

efficiencyJobs⁺

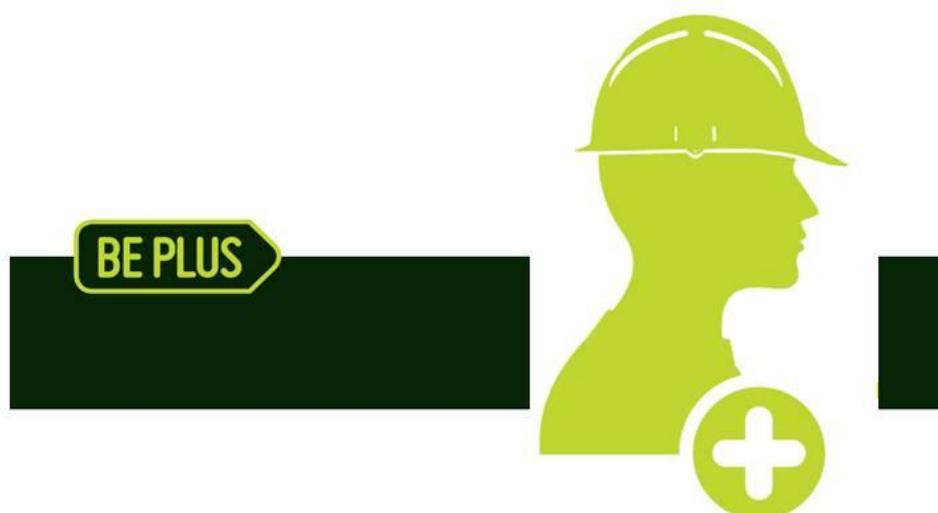


Co-financiado por el
Programa de
Aprendizaje Permanente

2013-1-ES1-LEO05-66818-AN

PEDAGOGIC GUIDE

“EFFICIENCY JOBS” PROJECT



COORDINADOR DEL PROYECTO



SOCIOS DEL PROYECTO



ecoversum

INDEX

1.- INTRODUCTION 3

2.- MAIN OBJECTIVES 3

3.- TARGET AUDIENCE 4

4.- METHODOLOGY 5

5.- TRAINING STRUCTURE 5

 5.1 Timetable 6

6.- MODULES 7

 6.1.- Specific objectives and study topics of the modules 7

 6.2.- Related skills and attitudes 16

7.- TEACHING RESOURCES..... 16

8.- EVALUATION 17

 8.1- Evaluation criteria: Student 17

 8.2- Evaluation criteria: learning process..... 18

9.- CONCLUSIONS 19

1.- INTRODUCTION

The present Pedagogic Manual is designed to establish the guidelines for the training activities development under the Efficiency Jobs Project. Firstly, these guidelines will be useful to prepare the teaching units that students must study. Secondly, the manual will serve to guide tutors along the teaching-learning process of students because the pedagogic guide sets the objectives to achieve and the methodology to follow.

It is important to note the international dimension of the training due to the European framework of the Project. In this regard, the specific context (legislation, technician development, social and professional situation, etc) of each country (Italy, Slovenian, Spain and Austria) has been included. Some differences have been found in terms of energetic efficiency implementation despite the European Directive, in fact approved in order to reduce these differences. Moreover it is noteworthy the differences in building patterns and in the professional development. These features are included but we have tried to unify criteria to improve the main teaching contents and to provide students a constructive learning.

In addition we studied some documents related to the named "professional qualification in energy and water" and "vocational training in the area of energy efficiency". This could ensure their suitability and engagement with other educational developments that have an official recognition by the competent authorities in education.

For a full understanding of contents adaptations done by each partner involved in the Project, the individual guides should be consulted, documents done from the present guide.

As follow, this guide presents several sections. The first explains the main goals of the training action. After, the structure and design of the training modules are presented. Modular design allows students to study common matters and select some specific modules at their convenience. Each module includes the following items: specific objectives and learning contents to achieve.

In the sixth section, we present the attendance and online methodology. To finish, the main didactic resources are described and a list of the principal conclusions of this Guide is displayed.

2.- MAIN OBJECTIVES

The main goals of training are:

1.- To reinforce key employment skills for employment in traditional professional profiles related to the construction sector, under the provisions of new Directive 2010/31/EU on the "Energy efficiency of buildings".

