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Training programs for professional and pedagogic training of trainers

Deliverable 3.2 of the

TRAIN-TO-NZEB project, financed under grant agreement No 649810 of HORIZON 2020 Programme of the EU

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1. Training programmes provided by project partners

1.1. 5-day Train-the-Trainer course provided by PHA



PASSIVE HOUSE & RENEWABLE ENERGY SYSTEMS

Daily Structure

8.30-10.00	Classroom
10.15-11.15	Break
11.15-12.45	Classroom
12.45-1.30	Lunch

DAY 1 PH Theory and Practical

8.30- 9.00	Induction, Introduction as group and overview of training
9.00- 10.00	Unit 1: Summary of Passive House bases and overview of PHPP
10.00- 10.15	Break
10.15- 11.45	Insulation , including Lamda and U-values and materials demo
11.45- 12.45	Unit 2: Thermal (and repeating) thermal bridging
12.45-1.30	Lunch
1.30- 2.30	Introduction to and tour of Building Workshop, model description
2.30-3.45	Model sketching by Trainees and description / critique

DAY 2 PH Theory and Practical

8.30- 9.30	Increased airtightness and site examples
9.30- 10.00	Airtightness equipment and testing
10.00- 10.15	Break
10.15- 11.15	Passive House windows and doors, including U-value calculation demo
11.15-12.45	Mechanical ventilation
12.45-1.30	Lunch
1.30- 4.30	Practical – Passive House construction using different practice models

DAY 3 PH Theory and Practical + RES Theory and Practical

8.30- 10.00	Mechanical ventilation flow calc. demo + cooling and dehumidification system
10.00- 10.15	Break
10.15- 11.45	Practical: introduction to and demo of mechanical ventilation systems
11.45- 12.45	Demonstration of airtightness construction and testing
12.45-1.30	Lunch
1.30- 2.45	RES: Introduction to and theory of photovoltaic and solar thermal systems
2.45-4.30	RES Practical demonstration of photovoltaic systems

DAY 4 PH Theory and Practical + RES Theory and Practical

8.30- 9.15	Passive House Quality Assurance and Certification
9.15- 10.00	Economics/Energy cost comparison between PH and Normal
10.00- 10.15	Break
10.15- 11.45	Whole-house Passive House design example – Demo
11.45- 12.45	Whole-house Passive House design exercise – Trainees
12.45-1.30	Lunch
1.30- 2.45	RES: Introduction to and theory of wind energy systems
2.45-4.30	RES Practical demonstration of wind energy systems

DAY 5 PH Theory and Practical

8.30- 10.00	Passive House detail design exercise (new build and retrofit) – Trainees
10.00- 10.15	Break
10.15- 11.45	Construction and energy performance of 4 case study retrofits

11.45- 12.45	Practical – Passive House construction using different practice models
12.45-1.30	<i>Lunch</i>
1.30- 4.30	Practical – Passive House construction using different practice models

1.2. 3-day Train-the-Trainer course provided by PHA

Day 1

9.30- 9.45		Induction, Introduction as group and overview of training
9.45-11.00	1	Summary of Passive House bases / demo constructions + calculations of building compactness ratio
11.00- 11.15		<i>Break</i>
11.15- 1.00	2	Insulation , U-values + calculations and materials demo
1.00-2.00		<i>Lunch</i>
2.00- 3.15	3	Lamda and U-values + calculations
3.15-3.45	4	Repeating Thermal Bridging and Thermal Bridging
3.45- 4.15	5	Increased airtightness and site examples

Day 2

9.30- 10.00	6	Airtightness equipment and testing
10.00-10.15		Video
10.15- 11.00	7	Passive House windows and doors, including U-value calculation demo
11.00- 11.15		<i>Break</i>
11.15- 12.00	7	- continuation
12.00-1.00	8:	Mechanical ventilation with heat recovery + Mechanical ventilation flow calc. demo
1.00-2.00		<i>Lunch</i>
2.00- 2.45	9:	Passive House requirements for heating demand
2.45- 3.45	10:	Whole-house Passive House design example/ checklist
3.45-4.15		Whole-house Passive House retrofitting design exercise

Day 3

9.30- 11.00		Whole-house Passive House design exercise
11.00- 11.15		<i>Break</i>
11.15- 12.30		Passive House detail design exercise (new build and retrofit)
12.30- 1.00		Construction and energy performance of 4 case study retrofits
1.00-2.00		<i>Lunch</i>
2.00- 2.45	11:	Passive House Quality Assurance and Certification
2.45- 3.30	12:	Economics/ Energy cost comparison between PH and Normal
3.30- 4.00		Economics/ Energy cost comparison between PH and Normal
4.00- 4.15		Introduction to the examination system of the Passive House Institute

1.3. 2-day Train-the-Trainer course provided by PHA and conducted in the framework of the Train-to-NZEB project

TRADESPERSONS Train-the-Trainer course for Train-to-NZEB

Programme for Second Project Meeting, Dublin

Wednesday 2nd and Thursday 3rd December 2015

DAY 1 Workshop

8.30 - 9.00	Induction and general introduction as group and overview of training
9.00 - 9.45	Introduction to training centre
9.45 - 10.00	<i>Break</i>
10.00 - 11.30	PHA explains and Participants sketch building envelope demonstration models and then describe the envelope re continuity of key energy-related components as examples of integrated construction systems
11.30 - 12.45	Description of mechanical ventilation systems and training, including systems suited to retrofitting and demonstration of materials
12.45 - 1.30	<i>Lunch</i>
1.30 - 2.00	Demonstration of a sample PH design solution
2.00 - 2.30	Overview of retrofit workshops
	<i>Travel to CDETB Training Centre at Ballyfermot</i>
3.00- 4.30	Tour of RES in Ballyfermot training centre re domestic systems: solar hot water, heat pumps, biomass heating and rainwater harvesting as well as pressurisation demonstration in Airtight Room (for new build and retrofitting)
	<i>Travel back from CDETB Training Centre at Ballyfermot</i>
6.00 - 7.00	Presentation / discussion on certification schemes as part of BKH business operation
7.30	<i>Project Dinner</i>

