PORTUGAL NATIONAL TRAINING

1ST MODULE

Title: Energy Audits and Commissioning
Duration: 4 hours
Type: Class room lectures or self-learning 2h and class room lectures – 2 hours
Short description of the module (aims, content etc.):

This module is focused on the methodology on the energy assessment of buildings. In scope of this module the participants will learn to know the key elements of energy audits and the commissioning process (definition, philosophy behind the process and examples). In this module, the two definition of the process of "energy audit" and "commissioning" are identified and explained. The role of the Energy Auditor, the scope and elements of the process and the general equipment used in an Audit is presented. The role of 3D scanning, BIM in construction and renovation process will also be addressed.

After completing this module, the individuals will be able to: know the process of energy audit, in particular referring to the regulations and standards; identify the different process elements of an energy audit; know which the correct equipment is in order to carry on an inspection; understand the different step of a commissioning process, including benefits and costs. Learners will also have learnt the importance of the commissioning process as well.

2ND MODULE

Title: Thermal Comfort Monitoring and Measurement
Duration: 4 hours
Type: Class room lectures or self-learning 2h and class room lectures – 2 hours
Short description of the module (aims, content etc.):

This module is focused on the thermal environment of buildings. It will define thermal comfort for a human body and how to model and measure it. The module is devoted to different ways of thermal comfort assessment according to valid standards. The impact of different renovation solutions, including the modular solutions, on the indoor thermal comfort will also be addressed.

It will be focused on the building regulations and standards related with thermal comfort, the thermal comfort predictive models; the simulation tools; thermal comfort assessment procedures overview; and monitoring and evaluation of thermal comfort conditions.

After completing this module, the individuals will be able to: understand the different methodologies used to evaluate thermal comfort conditions, identify the most adequate ones to be used in each situation and apply them; identify and apply the monitoring and evaluation strategies and techniques to the assessment of buildings' comfort; be able to identify on site key risks and understand the requirements for good construction practice to ensure the thermal comfort conditions while minimizing the energy use.

3RD MODULE

Title: Envelope's Thermal Performance – Thermal Bridges
Duration: 4 hours
Type: class room lectures
Short description of the module (aims, content etc.):

This module will focus on the evaluation and calculation of thermal bridges, through practical exercises. It will include 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. It also presents the drivers for, and benefit of, improving building fabric performance, as well as highlighting the risks that poor building fabric design and/or construction can present. It also addresses how building fabric performance can be assessed including information on the evaluation and calculation of thermal performance.

The estimation of thermal bridges in modular frame construction will also be addressed as thermal bridges have a crucial role in this kind of construction (once modular solutions have a higher share of thermal bridges in comparisons to typical rendered facades).

After completing this module, the individuals will be able to: understand how improvements to fabric performance will contribute to nZEB, EPBD and global greenhouse gas targets; understand and be able to explain the impacts that poor thermally performing buildings have on energy consumption, running costs, carbon footprint, occupant satisfaction and health; To be able to identify the key on-site risks which could jeopardize optimum thermal performance in relation to buildability and workmanship; understand where thermal bridging can occur, how to identify such locations and be able to investigate and specify remedial measures for poorly constructed details; understand the importance of commissioning in ensuring that new building fabric and systems perform as they should according to the design specification. Trainees will develop awareness and understanding of the different testing methods which can be used to ensure this.

4TH MODULE

Title: Retrofitting Towards nZEB
Duration: 4 hours
Type: class room lectures
Short description of the module (aims, content etc.):

This module will focus on the way to address the existing building stock and its possibilities for transformation into nZEB considering the cost optimality of nZEB retrofit technical solutions.

This module will address renovation solutions, highlighting the advantages of using modular solutions, cost optimization and Life Cycle Assessment (LCA), considering the cost optimal methodology applied to the renovation of buildings; the life cycle costs assessment; the identification and characterization of the cost optimal renovation solutions; the difference between cost optimal solutions and net zero energy solutions.

It also aims at understanding: the users' expectations and users' acceptance of renovation measures; the co-benefits associated to a renovation process; the drivers and barriers associated to renovation works; and to understand and be able to offer solutions to the technical, practical and logistical challenges faced in each country in nZEB retrofit.

After completing this module, the individuals will be able to: identify the cost optimal renovation solutions and be able to perform a cost optimal analysis and explain the differences between the cost optimal solutions and the net zero energy solutions; present the cost optimal renovation solutions for different types of buildings; explain users' expectations and users' acceptance of renovation measures; communicate the co-benefits associated to a renovation process; explain the drivers and barriers associated to renovation works; understand and be able to offer solutions to the technical, practical and logistical challenges faced in nZEB retrofit.