- 2.- To train professionals who are able to revise energetic consumption of a building and launch measures to improve the energy efficiency, with the resulting positive impact both economically and environmentally.
- 3.- To study main contents as the energy sources, production and consumption. Also students should appreciate the economic and environmental benefits resulting from the energy efficiency. All within the European framework and focused on the building sector.
- 4.- To know the corresponding legislation at European level and specially, at the national level in the building sector and to analyze the impacts of such legislation in the construction sector.
- 5.- To analyze deeply the Technical Building Code and the Regulations on Building Heating Installations to study the basic conditions and requirements to apply them.
- 6.- To find out about efficient, up and running building projects and recognize the practical energy efficiency applications and amount of energy saving achieved. And to know several successful cases of study.
- 7.- To know and recognize the implications of a certified energy management system, an energy certification or an energy efficiency label as key and useful tools in the development of energy efficiency.
- 8.-To acquire further knowledge and skills related not only to their specialty field but also to aspects of professions that are closely interrelated to their own, in a context of an integrated training course on energy efficiency
- 9.- To take a overall view of the need of energy efficiency in the building sector, knowing the implications in order to achieve a more eco friendly life style in accordance with current needs of comfort and wellbeing of the population.

3.- TARGET AUDIENCE

Since the project aims to benefit the employability and professional advancement of those working in the target sector, the training is aimed primarily at:

- **THE UNEMPLOYED** linked to traditional professions related to the construction sector (electricians, plumbers, bricklayers and masons, HVAC installers, etc.).
- **CURRENTLY SELF-EMPLOYED AND SALARIED WORKERS** of the construction sector and related professions.

The main professional areas and profiles of those for whom the training is intended are:

Building envelope and related elements

- Bricklayers and masons
- Insulation installers
- Carpenters (wood, aluminium, PVC...)
- Painters, decorators, etc.

Technical installations

- Electricians (including installers of photovoltaic solar and building automation systems)
- Heating installations
 - o Heating plant installers: boilers, biomass, geothermal, solar thermal...
 - o HVAC installers
 - o Plumbers, sanitary hot water installers, etc.

4.- METHODOLOGY

The methodology is focused on the development of a number of contents adapted to the particular context of students, mainly national legislation or building technical specifications. The adaptation will make learning more appealing and useful for students, due the context-environment harmonization. Also contents go from common to specific matters in order to unify the knowledge of each student at the first stage. After every student might focus his learning itinerary based on his own interests.

When preparing the didactic materials, we tried to use a simple and compressible language, without forgetting the required accuracy when discussing technical issues. Every means and didactic resources to students have been carefully selected, for example the usability of the elearning platform results very easy to use.

In regard to teaching activities, the tutor is as a guide of the learning process, being students, according their skills and personal needs, who organize their own learning process. So, students can integrate the training with other type of activities, work or family, due the self-study methods.

It is important to note there are two teaching methods: online and classroom version. The organization and implementation of the classroom and online courses will be development by each partner according to stakeholders' characteristics.

To sum up, all teaching process (classroom or online) and materials are designed harmonizing practical and theoretical contents. In the context of the Project, student is the main actor and responsible for his own learning. In that case, the effort will be appreciated by tutor who should guide students and motivate the feedback along the course.

5.- TRAINING STRUCTURE

Training is divided into several modules to perform learning more open and flexible. In that way, students can enroll in the course based on their goals, studying common modules and those specific modules according to their professional areas and profiles. In addition, a practicum module called Virtual Laboratory has been included to improve the professional skills of students and multiply the development of professional competences. The virtual laboratory displays different didactic resources as videos, web sites or links to guides, studies or articles.

The Modules are:

- Module 1 Towards lower energy consumption and greater energy efficiency.
- Module 2 Regulatory framework. How and by whom is energy efficiency regulated?
- Module 3 Conditions and requirements for energy saving in buildings.
- Module 4 Learning to build energy-efficiently.
- Module 5 Legal requirements of energy efficiency in the professional construction sector, for the application of energy efficiency measures in the fields of:
 - Building envelope (Bricklaying, masonry and insulation)
 - Construction related fields (carpentry, painting and others)
 - Electricity
 - Heating plant installers
 - HVAC and ACS
- Module 6 Energy efficiency measures in... the same key fields as in the previous Module.
- Module 7 Energy certification and energy management systems.
- Module 8. Virtual Lab
 - a) Building envelope and related occupations
 - b) Technical installations