DAY 2 Workshop

8.30 - 9.45	Building envelope practical – hands-on construction techniques using different practice models that pertain to both new build and retrofit projects
9.45 - 10.00	<i>Break</i>
10.00 - 11.45	Building envelope practical: hands-on construction techniques using different practice models that pertain to both new build and retrofit projects
11.45- 12.45	Project meeting 1 in Finglas – ToR and BKH centres
1.00 -2.00	<i>Lunch</i>
2.00- 3.30	RES demo in workshop (some theory included, focusing on wind and PV) systems
	<i>Travel to Metro Hotel – Meeting Room</i>
4.00- 5.30+	Project meeting 2 in Hotel meeting room

1.4. Training course provided by Limerick Institute of Technology under the QualiBuild project (content available for project partners)

MODULE 1: BUILDING FOR ENERGY PERFORMANCE

Unit 1: The Drive to Save Energy 14

Unit 1 Section 1: Energy Policy & Strategy for Low Energy Buildings

1.1 Introduction

1.2 Climate Change and Energy Conservation

1.3 EU Policy related to Energy Performance of Buildings

1.4 Energy Policy in Ireland

Unit 1 Section 2: Energy Use in Buildings

2.1 Introduction

2.2 Ireland's Energy Profile

2.3 Energy Use in Buildings

Unit 2: Energy Use in the Building Sector 56

Unit 2 Section 1: Building Regulations for Energy Performance

1.1 Introduction

1.2 Building Regulations

1.3 Evolution of Part L

1.4 Evolution of Building Regulations Part F – Ventilation

1.5 Impact on onsite work practices

Unit 2 Section 2: Energy Performance of Buildings

2.1 Introduction

2.2 Building Stock and Energy Performance Standards

2.3 Building Energy Rating

2.4 Dwelling Energy Assessment Procedure (DEAP)

Unit 3 Implications of Low Energy Buildings for Skills

Unit 3 Section 1: Further Drivers for Low Energy Buildings

1.1 Introduction

1.2 SEAI Schemes and Supports

1.3 Residential Sector Schemes

1.4 Non-Residential Sector Schemes and Supports

1.5 Implications of SEAI Schemes for Skills of Building Workers

Unit 3 Section 2: Review of Existing VET for Building Workers

2.1 Introduction

2.2 Apprenticeship Training for the Construction Related Trades

2.3 Construction Skills Outside of Formal Apprenticeship

2.4 Training in Energy Efficiency and Renewable Energy in Buildings

2.5 Policy Drivers on Jobs and Skills

MODULE 2: BUILDING FABRIC

Unit 1: Heat Loss in Buildings

Unit 1 Section 1 Modes of Heat Transfer

- 1.1 Introduction
 - 1.2 Laws of Thermodynamics
 - 1.3 Modes of Heat Transfer
 - 1.4 Heat Transfer in Buildings
 - 1.5 Heat Gain in Buildings
- ### Unit 1 Section 2 Air Permeability and Thermal Bridging

- 2.1 Introduction
- 2.2 Ventilation versus Air Infiltration
- 2.3 Air Tight Construction
- 2.4 Thermal Bridging
- 2.5 Principle of continuity of the thermal envelope in a building

Unit 2: Measuring Building Fabric Performance

Unit 2 Section 1 Heat Loss Calculation

- 1.1 Introduction
- 1.2 Measuring Heat Loss
- 1.3 Calculating U-Values
- 1.4 Building Element U-Values for Walls
- 1.5 Building Element U-Values for Floors
- 1.6 Building Element U-Values for Roofs
- 1.7 Building Element U-Values for Windows & Doors
- 1.8 Building Element U-Values for Unheated Spaces
- 1.9 Overall Heat Loss Calculation

Unit 2 Section 2 Measuring Performance with DEAP

- 2.1 Introduction
- 2.2 Ventilation
- 2.3 Floors
- 2.4 Roofs
- 2.5 Walls
- 2.6 Doors and Windows
- 2.7 Heat Loss Results

Unit 3 Insulation Materials and Systems

Unit 3 Section 1 Properties of Insulation Materials

- 1.1 Introduction
- 1.2 Properties of Thermal Insulation
- 1.3 Types of Insulation Materials

Unit 3 Section 2 Common Insulation Systems

- 2.1 Introduction
- 2.2 Insulation of External Walls
- 2.3 Insulation of Ground Floors

