chance that re-modeling and/or re-furbishing of a building to near zero will demand expenses that do not worth the trouble of doing. This element is very crucial and should be added to the module material.
8. There should be a reduction in the numbers of allocated hours in the 9th module. The module should have a prerequisite the two introductory ones and should be of 10 to 20 hours. This module could also accommodate the last (10th module) on the various governmental and/or European schemes and other financial opportunities to move into near zero.

In summary, the Cypriot 2nd design meeting suggests the following modules (new numbering):

1. Two introductory modules of 30-40 hours each covering the general theoretical material (losses, new and traditional building materials, energy and related terms, thermal bridges, renewables, management systems, automations introduction to economics of energy savings) along with the legislation/directives on near zero. These two modules should be attended by all disciples and are prerequisites for some of the subsequent modules,
2. A third module covering thermal comfort (as described by our Portuguese partners). The module should be of 20-30 hours duration and could be attended by all engineering disciplines,
3. A 20-hour 4th module on the available and most popular software programs/tools,
4. A 20-hour 5th module on energy. The module should include energy generation mechanisms, renewables and practices, distribution, and economics of near zero energy buildings,
5. In cases of re-furbishing/remodeling/repairing the material proposed for the 6th module is not sufficient. There is a need to add material on the evaluation of the existing situation. This element is very crucial and should be added to the module material. The module should also include architectural regulations on a variety of buildings. The time allocation for this module is rather difficult to establish as this depends largely on the details to be discussed, and
6. There should be a reduction in the numbers of allocated hours in the last (7th) module. The module should have a prerequisite the two introductory ones, and should last around 10 to 20 hours. The module should include the various governmental and/or European schemes and other financial opportunities to move towards near zero.

MEETING ATTENDANCE LIST



Intelligent Energy Europe (IEE)
(nZEB training in the Southern EU Countries – Maintaining Building Traditions)

2nd Design Meeting
Wed July 02, 2014
Cyprus Scientific Technical Chamber headquarters
17:30 – 19:00

	Last Name	First Name	Specialization	Phone Number	e-mail	Signature
1	Demetriou	Giorgos	Civil Engineer	99538564	gdemetriou@cytanet.com.cy	
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4	Iacovou – Galazi	Anna	Architect Engineer	99417928	agiakovou@cytanet.com.cy	
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7	Nicolaidis	Dinos	Mechanical Engineer	99607670	ndinos@cytanet.com.cy	
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Annex F – SouthZEB, 1st Design Meeting in Italy (Minutes of Meeting)

1st Design Meeting in Italy

Venue: Habitech DTTN

Date: 17th of June 2014

Participants

ESCO Primiero srl - Luigi Boso

P.A.T (Provincia Autonoma di Trento) - Giacomo Carlino

Studio di progettazione Rwa, Architetti Wolf - Ruffo Wolf

Ecodomo Societa' Cooperativa - Remo Zanella

Tosi Serramenti - Flavio Tosi

Paterno Group - Franco Paterno

HABITECH - Distretto Tecnologico Trentino scarl - Elia Visetti, Francesco Cattaneo, Thomas Miorin

Market Analysis

In the northern part of Italy problems related to energy costs are perceived as less urgent; nevertheless, from a cultural perspective the north is more sensible and prone than the south to implement energy saving and sustainable measures.

Another element worth mentioning refers specifically to the Real Estate market; In the northern regions there is an increasing demand for sustainable/green solutions within the building industry.

As a consequence the supply side is responding and has grown, also as to what concern the skills and the expertise (ex: building with wood, new green materials and products, new construction techniques etc...). In this context the south still lacks behind and does not show such interest both at the supply (required competences) and at the demand level (trust and will towards the market), creating a market that is less prone to change, innovation and energy efficiency.

Market Analysis – Regional Targets

The main distinction shall be done on the base of the climatic differences; in fact in general those regions that are characterized by a warmer and tempered climate do present the biggest deficiencies.

In this context the region Lazio can be considered as a border area; going southern it is in fact quite marked the increasing gap (cultural and technical).

Sardinia makes an exception. The region is growing as the local market and there is a higher sensibility towards NZEBs and the saving of energy.