Taking into account the individual modules, their combination produces the following courses:

Course	Modules							
	M1	M2	M3	M4	M5	M6	M7	M8
Energy efficiency in buildings: Building envelope (Bricklaying, masonry and insulation)	✓	✓	✓	✓	Envelope 5.1 and 6.1		✓	Building envelope and related occupations
Energy efficiency in buildings: Electricity	✓	✓	✓	✓	Electricity 5.2 and 6.2		✓	Technical installations
Energy efficiency in buildings: Plumbing and HVAC and SHW installations	✓	✓	✓	✓	SHW and HVAC 5.3 and 6.3		✓	Technical installations
Energy efficiency in buildings: Thermal plant installers	✓	✓	✓	✓	Thermal plants 5.4 and 6.4		✓	Technical installations
Energy efficiency in buildings: Carpentry and other construction related fields	✓	✓	✓	✓	Related fields 5.3 and 6.3		✓	Building envelope and related occupations

5.1 Timetable

The duration of each online course is 60 hours, while the classroom training is up to 20 hours (5-6 hours/day).

6.- MODULES

In this section, the specific objectives and contents of each module listed above are presented. Both objectives and contents are the base for developing and writing the teaching units available for students along the course. The next paragraph 6.2 listed the professional competences and skills and social abilities that students can acquire.

6.1.- Specific objectives and study topics of the modules

MODULE 1: Towards low electricity consumption and greater energy efficiency

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To correctly differentiate between the concepts primary energy, energy transformation and secondary energy. - To interpret figures and numerical data on energy consumption in different contexts. - To understand the magnitude of energy consumption in today’s society. - To differentiate between renewable and non-renewable energy sources. - To understand the concept of energy efficiency. - To understand the possibilities of energy efficiency in the building sector. - To relate energy consumption to its economic, environmental and social consequences.
STUDY TOPICS
<ul style="list-style-type: none"> - INTRODUCTION: ENERGY CONSUMPTION AND SAVING <ul style="list-style-type: none"> Dependence on electrical energy Renewable and non-renewable energies Energy saving - ENERGY CONSUMPTION AND BUILDING IN EUROPE <ul style="list-style-type: none"> Energy context of Europe Energy and building - WHAT IS ENERGY EFFICIENCY? <ul style="list-style-type: none"> Energy measurements Energy efficiency - SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS OF ENERGY INEFFICIENCY

MODULE 2. Regulatory framework. How and by whom is energy efficiency regulated?

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To get to know the various regulations governing energy efficiency which have been developed in recent years - To assess the key content of the most important European directives published in recent years in respect of energy efficiency in the context of building - To be up to speed on the latest changes that have taken place in the scope of relevant regulations and any new developments introduced recently. - To address the most important repercussions arising from the application of domestic and EC regulations governing energy efficiency - To consider the regulatory measures and the incentives included in the The National Energy Efficiency Action Plan 2008–2016.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY REGULATIONS IN BUILDINGS - EUROPEAN DIRECTIVES - REGULATION IN SLOVENIA <ul style="list-style-type: none"> Transposition of Directives on the energy efficiency of buildings Energy Saving and Efficiency Action Plans - IMPACTS ON THE CONSTRUCTION SECTOR

MODULE 3. Conditions and requirements for energy saving in buildings

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - Understanding the conditions and requirements currently established in Spanish legislation with regard to energy efficiency in building - Becoming familiar with the contents of the Technical Guideline TSG – 1 – 004:2010 (TSG) based on current legislation. - Analysing the structure of the TSG and understanding the areas of building and construction which are subject to a set of basic conditions - Being aware of the contents of the Rules on efficient use of energy in buildings with a technical guideline; Rules on the methodology of construction and issuance of building energy certificates; Construction Act and Energy Act. - Familiarity with the energy efficiency and safety requirements for technical installations in buildings.
STUDY TOPICS
<ul style="list-style-type: none"> - TECHNICAL GUIDELINE TSG-1-004:2010 <ul style="list-style-type: none"> How did the Technical Guideline arise? Structure and contents of the TSG Scope of application of the TSG Basic requirements of the TSG - ENERGY CERTIFICATES