2.4 Insulation of Roof Constructions

2.5 Windows & Doors

MODULE 3: BUILDING SERVICES

Unit 1: General Introduction

Unit 1 Section 1 Space Heating

1.1 Introduction

1.2 Energy Use for Space Heating

1.3 Fuel Types for Space Heating

1.4 Primary and Secondary Heating Systems

1.5 Boiler Technology

1.6 System Efficiency

1.7 Space Heating Controls

Unit 1 Section 2 Water Heating

2.1 Introduction

2.2 Energy Use for Water Heating

2.3 Water Heating Systems

2.4 Water Heating System Losses

Unit 1 Section 3 Lighting & Small Power

3.1 Introduction

3.2 Energy Use for Lighting

3.3 Energy Use for Pumps

Unit 2: Renewable Energy Systems

Unit 2 Section 1 Renewable Heating

1.1 Introduction

1.2 Building Regulations

1.3 Solar Thermal Technology

1.4 Heat Pumps

1.5 Biomass Heating

Unit 2 Section 2 Micro-Generation of Electricity

2.1 Introduction

2.2 Solar Photovoltaic (PV)

2.3 Small-Scale Wind Energy Systems

Unit 3 Ventilation Systems

Unit 3 Section 1 Ventilation Design

1.1 Introduction

1.2 Ventilation Strategy

1.3 Traditional forms of ventilation

Unit 3 Section 2 Types of Ventilation Systems

2.1 Introduction

2.2 Natural Ventilation with Intermittent Mechanical Extract

- 2.3 Passive Stack Ventilation (PSV)
- 2.4 Mechanical Extract Ventilation (MEV)
- 2.5 Mechanical Heat Recovery Ventilation (MVHR)
- 2.6 Demand Controlled Ventilation (DCV)
- 2.7 Positive Input Ventilation (PIV)

MODULE 4: PEDAGOGICAL APPROACHES

Unit 1: Learning Theory

Unit 1 Section 1 Models of Learning

- 1.1 Introduction
- 1.2 Learning Theories
- 1.3 Context in Vocational Education and Training

Unit 1 Section 2 Learning Styles

- 2.1 Introduction
- 2.2 Visual, Auditory, Reading and Kinaesthetic (VARK)
- 2.3 Kolb's Experiential Learning Cycle
- 2.4 Multiple Intelligence
- 2.5 Blooms Taxonomy
- 2.6 Conditions of Learning Model
- 2.7 The Curriculum Design Model
- 2.8 Characteristics of Adults as Learners (CAL) model
- 2.9 Outline of Limitations on the Use of Models

Unit 2: Vocational Education Contexts and Settings

Unit 2 Section 1 Vocational Learners

- 1.1 Introduction
- 1.2 Context in Vocational Education
- 1.3 Learner Motivation
- 1.4 Educational Settings
- 1.5 Training for Attitude Change

Unit 2 Section 2 Learning in Groups

- 2.1 Introduction
- 2.2 Group Development
- 2.3 Group Performance
- 2.4 Group dynamics

Unit 3: Teaching and Assessment Methods

Unit 3 Section 1 Content Delivery Methods

- 1.1 Introduction
- 1.2 Physical Learning Environment
- 1.3 Outline of course delivery methods
- 1.4 Training Aids and Materials

Unit 3 Section 2 Assessment Methods

- 2.1 Introduction
- 2.2 Why Assess?
- 2.3 When to Assess?
- 2.4 Principles of Assessment
- 2.5 Assessment strategies and marking criteria
- 2.6 Types of Assessment



Part 1 – Passive House Knowledge	Start	09:00	TTT course Day 1	Start	09:00	TTT course Day 2	Part 2 - Courses		
	End	17:55		End	17:25				
	1.TU	09:00 00:45 09:45	Welcome to the Passive House train the trainer course	10.TU	08:30 00:45 09:15	Information on the Passive House Standard: exam			
	2.TU	09:45 00:45 10:30	Introduction to the Passive House Designer course material (10 days) and to the Train the trainer course.	11.TU	09:15 00:45 10:00	How to teach: How to plan a unit			
	3.TU	10:30 00:45 11:15	Introduction to the Passive House Tradesperson course material (3 days) and the PassREg project.	12.TU	10:00 00:45 10:45	How to teach: Practical tips for planning			
		00:20	Coffee break		00:20	Coffee break			
	4.TU	11:35 00:45 12:20	Knowledge of the Passive House Standard	13.TU	11:05 00:45 11:50	How to teach: Types of slides			
	5.TU	12:20 00:45 13:05	Knowledge of the Passive House Standard	14.TU	11:50 00:45 12:35	How to teach: How to deal with different types of charts			
	Part 2 - Courses	6.TU	13:05 00:45 13:50	Parallel session: Information on the Designer/ Tradesperson course: content and curriculum	15.TU	12:35 00:45 13:20		How to teach: Practical tips for Powerpoint presentations (PPP)	Part 3 - Teaching techniques
			01:30	Lunch break		01:30		Lunch break	
7.TU		15:20 00:45 16:05	Information on the Passive House Standard: course material	16.TU	14:50 00:45 15:35	How to teach: Practical tips for teaching			
8.TU		16:05 00:45 16:50	Information on the Passive House Standard: exercises	17.TU	15:35 00:45 16:20	How to teach: How to handle tricky questions professionally			
		00:20	Coffee break		00:20	Coffee break			
9.TU		17:10 00:45 17:55	Information on the Passive House Standard: exercises with PHPP	18.TU	16:40 00:45 17:25	Evaluation and Goodbye			
TU = Training unit (45min)									

1.6. Framework of the online Train-the-trainer course (technical) offered by Passive House Institute (access granted to participants in the Train-to-NZEB TTT course in Dublin) (www.elearning.passivehouse.com)