Normative Issues

The issue related to the existing norms shall be addressed as a fundamental step for the diffusion of NZEBs and the development of the market. At first it seems crucial to simplify the regulatory framework which is highly fragmented and changes from region to region (see also the report on EPBD/RED implementation in Italy).

It would be important to stimulate the introduction of a Ministerial Decree to reduce this differences and promote a clear set of commonly accepted principles in order to facilitate the work of the industry on the whole national territory and to bring trust and information to the demand side.

To do so it seems clear that, also in the context of the training courses, a stimulation of the regional authorities and the public local administration shall be considered.


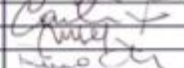
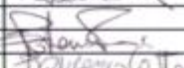
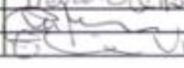





Trainings

In general the trainings shall cover a deficit in technical competences that is registered among the most market operators. These are for example entrepreneurs, specialized industries, architects, engineers and technicians. Also the public administration shall be addressed.

Another element that arose is the need to show National and eventually international best practice successful stories, coherent with the organized trainings.

Moreover, in order to ensure the most participation to the trainings it would be important to obtain the recognition of the CPD (Continuous Professional Development) credits from the National professional orders.

MEETING ATTENDANCE LIST

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Annex G –Description of the revised Training modules

Based on the joint assessment of the design meetings a total of ten revised training modules have been proposed and are presented in this Annex. It should be noted that this is the same number of training modules as presented within the description of work. In reality the training modules remain substantially the same as the description of work, but those that are new or substantially revised are identified.

In this section for each training module a description, the duration and target audience, and the topics to be covered are given. The proposed topics have been provided from the design meetings held in each target country, but they will be progressed further within the training module development phase in WP3.

a. Training Module 1: nZEB Basic module

This module has not been changed from the Description of Work (2.1).

The module will be developed by CUT.

i. Module 1 description

The basic module will present the South nZEB concept and the principles of a near zero energy construction: applied physics basics, thermal insulation, materials and construction. Furthermore, the basic module will present the requirement for the minimum percentage of renewable energy sources of nearly Zero-Energy Buildings (nZEB), according to existing EU definitions, standards and roadmaps (such as the Energy Performance of Buildings Directive-EPBD). Active renewable energy supply systems will be presented such as solar systems, PV systems, heat pumps solutions, biomass solutions, pellet boilers etc.. It will be divided in sub-modules, according to the abovementioned categories.

ii. Duration and target audience

The duration of this module is estimated as 20 hours.

The module will be addressed mainly to engineers and architects.

iii. Proposed topics in Module 1

Topics proposed by the Focus Groups were as follows:

- User Acceptance of Technical Solutions of nZEB;
- Building Technical systems (active) – Cost optimal solutions for each target country;
- Renewable energy – Different possibilities according to the buildings needs and availability of this resource;
- Building Regulations and other relevant documentation
- Status-quo of existing national definitions for nearly Zero Energy Buildings;
- Greek nZEB national criteria do not exist yet, curriculum should be proportionally adjusted, so as trainees could implement Greek directives once these are published.
- District Heating (or Teleheating) techniques.

b. Training Module 2: nZEB Advanced module

This module has not been changed from the Description of Work (2.2).

The module will be developed by DTTN.

i. Module 2 description

The advanced module will elaborate further on various arguments of nZEB design and building, including technical physics with respect to humidity, building materials, construction techniques, measurement techniques, installation and maintenance, ventilation and use of renewable energy sources. The passive use of renewable energy, e.g. passive solar gains, will be presented. The module will include a practical workshop for the trainees. This practical workshop will provide hands on experience to the trainees on how to use renewable energy sources in the nZEB design and building.

ii. Duration and target audience

The estimated duration of the training is 40 hours.

The module will be addressed mainly to engineers and architects.

iii. Proposed topics in Module 2

Topics proposed for inclusion by the Focus Groups were as follows:

- Principles of Bioclimatic Design and Bioclimatic Architecture, Building design (passive);
- Passive systems for heating-cooling and lighting (Passive Solar Heating Systems, Passive (Natural) Cooling Systems and Techniques, Systems and Techniques for Natural Lighting).

c. Training Module 3: Thermal bridging module

This proposed module combines two modules from the Description of Work (2.3 and 2.4).