MODULE 4. Learning to build energy-efficiently

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To learn the fundamentals of energy efficiency in the construction and building industries - To recognize the major components and processes energy efficiency must address in a building. - To identify the regulations on which energy efficiency is based in the building industry. - To recognize the major areas on which energy efficiency must focus in the construction and building industry. - To understand the “bioclimatic architecture” concept and its implications - To identify the pillars on which bioclimatic architecture is based. - To recognize how passive systems work. - To know the parameters on which bioclimatic architecture is based. - To differentiate between the renewable energy sources that may be applied in the building industry, and their applications and advantages. - To assess the importance of thermal insulation in new buildings and in existing buildings through energy rehabilitation. - To know the type of materials used for proper thermal insulation. - To understand the use of and correctly interpret the energy label on domestic appliances. - To find out about efficient, up and running building projects and recognize the practical energy efficiency applications and amount of energy saving achieved.
STUDY TOPICS
<ul style="list-style-type: none"> - EFFICIENT USES OF ENERGY IN CONSTRUCTION <ul style="list-style-type: none"> Bioclimatic Architecture Use of renewable energies Use of innovative materials and equipment - EFFICIENT BUILDINGS. ACTUAL PROJECTS DEVELOPED <ul style="list-style-type: none"> CEC5 NewBEE GreenLabelsPurchase

MODULE 5. 1. Legal requirements of energy efficiency in the masonry and insulation sector (building envelope)

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To understand the legal requirements established by current legislation with regard to masonry and insulation. - To learn the most important aspects of the Technical guideline (TSG-1-004:2010) in the field of thermal building envelopes. - To be able to apply the requirements of the Rules on efficient use of energy in buildings referring to new buildings and to extension, modification, upgrade or rehabilitation works. - To apply correctly the basic requirements set out in the Technical guideline, establishing the qualitative “performance” that buildings must deliver in order to achieve the quality that society demands. - To be up to speed on the content of the various documents of the Technical guideline, in which the basic requirements are detailed and explained. - To know the limitations included in the chapter THERMAL PROTECTION of the Technical guideline with implications for the building sector, to be taken into account by workers in the field of masonry and insulation. - To know in which particular cases these requirements will have to be applied and, conversely, in which cases they will not be deemed necessary.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY EFFICIENCY IN THE PROFESSIONAL MASONRY AND INSULATION SECTOR The masonry and insulation sector in the field of construction Towards a more efficient model - CURRENT REGULATORY REQUIREMENTS Requirements of the Technical guideline Section Thermal protection

MODULE 6. 1. Energy efficiency measures in the masonry and insulation sector (building envelope)

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To know the most important energy efficiency measures that can be implemented in the masonry sector, in relation to the thermal insulation of buildings. - To understand the concept of “thermal insulation” and the characteristics of the main thermal insulation materials used in efficient building. - To relate the requirements of the Technical Guideline to the energy efficiency measures to be implemented in both newly constructed buildings and existing buildings. - To find out about the different possibilities of thermal rehabilitation in buildings, addressing two elements of its envelope: the facade and the roof. - To differentiate between the characteristics and recommendations related to the thermal insulation of the envelope applied externally and internally. - To know the techniques and materials used most frequently in the thermal rehabilitation of the facade and roof of the buildings, and their advantages and limitations. - To learn how to look for published information on the thermal insulation of buildings. - To find out about the assistance schemes and subsidies currently available to promote energy efficiency and electricity through the various plans and programmes (ECO Fund).
STUDY TOPICS
<ul style="list-style-type: none"> - THERMAL INSULATION MATERIALS - INSULATION OF FACADES - ROOF INSULATION - ASSISTANCE SCHEMES AND SUBSIDIES Action plan for renewable energy sources for the period 2010 – 2020 The National Action Plan for Energy Efficiency 2008 - 2016 ECO Fund

MODULE 5.2. Legal requirements of energy efficiency in the professional electricity sector