1 - PASSIVE HOUSE : Principles, aim and scope

1.1 What is a Passive House

> Review quiz

1.2 Passive House and NZEB

> Review quiz

1.3 Economics, life cycle costs

> Review quiz

Final quiz about the Passive House principles

2 - BASICS : Heat and humidity

2.1 Heat transfer

> Review quiz

2.2 Humidity basics

> Review quiz

2.3 Humidity in the building

> Review quiz

Final quiz about physical basics

3 - BUILDING ENVELOPE : Opaque elements

3.1 Continuous insulation layer

> Review quiz

3.2 Insulation materials

> Review quiz

Final quiz about opaque elements

4 - BUILDING ENVELOPE : Transparent elements

4.1 Passive House windows and installation

> Review quiz

5 - BUILDING ENVELOPE : Thermal bridging

5.1 What is a thermal bridge?

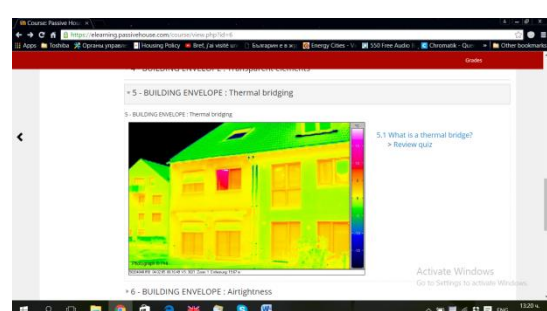
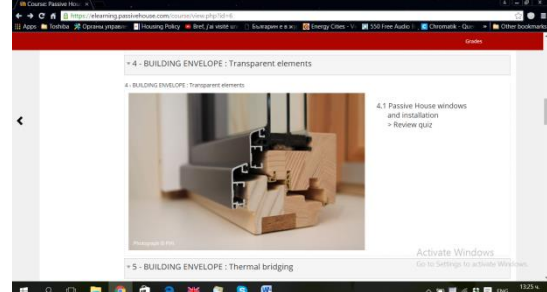
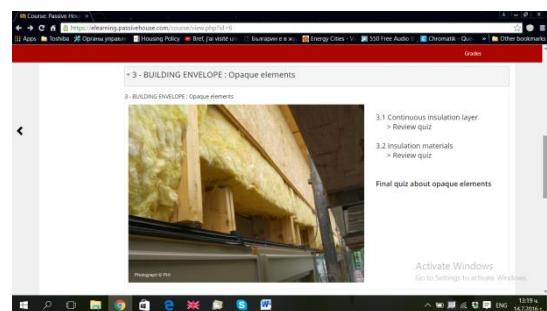
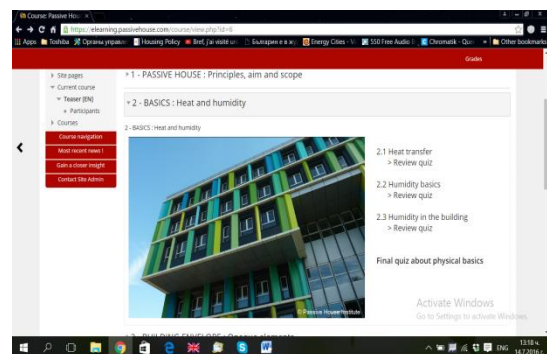
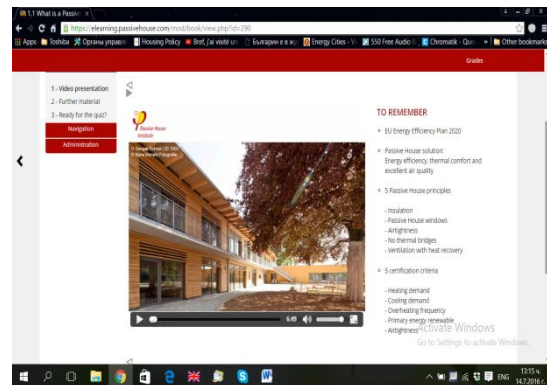
> Review quiz

6 - BUILDING ENVELOPE : Airtightness

6.1 Importance of airtightness

> Review quiz

6.2 Airtightness implementation



basics

> Review quiz

6.3 Airtightness testing basics

> Review quiz

Final quiz about airtightness

7 - TECHNICAL EQUIPMENT : Ventilation

7.1 Why do we need to ventilate

> Review quiz

7.2 Ventilation concepts for a Passive House

> Review quiz

7.3 MVHR anatomy and specifications for certification

> Review quiz

Final quiz about ventilation

8 - TECHNICAL EQUIPMENT : Heating and DHW

8.1 Heat supply for space heating and DHW

> Review quiz

8.2 Heat storage and distribution

> Review quiz

Final quiz about heating

9 - TECHNICAL EQUIPMENT: Cooling

9.1 Passive House in warm conditions

> Review quiz

10 - PHPP

10.1 Energy balancing with PHPP

> Review quiz

10.2 Renewables

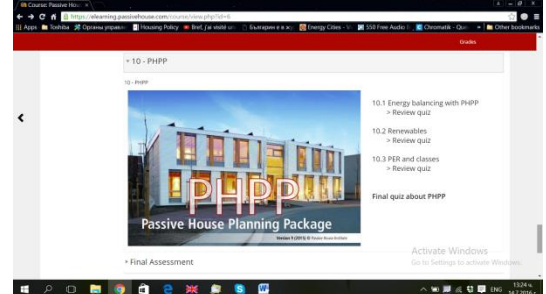
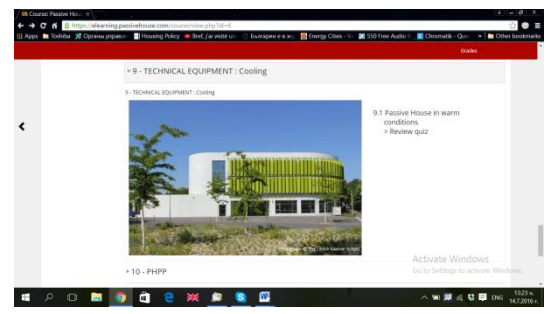
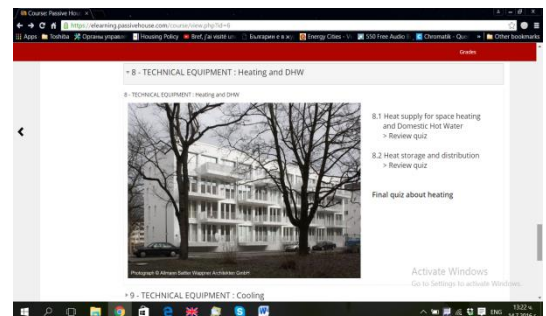
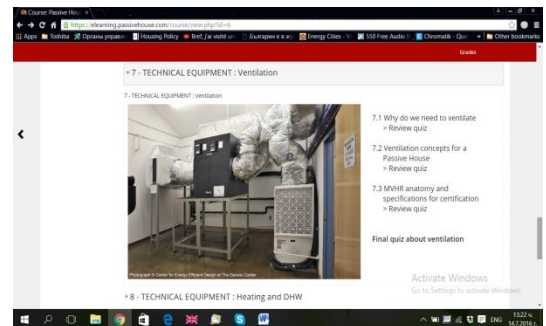
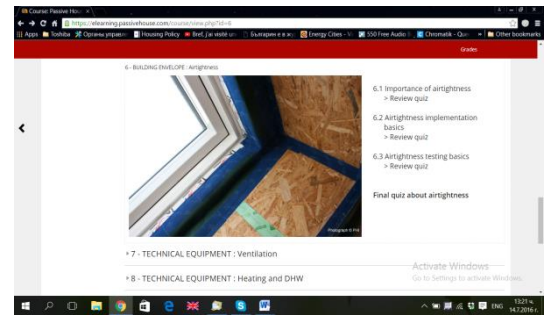
> Review quiz