The module will be developed by BRE.

i. Module 3 description

This module will focus on the evaluation and calculation of thermal bridges, through practical exercises. It will include sub-modules on the definition of thermal bridges, thermal losses through bridging, isothermal curves, surface temperatures, humidity, active directives and regulations. Calculation of surface temperature and the linear thermal bridging of various points will be included. The module will include a practical workshop for the trainees.

ii. Duration and target audience

The estimated duration of the training is 20 hours.

The module will be addressed mainly to engineers and architects.

iii. Proposed topics in Module 3

The proposed topics from the Focus Group were as follows:

- The training modules 3 and 4 can be unified in a single training module.

d. Training Module 4: Thermal Comfort

This module is new and has been proposed after focus groups in Portugal and Greece.

The module will be developed by UMinho.

i. Module 4 description

This module is focused on the thermal environment of buildings. It will define thermal comfort for a human body and how to model it. It will explain factors and values that form the perception of thermal comfort. A significant part of the module will be devoted to different ways of thermal comfort assessment according to valid standards. It gives optimal value ranges for thermal comfort depending on the level (category) of the requirements of the space. It will consider also the users' expectations, adaptation and adaptive models of thermal comfort on resultant acceptable range of temperatures, its role in applicable standards and its effect on energy performance.

ii. Duration and target audience

The estimated duration of the training is 20 hours.

The module will be addressed mainly to engineers and architects.

iii. Proposed topics in Module 4

No specific topics were proposed by the focus groups, other than those set out in the description.

e. Training Module 5: SouthZEB framework module and local architectural regulations

This module has not been changed from the Description of Work (2.5).

The module will be developed by BRE.

i. Module 5 description

This module will aim at presenting to architects, engineers and municipality employees the SouthZEB approach for the verification and certification of nZEB in the target countries. Emphasis will be given on the special provision that SouthZEB has for building traditions and local architectural regulations as well as the user acceptance of technical solutions to nZEB. This module will be based on different training material for each target country, following though the common framework and directions.

ii. Duration and target audience

The estimated training duration is 30 hours.

It is addressing the needs of engineers, architects and municipality employees.

iii. Proposed topics in Module 5

Topics proposed by the Focus Groups for inclusion were as follows:

- How nZEB implementation could overcome obstacles posed by particularities such as apartment blocks, traditional settlements, islands and listed buildings.

f. Training Module 6: nZEB simulation and design software module

This module has not been changed from the Description of Work (2.6), but an expanded description has been provided.

The module will be developed by IST-ID.

i. Module 6 description

This module will present to the participants the best simulation tools for the design of nZEB and energy efficient buildings. Engineering design tools for nZEB will also be presented by the partners from the front runner countries and especially BRE and DTTN. The module will include a practical workshop for the trainees.

Building energy simulation tools provide the ability to consider energy efficiency measures in buildings by predicting their behaviour under given climatic conditions and usage patterns. These tools help to predict building energy consumption and give the opportunity to compare different design options.

Decisions on the use of envelope insulation, advanced glazing, natural ventilation, passive solutions, high performance HVAC systems among many others can be taken with high confidence level. Energy conservation measures and concepts are important in economic terms for nZEB, as it reduces energy use without installing additional energy production systems. In order to identify the most effective conservation strategies, energy simulation tools are critical to identify and analyse the most efficient solutions.

By combining annual energy simulations with a life-cycle cost analysis, it is possible to answer design questions such as “is it cheaper to replace the lighting system than to add more PV?” or “Is this passive solution more cost effective than additional insulation?”

At the end of this training module the participants will have the capability to evaluate several design options with a building simulation tool and by that define the set of technical solutions more suitable to achieve nZEB. This training course focuses on improving the skills and knowledge required for carrying out energy simulations. Some questions will be answered through exercises, namely:

- How much detail is required to perform an energy modeling?
- What type of information is necessary?
- How to consider the envelope and building systems?
- How to consider the impacts of lighting, internal loads, occupancy and schedules on energy consumption?
- How to analyze simulation results and propose energy conservation measures (ECMs)?

ii. Duration and target audience

The estimated duration of the training is 30 hours.

The module will be addressed mainly to engineers, architects and other building technicians.

iii. Proposed topics in Module 6

Topics proposed by the focus groups for inclusion were as follows:

- Introduction to energy building simulation software;
- Importing building geometry and characteristics;
- Program and simulation options;

- Model inputs and output results;
- Existing accurate simulation models representing the building structure and the subsystems should be included in this module together with a comprehensive comparative review of existing simulation tools.

g. Training Module 7: Low carbon technology and automation for nZEB

This module description has been revised and expanded from the Description of Work (2.7).