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To understand the legal requirements established by current legislation with regard to electricity. - To learn the most important aspects of the Technical Guideline TSG-1-004:2010 in the field of electricity - To be able to apply these requirements referring to new buildings and to extension, modification, upgrade or rehabilitation works. - To apply correctly the Basic Requirements set out in the Technical Guideline, establishing the qualitative “performance” that buildings must deliver in order to achieve the quality that society demands. - To be up to speed on the content of the different chapters of the Technical Guideline, in which the basic requirements are detailed and explained. - With regard to interior lighting, to analyse the minimum requirements of energy efficiency established in regulations and in the Technical Guideline. - To know in which particular cases these requirements will have to be applied and, conversely, in which cases they will not be deemed necessary. - To address the technical characterization of the requirements and know the parameters to be considered in the field of lighting. - To become familiar with the various types of control and regulation systems available to govern illumination and lighting, and energy efficiency. - To review the regulations governing the energy labelling of domestic appliances.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY EFFICIENCY IN THE PROFESSIONAL ELECTRICITY SECTOR <ul style="list-style-type: none"> The electricity sector in the field of construction Towards a more efficient model - CURRENT REGULATORY REQUIREMENTS <ul style="list-style-type: none"> Requirements of the Technical guideline Energy efficiency of the lighting Regulation of the energy labelling of domestic appliances

MODULE 6.2. Energy efficiency measures in the professional electricity sector

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To know the most important energy efficiency measures that can be implemented in the electricity sector. - To analyse existing energy efficiency systems for lighting installations; devices that have been developed under current regulations and their requirements. - To gain an overview of existing control and regulation systems, based on the definitions of the Technical Guideline. - To know how these devices work, especially those designed to provide automatic control over the on-off switching of lighting installations depending on whether or not there are people in the area. - To assess which systems, such as timers, are best suited to a building’s infrequently used zones (such as corridors, stairways, car parks or rest rooms). - To know in which cases natural light harvesting systems should be installed, based on the regulatory requirements of the Technical Guideline. - To consider the need to implement daylight responsive control systems for artificial lighting, a type of system that acts automatically depending on the amount of natural light available. - To review the different systems and types of efficient lighting, light bulbs and luminaires - To know the main advantages and drawbacks that these low consumption light bulbs, such as fluorescent bulbs, LEDs, or improved incandescent light bulbs, may have compared to traditional light bulbs. - To find out about the assistance schemes and subsidies currently available to promote energy

efficiency and electricity through the various plans and programmes (ECO Fund).
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY SAVING MEASURES IN ILLUMINATION AND LIGHTING <ul style="list-style-type: none"> Lighting control and regulation systems Natural light harvesting systems More efficient lighting: types of light bulbs and luminaires - ENERGY SAVING MEASURES IN THE CONSUMPTION OF DOMESTIC APPLIANCES AND OTHER DEVICES <ul style="list-style-type: none"> Energy labelling of domestic appliances - ASSISTANCE AND SUBSIDIES <ul style="list-style-type: none"> Action plan for renewable energy sources for the period 2010 – 2020 The National Action Plan for Energy Efficiency 2008 - 2016 Public calls

MODULE 5.3. Legal requirements of energy efficiency in the plumbing sector and SHW and HVAC installations

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To understand the legal requirements established by current legislation with regard to plumbing and SHW (Sanitary hot water) and HVAC (air-conditioning) installations. - To learn the most important aspects covered by the Technical Guideline TSG-1-004:2010 in the scope of plumbing and SHW and HVAC installations. - To be able to apply the requirements of the Rules on efficient use of energy in buildings, for both new buildings and extension, modification, upgrade and rehabilitation work on existing buildings. - To apply correctly the basic requirements set out in the Technical guideline, establishing the qualitative “performance” that buildings must deliver in order to achieve the quality that society demands. - To be up to speed on the content of the different basic documents of the Technical guideline, in which the basic requirements are detailed and explained. - With regard to heating, SHW and air-conditioning installations, study the minimum energy efficiency requirements established in current regulations (Technical Guideline TSG-1-004:2010) - To know in which particular cases these requirements will have to be applied and, conversely, in which cases they will not be deemed necessary. - To address the technical characterization of the requirements and know the parameters to be considered in the scope of heating, SHW and air-conditioning installations. - To become familiar with the various types of efficiency measures that have been established in the scope of heating, SHW and air-conditioning installations.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY EFFICIENCY IN THE PROFESSIONAL PLUMBING SECTOR AND SHW AND HVAC INSTALLATIONS <ul style="list-style-type: none"> The plumbing sector and SHW and HVAC installations in the field of construction Towards a more efficient model - CURRENT REGULATORY REQUIREMENTS <ul style="list-style-type: none"> Requirements of the Technical guideline - ENERGY EFFICIENCY OF HEATING INSTALLATIONS <ul style="list-style-type: none"> Requirements relating to heat generators Requirements relating to the thermal insulation of networks of pipes Requirements relating to heating and air-conditioning installations - ENERGY EFFICIENCY OF SHW INSTALLATIONS: SOLAR ENERGY CONTRIBUTION <ul style="list-style-type: none"> Installation of solar collectors