10.3 PER and classes

> Review quiz

Final quiz about PHPP

FINAL ASSESSMENT



2. Training programmes from other EU-financed projects

Name/Website/partners	Topic	Type of training materials	Notes	Availability / languages
POWERHOUSE resources database http://www.powerhouseeurope.eu/cases_resources/resources/	Energy efficiency and RES in all areas	Case studies, tools, methodologies, guidelines, brochures, booklets, presentations, etc.	A broad database of training materials with well developed search engine allowing selection by multiple categories	Available online EN
EDUCATE http://www.educate-sustainability.eu/home	Environmental Design in University Curricula and Architectural Training in Europe	Frameworks for curriculum development, Results of course and curriculum development, Criteria for professional education, etc	Targeted to architectural training in universities	Available on DropboxEN
PROF/TRAC http://proftrac.eu/open-training-platform-for-nzeb-professionals.html	Training on energy efficiency and RES	A database of training materials developed by EU projects and other sources	A Horizon 2020 project; opportunities for cooperation	Available online EN, etc
nZEB training in the Southern EU countries – Maintaining building traditions (SOUTHZEB) http://www.southzeb.eu/	NZEB trainings for architects, engineers, building technicians and municipal experts	10 training modules: nZEB Basic module, nZEB Advanced module, Thermal bridging, Thermal Comfort, SouthZEB framework module and local architectural regulations, nZEB simulation and design software	No training available for download; possible exchange and cooperation. TTT course on offer. Project certification scheme (2 mandatory + 2 optional lead to “certified NZEB designer”).	Available online – after registration/fee

		module, Low carbon technology and automation for nZEB, Retrofitting towards nZEB, Construction management and field supervision of nZEB, Preparation of funding schemes and other incentives for nZEB		
Training for Rebuilding Europe (TRAINREBUILD) http://www.trainrebuild.eu	Trainings for renovation	Training materials for owners, financiers, municipalities and trainers	Available (.ppt) at http://trainrebuild.eu/project-results	Available on Dropbox EN
Continuous, practice-oriented implementation and dissemination of the EPBD 2002 and energy end-use efficiency and energy services 2006 by training craftsmen and trainers in the construction trade (TRAINENERGY) http://tea.ie/projects/train-energy/	Training for low-energy buildings	Training course consisting of 15 modules / 9 days.	4 video clips in YouTube https://www.youtube.com/user/Trainenergy	Available on Dropbox EN
Quality certification & accreditation for installers of small-scale renewable energy systems (QUALICERT) http://www.qualicert-project.eu/	Trainings for RES installers	Guidebook for installer (EN)		Available on Dropbox
Transferring Open Content on Energy-efficient Buildings www.toceb.eu	Open content learning platform on energy efficiency in buildings	The topics covered are “Energy-efficient building”, “Insulation materials”, “Thermal renovation” and “Façade systems”. http://www.e-genius.at/themenuebersicht	Convenient to use and well-developed pool of training materials, designed for teachers and students in vocational schools	Available online, Austria, the Czech Republic, Italy, Lithuania and Poland
TRAINING TOOLS FOR SUSTAINABLE	Sustainable buildings:	Network of training providers with online platform for	After registration for network members	Available online,

BUILDINGS www.construction-durable.org		creating and delivering courses: The Concept of Sustainability, Renewable Energy, Energy Efficiency, Air Quality, Water management, Materials, Waste,		EN DE GR FR IT RO
NaSaBau - Transfer of innovative curricula of consulting building owners (KOMBAU) in the area of sustainable renovation http://www.nasabau.de	Renovation	2 TTT schedules		
Skills Alliance Energy Saving and Sustainable Construction in Baltic Sea Region www.skills-energy.eu	Innovative training programmes	Module contents and descriptions: Description Curriculum Vocational Training Specialist for Building Insulation Module Map Curriculum Vocational Training Specialist for Building Insulation 1st module content Preparing Object for Insulation 1st module description Preparing Object for Insulation 2nd module contents Preparing surfaces for insulation 2nd module description Preparing surfaces for insulation 3rd module contents	Specific country concepts for the Baltic region Modules for SMEs and TTT Materials of the advanced training for SMEs and Train-the-Trainer: in English: Curriculum Advanced Training for SMEs Energy efficiency Curriculum Advanced Training for SMEs Solar Energy Curriculum Advanced Training for SMEs Waste and Water Management Curriculum Advanced Training for SMEs Energy Efficient Construction Curriculum Advanced Training Train the Trainer Energy Sector	Available on Dropbox Available online EN,DE