The module will be developed by BRE.

i. Module 7 description

This module will train architects and engineers in learning the technologies of the various sub-systems and installations as well as their cost and effectiveness. As in all modules, emphasis is paid to the technologies most suitable for the target countries. The module will include building automation and its contribution to the integration and support of low carbon technology and nZEBs. Design and dimensioning issues will also be addressed. Additionally, the financial performance of the energy efficiency measures on nearly zero-energy buildings will be presented. These costs will include installation, maintenance and operating costs as well as earnings from energy produced and disposal costs (if applicable). The global cost calculation method, which is described in EN 15459: Energy performance of buildings – economic evaluation procedure for energy systems in buildings, will also be presented to the trainees.

ii. Duration and target audience

The estimated duration of the training is 20 hours.

The module will be addressed mainly to engineers, architects and other building technicians.

iii. Proposed topics in Module 7

Topics proposed by the Focus Groups for inclusion were as follows:

- Cost optimality of nZEB technical solutions;
- The use of “intelligent” energy management, i.e., advanced sensors, energy control (zone heating and cooling) and monitoring systems;
- The management on the supply side, which involves optimization techniques of the energy produced, e.g. use of maximum power point tracking system for photovoltaics and wind generators, energy storage management or feeding the extra energy produced to the grid;
- Energy storage technologies;
- Potential role of wireless communication in NZEB;
- Building optimization and control methodologies for NZEB;
- Energy Hubs.

h. Training Module 8: Retrofitting towards nZEB

This module has not been changed from the Description of Work (2.8).

The module will be developed by UMinho.

i. Module 8 description

The aim of this training module will be to educate all interested parties in the way to address the existing building stock and its possibilities for transformation 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 retrofit technical solutions.

ii. Duration and target audience

This training module is addressed to the needs of engineers, architects and municipality employees.

The estimated duration of the training is 40 hours.

iii. Proposed topics in Module 8

Topics proposed by the Focus Groups for inclusion were as follows:

- Existing buildings – How to incorporate adaptive thermal comfort concepts, user acceptance of technical solutions for nZEB, cost optimality of nZEB technical solutions; building regulations, passive and active building systems and renewable energy systems into existing buildings in order to become nZEB;
- Definition of nZEB renovation;
- Design framework for achieving nZEB in existing buildings;
- Criteria to track nZEB housing renovation;
- Examples of highly efficient refurbished houses should be included in this training module;
- nZEB list of renovated houses in each partner country should be presented.

i. Training Module 9: Construction management and field supervision of nZEB

This module has not been changed from the Description of Work (3.1).

The module will be developed by GARNET.

i. Module 9 description

The aim of the training module will be to train the participants in construction management and field supervision according to the latest construction standards for nZEB. A Greek company with significant expertise in the area of sustainable building construction management and energy will also be subcontracted by UPATRAS to assist in the development of this module. Techniques will also be transferred from the participating front runners and especially BME.

ii. Duration and target audience

The training module is directed towards the needs of professionals from the construction sector, aiming to gather extensive knowledge on construction standards for nZEB.

The estimated duration of the training is 40 hours.

iii. Proposed topics in Module 9

No further topics were proposed by the focus groups.

j. Training Module 10: Preparation of funding schemes and other incentives for nZEB

This module has not been changed from the Description of Work (3.2).

The module will be developed by BRE.

i. Module 10 description

This training module is aimed at local and national authorities' representatives that will participate in the corresponding sessions. It will include policy and legislation issues, financing energy efficiency retrofitting issues, citizens' engagement issues and nZEB successful practices issues. The associated partners will be engaged in the development of this module. The aim is to make sure that the decision makers that will follow the course will be able to design new funding/promotion schemes for nZEB for the South European participating countries (EL, CY, PT, IT).

ii. Duration and target audience

This training module addresses the needs of professionals from municipalities, local or national energy authorities, working on the development of development policy and funding mechanisms for nZEB buildings.

The estimated duration of the training is 20 hours.

iii. Proposed topics in Module 10

No further topics were proposed by the Focus Groups.