MODULE 6.3. Energy efficiency measures in the plumbing, sanitary hot water and HVAC sector

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To find out about the most important energy efficiency measures that can be implemented in the plumbing sector, and in sanitary hot water (Slovenian acronym, TSV; referred to here by its English acronym, SHW) and air-conditioning sector. - To link the application of these efficiency measures in sanitary hot water, air-conditioning and heating installations with the requirements specified in current regulations. - To analyse efficiency measures for sanitary hot water installations, especially, those related to the minimum solar energy contribution in these systems. To differentiate between the various types of solar energy systems, such as distributed storage and central heat storage. - To evaluate the efficacy and suitability of each type of free cooling systems (by air, by water or by refrigerant migration) and of other systems, such as evaporative cooling, among the various efficiency measures for air-conditioning installations that exist. - To be up to speed with new developments in respect of the high energy efficiency air-conditioning equipment and control systems there are on the market, perhaps the most important of which are multisplit air-conditioning systems. - To learn how to differentiate between the various types of high performance boilers, such as low temperature boilers and condensing boilers - To find out about the use and requirements of pipes and other hot or cold water conducting installations in the scope of thermal insulation, as specified in the relevant regulation. - To determine the required insulation thickness, based on the diameter of the pipe, the temperature of the fluid being transported (hot or cold) and the location of the conduits (indoor or outdoor). - To find out about the assistance schemes and subsidies currently available to promote matters of energy efficiency and electricity through the various plans and programmes.
STUDY TOPICS
<ul style="list-style-type: none"> - EFFICIENCY MEASURES FOR SANITARY HOT WATER INSTALLATIONS <ul style="list-style-type: none"> Solar thermal installations and sanitary hot water systems Equipment control and regulation systems - EFFICIENCY MEASURES FOR AIR-CONDITIONING INSTALLATIONS <ul style="list-style-type: none"> Free cooling systems Evaporative cooling systems High energy efficiency equipment and control systems - EFFICIENCY MEASURES FOR HEATING SYSTEMS <ul style="list-style-type: none"> Types of heating boilers District heating systems - EFFICIENCY MEASURES FOR PIPE INSULATION <ul style="list-style-type: none"> Measures and requirements specified in the Technical guideline - ASSISTANCE SCHEMES AND SUBSIDIES <ul style="list-style-type: none"> Action plan for renewable energy sources for the period 2010 – 2020 The National Action Plan for Energy Efficiency 2008 - 2016 ECO Fund Public calls

MODULE 5.4. Legal requirements of energy efficiency in the thermal plant installations sector

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To understand the legal requirements established by current legislation with regard to thermal plant installations. - To learn the most important aspects covered by the Technical Guideline TSG-1-004:2010 in the scope of thermal plant installations. - To be able to apply the requirements of the Rules on efficient use of energy in buildings, for both new buildings and extension, modification, upgrade and rehabilitation work on existing buildings.

<ul style="list-style-type: none"> - To apply correctly the Basic Requirements set out in the Technical Guideline, establishing the qualitative “performance” that buildings must deliver in order to achieve the quality that society demands. - To be up to speed on the content of the different Basic Documents of the Technical Guideline, in which the Basic Requirements are detailed and explained. - With regard to thermal plant installations, study the minimum energy efficiency requirements established in current regulations. - To know in which particular cases these requirements will have to be applied and, conversely, in which cases they will not be deemed necessary. - To address the technical characterization of the requirements and know the parameters to be considered in the scope of thermal plant installations. - To become familiar with the various types of efficiency measures that have been established in the scope of thermal plant installations.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY EFFICIENCY IN THE PROFESSIONAL THERMAL PLANT INSTALLATION SECTOR <ul style="list-style-type: none"> The thermal plant installations sector in the field of construction Towards a more efficient model - CURRENT REGULATORY REQUIREMENTS <ul style="list-style-type: none"> Requirements of the Technical guideline Requirements of the Rules on efficient use of energy in Buildings for achieving the energy efficiency of buildings - ENERGY EFFICIENCY OF THERMAL INSTALLATIONS <ul style="list-style-type: none"> Requirements related to heat generators Requirements relating to heating and air-conditioning installations - ENERGY EFFICIENCY OF SHW INSTALLATIONS: SOLAR ENERGY CONTRIBUTION <ul style="list-style-type: none"> Installation of solar collectors