		Assembling thermal insulation 3rd module description Assembling thermal insulation 4th module contents Application of finish layers 4th module description Application of finish layers		
Training courses for installers of small-scale renewable energy systems in buildings (INSTALL+RES) http://www.resinstaller.eu/	RES installers in the building sector	Courses on PV, Solar Thermal, Thermal Pumps, Biomass	Free training materials available on request	German, English, Italian, Polish, Slovenian, Bulgarian and Greek
Training of Photovoltaic Installers (PVTRIN) http://www.pvtrin.eu	OV installers	Training course and certification scheme	Textbook and additional materials available only online http://pvcert.gr/en/training_material_f_or_pvtrin_trainees/index.html	Other materials available on Dropbox, BG, EN
ISO 17024:2003 certification: Qualified Construction Worker ISO 17024:2003 www.iso-construct.eu	Validation of competences of unskilled workers in the construction sector applying ISO 17024 standards	Checklists, appraisal sheets, examination programmes, certification schemes, etc.	Qualification level 1 and 2	Available online, EN, DE, SL, FI, ES

3. List of programmes to be used in the BKHs

3.1. Country: Bulgaria

PART 1: ONLINE TRAIN-THE TRAINER COURSE DEVELOPED BY PHI (see 1.6 above): accounting for 28 hours

PART 2: CLASSROOM/DEMO FACILITIES TRAINING: accounting for 12 hours

TRAIN-THE-TRAINER COURSE

PRINCIPLES OF PASSIVE AND NEARLY ZERO ENERGY BUILDINGS

Two-day training course for trainers

	Day 1	
13:30 – 13:45	Opening and introduction	
13:45 – 14:45	1 NATIONAL DEFINITION FOR NEARLY ZERO-ENERGY BUILDING Impact of the new regulations on the design and construction practice. New heat transfer requirements for building components, materials and products	Poster exhibition
14:45 – 15:30	2 WHAT IS THE ESSENCE OF THE PASSIVE BUILDING? Basic principles – situation, building envelope, major building components, MVHR	Video on insulation materials
15:30 – 16:00	Coffee break	
16:00 – 16:45	3 HOW TO DESIGN AND BUILD PASSIVE HOUSES? Thermal bridges, airtightness, economic viability	Video on airtightness in buildings
16:45 – 17:30	4 HOW TO HEAT AND VENTILATE A PASSIVE BUILDING? Comfort of habitation and internal air quality. Centralized and decentralized ventilation systems	Video on ventilation systems

17:30 – 18:00	5 WHAT SHOULD WE KNOW ABOUT RES INSTALLATIONS IN BUILDINGS? Assessment of the potential for installation of small-scale RES solutions in passive buildings: Electricity - autonomous PV systems and mini-wind installation Thermal energy - solar thermal collectors, heat pumps	Announcement of RES course providers
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	DAY 2	
09:00 – 09:15	WHAT ELSE SHOULD WE KNOW ABOUT PASSIVE BUILDINGS? Review of Day 1 and presentation of the agenda for Day 2	
09:15 – 10:00	6 HOW TO RETROFIT EXISTING BUILDINGS ACCORDING TO THE PASSIVE HOUSE STANDARD? The “EnerPHit” standard and the step-by-step renovation approach	Video on EnerPHit retrofit project
10:00 – 10:45	7 PRACTICAL EXERCISE 1. Design of a continuous insulation layer and airtight building envelope and design of a ventilation system according pre-given conditions 2. Evaluation of the potential of a particular building for installation of renewable energy systems	
10:45 – 11:00	Coffee break	
10:30 – 11:15	8 EU POLICIES AND PRACTICES ON ENERGY EFFICIENCY IN BUILDINGS “Passive” regions and best practice cases	
11:15 – 11:45	9 WHAT SHOULD WE AIM FOR? Unlimited scope for the introduction of passive buildings. What was demonstrated by the winners of the second International Passive House Awards?	Review of the awarded projects
11:45 – 12:30	10 WHAT ELSE COULD WE DO TOGETHER? Presentation of the plans and activities of the	Promotional video of the Brussels-based PH association PMP (optional)

	Centre of Excellence on Energy Efficiency and RES in Buildings	
12:30 – 13.00	Discussion	
13:00-14.00	Lunch	
14.00-16.00	11-12 REVIEW AND EXERCISE ON THE DEMONSTRATION FACILITIES Drawings and explanation of the principles presented on the construction models and hands-on exercises on the practice walls	Multimedia 3D building/component models shown

4.2 Country: Romania

In Romania the pedagogical competences for trainers participating in the Train-to-nZEB programs can be proved by a trainer certificate (obtained for the 242401 position/occupation in the Nomenclature of Occupations in Romania in an authorized training program according to the Ordinance no 129/2000 on adult training). Also, if the person acting as trainer has a proven specific pedagogical background in adult learning methodologies (e.g. teacher in professional school), then no further pedagogical training is required to enable the participation in Train-to-nZEB courses in Romania.

Additionally, a special module for pedagogical training for adult learning was developed in order to facilitate the participation of high level specialists / professionals as trainers in the programs organized under the Romanian BKH.

The Train the trainers (TTT) Pedagogical module (**¹) is part of the Train the trainers Package to be implemented to construction workers, specialists and other categories of stakeholders in relation with nZEB concept implementation in Romania.