MODULE 6.4. Energy efficiency measures in the thermal plant installations sector

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To learn about the most important energy efficiency measures that can be implemented in the thermal plant installations sector, especially those linked to the use of renewable energies. - To link the application of these efficiency measures to thermal plant installations (related to air-conditioning and heating systems) with the requirements specified in current regulations and standards. - To learn the advantages of using systems based on the harvesting of biomass, and to obtain an overview of the different types of biomass boilers and the use of biomass in air-conditioning systems - To assess the applications of solar energy the harvesting in the scope of thermal installations, especially in heating systems and sanitary hot water installations (Spanish acronym, ACS; referred to here by its English acronym, SHW). - To study the measures involving the minimum contribution of solar energy, especially in SHW installations. To differentiate between the different types of solar energy systems; i.e. distributed storage and centralized storage. - To study the possibility of developing and implementing combined systems, and of jointly harvesting two sources of renewable energy (biomass and solar thermal energy) in the scope of thermal installations. - To find out what geothermal energy based systems consist of. To differentiate between the different types of geothermal energy harvesting and know how a geothermal heat pump (or ground source heat pump) works and its principal advantages and applications. - To find out about the assistance schemes and subsidies currently available to promote matters of energy efficiency and electricity through the various plans and programmes (ECO Fund).
STUDY TOPICS
<ul style="list-style-type: none"> - THERMAL BIOMASS INSTALLATIONS <ul style="list-style-type: none"> - Types of biomass boilers

<ul style="list-style-type: none"> - Use of biomass in air-conditioning systems - SOLAR THERMAL ENERGY INSTALLATIONS <ul style="list-style-type: none"> - Solar thermal energy for heating production - Solar thermal installations and SHW systems - COMBINED SYSTEMS OF BIOMASS AND SOLAR ENERGY <ul style="list-style-type: none"> - Types of combined systems - GEOTHERMAL HEAT PUMP SYSTEMS <ul style="list-style-type: none"> - Operation of geothermal heat pumps - Execution of the installation - ASSISTANCE SCHEMES AND SUBSIDIES <ul style="list-style-type: none"> Action plan for renewable energy sources for the period 2010 – 2020 The National Action Plan for Energy Efficiency 2008 - 2016 ECO Fund Public calls

MODULE 5.5. Legal requirements of energy efficiency in the carpentry sector and other construction-related sectors

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To understand the legal requirements established by current legislation with regard to carpentry and other construction-related sectors. - To learn the most important aspects of the Technical guideline (TSG-1-004:2010) in the field of carpentry and other construction-related sectors. - To be able to apply the requirements of the Rules on efficient use of energy in buildings, for both new buildings and extension, modification, upgrade and rehabilitation work on existing buildings. - To apply correctly the basic requirements set out in the Technical guideline, establishing the qualitative “performance” that buildings must deliver in order to achieve the quality that society demands. - To be up to speed on the content of the various documents of the Technical guideline, in which the basic requirements are detailed and explained. - To know the limitations included in the chapter THERMAL PROTECTION of the Technical guideline with implications for the building sector, to be taken into account by workers in the field of carpentry and other construction related sectors. - To know in which particular cases these requirements will have to be applied and, conversely, in which cases they will not be deemed necessary.
STUDY TOPICS
<ul style="list-style-type: none"> - ENERGY EFFICIENCY IN THE PROFESSIONAL CARPENTRY SECTOR <ul style="list-style-type: none"> The carpentry sector in the field of construction Towards a more efficient model - CURRENT REGULATORY REQUIREMENTS <ul style="list-style-type: none"> Requirements of the Technical guideline Section THERMAL PROTECTION - ENERGY EFFICIENCY IN OTHER CONSTRUCTION-RELATED SECTORS

MODULE 6.5. Energy efficiency measures in the carpentry sector and other construction related sectors

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To learn about the main energy efficiency measures that can be implemented in relation to the thermal insulation of buildings in the carpentry sector. - To know the materials used in carpentry in the building sector and their energy efficiency-related properties. - To relate the requirements of the Technical Guideline with the energy efficiency measures to be implemented in newly constructed buildings and existing buildings. - To know the different solutions existing for the rehabilitation of glass closures.