The content of the TTT (pedagogical) module is summarized as follows:

1. Section A: Basic notions

1.1. Basic notions of learning theories

1.2 About vocational education and training (Vocational and educational training - VET)

This section is about basic notions of vocational education and training methodologies for adult learning. The roles and competences of the trainer, part of the Train the Trainer (TTT) module course will be analyzed.

Items to be presented in Section 1:

• More details

** temporary name

- Role of the trainer,
- Classic learning vs. vocational learning,
- Experiential learning cycle (Kolb),
- Learning styles,
- Experiential cone (classification of learning levels)²

2. Section B: Group dynamics

- 2.1. Learning in groups,
- 2.2. Steps in developing groups,
- 2.3. Roles in groups.,
- 2.4. Group dynamics and performances. Group management.

In this section a group/team will be defined.

Group learning and building the group potential is an important learning technique for ensuring pro-active participation and peer-to peer learning.

We will present The Tuckman's (1) theory about groups' development in 5 steps: Group forming, Storming, Norming, Performing, and Transforming/Closing.

We will discuss about the management principles of groups (size of groups. Splitting groups, location set of materials available etc.) and methodologies used by trainers to eliminate the problems that might occur in groups.

We will present the stages of group performance model (³2): Orientation, Trust Building, Goal clarification, Commitment, Implementation, High performance, Renewal.

Training strategies for conflict solving in groups will be an important item to be treated in this chapter (typologies of group members, where the conflict starts, types of conflicts, strategies to manage the conflicts).

3. Section C: Management of training process

- 3.1. Assessment of training needs,
- 3.2. Design and development of training programme,
- 3.3. Implementing the training programme,
- 3.4 Monitoring and evaluation of training programme,

² Bruce Tuckman, Developmental sequence in small groups, Psychological Bulletin, 1965

³ Drexler and all. (2009)

3. Section C: Management of training process

There are 4 steps in management of training process:

- Training needs assessment
- Design and development of training process
- Implementation of training
- Monitoring and process evaluation

All methodologies should follow the 5 principles, no matter the type or moment of assessment:

- Validity (to measure what is really needed)
- Reliability (data should be accurate and valid)
- Fairness (equal opportunity for all participants in the process)
- Transparency
- Practicality (to take care about costs and time consumption)

In this section we will present the *training needs assessment (TNA)*, as part of the assessment methodologies available for the construction sector.

Design of the training process will include discussions about: development of training goals, set up the course structure, agenda of training sessions, selection of methodologies of training, adaptation of practical situations in nZEB sector, creation of all course supports like manuals, PPT presentations, movies, disks, questionnaires etc.

Implementation of the training should focus on *impact* on the group.

We also need to create an evaluation system for the module /course. We will discuss about direct feedback from participants, "end of the day" conclusions, interim reporting etc.

ROMANIA

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4.3 Country: Czech Republic

APPROACH TO THE TRAINING THE TRAINERS

To achieve targeted numbers of trainees within the project duration there is a necessity to involve top quality trainers in the project. The trainers should have a large experience in the field of the training and very good reputation.

Such trainers are typically recruited from the academic sphere and provide their own trainings for various companies and centres. Only highly respected trainers can achieve high attendance of the courses and repetition of the courses in a short time (increasing absorption capacity).

It is very difficult for the individual trainers to update regularly their lectures and trainings and to cover all trends in the market, legislation and technology. Support in this field through delivery of the trainings from the Train-to-nZEB project will be definitely welcomed by the trainers.

The key target in this field is to establish effective network of active trainers for intensive information exchange. It should increase the number of courses related to the nZEB buildings in the Czech Republic.

PART 1: CONTACTING THE POTENTIAL TRAINERS

Within the first phase there were contacted first trainers (front runners). The project Train-to-nZEB was personally introduced and they agreed with their collaboration in customisation, localisation and leading the courses. The number of trainers should gradually increase within the time frame of the project.

PART 2: CREATION OF THE NETWORK

Based on materials from <http://www.qualibuild.ie/> and materials developed by the project partners, there will be provided common meeting of the trainers. This one day meeting will include following activities:

- Introduction of the project;
- Pedagogical training;
- Technical training.

After the first meeting, the trainers will keep in touch within the network and will be regularly invited to get new information delivered by the project. The training will be conducted by SEVEN and the best selected national trainers.

The TTT CZ list was established according to the trainers involvement into trainings provided in CZ. Trainers will be sorted by region and field of qualifications. A possible list of other criteria (background of each individual, attitude, skills, commitment, etc.) can be taken in consideration. Prague and Ostrava are among the 3 regions where TTT courses will be launched.

It is estimated that around 20 trainers will be enough to provide trainings in CZ at the moment (initial group is smaller; the meeting date is depending on the capacity of the local nZEB training centre and

availability of trainers). Search for other formats of courses (video manuals) could be useful for attraction of potential trainees.

PART 3: INFORMATION TRANSFER

Via newsletters, email conference and Dropbox storage the trainers will get the approach to latest programmes adopted by the consortium and they will implement it to their courses.

4.4. Country: Turkey

Training of Trainers Program in EGE-CE BKH Turkey

The objective of the Training of Trainers Program is to create a critical mass of trainers in Turkey who have the basic knowledge, skills and experience about training modules in ‘nZEB Training the Trainees course’ to provide preliminary assistance to trainers.

The participants in the Training of Trainers course have detailed knowledge about proposed training modules in Training of Trainees course (Table 1). Trainers were selected after a preliminary screening process, and majority of candidates were from academic staff employed in departments such as architecture and engineering (Table 2). Most of the trainers has a Ph.D. degree and inevitably they have a pedagogical formation.

Table 1. Content of proposed training modules for Training of Trainees course

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
nZEB Basic	nZEB Advanced	Retrofitting towards nZEB	nZEB Simulation	Preparation of funding schemes	Automation in buildings
Definition of nZEB	Energy-use in buildings	Definition of nZEB renovation	Introduction to energy building simulation	Financial opportunities and funding programmes in Turkey	The major components in a Building automation systems
Awareness of current energy efficiency standards and legislation	District-heating	Energy audit techniques in existing buildings	Current simulation software	•	Monitoring systems
Heat transfer mechanisms	HVAC systems	Practical issues with external and internal	Practical applications of energy building		

		insulation	simulation		
Heat gain and loss	Renewable-energy supply systems	Energy efficient windows and door	Understanding simulation results and errors		
Overall heat transfer coefficients for opaque and transparent components	Photovoltaic				
Thermal insulation and thermal bridge	Air conditioning with heat recovery				
Ventilation and air tightness	Passive house basics				
Solar control					
Thermal comfort					

Table 2. The list of selected trainers

NAME	SURNAME	EXPERTISE
Türkan	GÖKSAL ÖZBALTA	PhD. Architect, certified Energy Efficiency Manager, Member of Chamber of Architect, Professor at Ege University.
Yusuf	YILDIZ	PhD. Architect, certified Energy Efficiency Manager, Member of Chamber of Architect, Assoc. Professor at Balıkesir University,
Necdet	ÖZBALTA	PhD. Chemical Engineer, Working on energy engineering, Professor at Ege University.
Ali	GÜNGÖR	PhD. Mechanical Engineer, Working on energy engineering, Professor at Ege University.
Mustafa	ENGİN	PhD. Electrical Engineer, Working on Solar Energy, fotovoltaics, Assis.Professor at Ege University.

Semiha	KARTAL	PhD. Architect, Member of Chamber of Architect, Assist. Professor at Trakya University.
Filiz	UMAROĞULLARI	PhD. Architect, Member of Chamber of Architect, Assist. Professor at Trakya University.
Şener	UNGAN	Engineer , Metalurgist, Working on Glass Industrie.
İsmail	CANER	MSc, Mechanical Engineer, Working on energy efficiency, Research assistant at Balıkesir University.
Merve	KOÇYIĞIT	Architect , Working on energy efficiency in buildings.

Participants enter the Training of Trainers course from various levels of prior experience and bring along a portfolio of competences - consequently, their needs are different. The educational approach implemented in the Training of Trainers course intends to allow for these different learning needs to be identified and pursued. At the core of this process is the competence of the participant to direct his/her own learning. For that reasons, the Training of Trainers course consists of a seminar and its duration is planned as one day. It is considered to award the trainers participated in Training of Trainers course with a “nZEB Trainer”, and we are currently making the necessary attempts for constructing a legal platform of certification.

List of selected trainers

Degree before name	First name	Surname	Profession	Organization	City	E-mail
Ing. arch.	Nataliya	Anisimova	consultant	SEVEn	Prague	natalie.anisimova@svn.cz
Ing.	Jiří	Karásek	senior consultant	SEVEn	Prague	jiri.karasek@svn.cz
Ing.	Bohuslav	Málek	senior consultant	SEVEn	Prague	bohuslav.malek@svn.cz
Ing.	Petr	Matějka	assistant professor	CTU FCE	Prague	petr.matejka@fsv.cvut.cz
Doc. Ing.	Daniel	Macek	associate professor	CTU FCE	Prague	daniel.macek@fsv.cvut.cz
Ing.	Jiří	Šála	expert advisor	MODI	Prague	salamodi@volny.cz
Ing.	Karel	Rod	manager	SPS in CR	Prague	rod@sps.cz
Doc. Ing.	Tomáš	Matuška	head of the research team	UCEEB	Buštěhrad	tomas.matuska@fs.cvut.cz

4.5. Country: Ukraine

The Ukrainian Building Knowledge Hub will be set up within the Kyiv National University of Construction and Architecture (KNUCA, Ukraine) following a Memorandum of Understanding already concluded. The future trainers will be selected from a pool of leading experts in energy efficiency in construction and architecture; it is anticipated to mobilize expertise of KNUCA and professionals

from EE equipment and materials producers (partner companies) who participate in the development of norms and regulations and national building standards.

In order to meet this goal, project partner MDI mobilized support from a wide range of EE equipment and materials producers ; with their assistance, detailed training programmes are already developed, using the experience and also the existing training facilities and laboratories of local manufacturers. The trainings are expected to start in October 2016, as hopefully they will be attended and supported by Train-to-nZEB project partners from Passive House Institute, Passive House Academy and project coordinator EnEffect, who will deliver a specialized train-the-trainer session at the new premises.

Initial list of Trainers

1. Oleg SERHEYCHUK, Doctor of Technical Sciences, Professor of the Department of Architectural Structures with Architecture Faculty of Kyiv National University of Building and Architecture; Member of the Construction Academy of Ukraine; Chairman of the Committee "Lighting and insulation" with the Technical Committee on "Energy Efficiency" of the Ministry of Regional Development, Construction and Housing and Municipal Economy of Ukraine.
2. Volodymyr SKOCHKO, candidate of technical sciences, Associate Professor, Doctoral Candidate of Department of Architectural Structures with Architecture Faculty of Kyiv National University of Building and Architecture; Coordinator of International Activities of Kyiv National University of Building and Architecture on energy efficiency in construction and architecture; Technical Specialist of Municipal Development Institute.
3. Oleksandr POGOSOV, candidate of technical sciences, Associate Professor, Head of Laboratory with the Department of Heat Technology of Sanitary Engineering Faculty of Kyiv National University of Building and Architecture.