<ul style="list-style-type: none"> - To have a working knowledge of the criteria of the Technical Guideline when specifying the energy parameter limit values in a particular opening. - To relate the presence of various materials with the approximate installation stages of those materials and the shortcomings and problems they present, so as to be able to provide an appropriate rehabilitation solution. - To identify actions and possibilities for including energy efficiency criteria in other construction-related sectors: painting and decoration. - To obtain information about any relevant assistance schemes and subsidies there may be applicable to energy efficiency and insulation, through the various plans and programmes (ECO Fund).
STUDY TOPICS
<ul style="list-style-type: none"> - CHARACTERIZATION OF OPENINGS <ul style="list-style-type: none"> The profile: thermal properties and types of frames Glazing: properties and types of glass Thermal properties of closures - SOLUTIONS FOR THE REHABILITATION OF GLASS CLOSURES - ENERGY EFFICIENCY RECOMMENDATIONS FOR OTHER CONSTRUCTION-RELATED SECTOR <ul style="list-style-type: none"> Energy efficiency in paintwork and in decoration - ASSISTANCE SCHEMES AND SUBSIDIES <ul style="list-style-type: none"> Action plan for renewable energy sources for the period 2010 – 2020 The National Action Plan for Energy Efficiency 2008 - 2016 ECO Fund

MODULE 7. Energy management systems and energy certification

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - To find out what an energy management system is and what it consist of. - To assess energy management systems as a key tool in the development of energy efficiency. - To learn about the SIST-EN ISO 50001 standard as the implementation tool for energy management systems - To recognize the implications of a certified energy management system. - To know and differentiate the various development phases of energy management systems, understanding the aims and stages of each phase. - To understand the energy certification process for buildings. - To know the implications of building energy certification and the agents involved in the process. - To know the energy efficiency evaluation process for buildings. - To interpret correctly the building energy efficiency label.
STUDY TOPICS
<ul style="list-style-type: none"> - WHAT IS AN ENERGY MANAGEMENT SYSTEM? <ul style="list-style-type: none"> Energy management systems Advantages of energy management systems Costs of energy management systems Standardization of energy management systems - STEP BY STEP IMPLEMENTATION OF AN ENERGY MANAGEMENT SYSTEM - ENERGY CERTIFICATION IN BUILDINGS - ENERGY RATING OF BUILDINGS <ul style="list-style-type: none"> Calculation of the energy rating The energy efficiency label

MODULE 8. Virtual Laboratory

SPECIFIC OBJECTIVES
<ul style="list-style-type: none"> - Improve the professional skills of students with the new Community legislation related to energy efficiency - Encourage students’ constructivist learning - Allow students go deeply into certain areas; lighting and HVSC especially - Provide a framework to discuss about bad and good practices in the construction sector in relation the energy efficiency
STUDY TOPICS
<ul style="list-style-type: none"> - BUILDING ENVELOPE AND RELATED FIELDS - TECHNICAL INSTALLATIONS

6.2.- Related skills and attitudes

Students can improve those skills and abilities that are directly related to the learning matter and connected with each developed professional contexts. But also those attitudes directly attached with any learning process.

Professional context

- To develop a professional career engaged in companies, public or private, related to the construction sector and within the field of energy efficiency
- To acquire the knowledge and professional to improve the employability of the participants
- To implement the acquired contents (theoretical and practical) to analyze or to report proposals concerning the improvements of energy efficiency in buildings
- To appreciate the energy efficiency as an opportunity for employment, self-employment or to diversify the company scope.

Social and personal context of the student

- Motivation and adequate follow-up to the course
- Self-confidence for the completion of training
- Responsible behavior with teaching materials
- Appropriate use of the communication means
- Appreciate that energy efficiency can contribute to sustainable development
- Respect for responsible consumption and environment

7.- TEACHING RESOURCES

The learning means available for students are:

- E-learning Platform
- Didactic Units
- Other didactic resources selected by the tutor
- Self-assessment questionnaires

- Course evaluation questionnaire
- Communications means
- Virtual laboratory

The classroom equipment is:

- Classroom didactic materials: the board, audiovisual equipment, computer, projector and the Internet
- Classroom furniture

8.- EVALUATION

Evaluation process is a key stage of the learning process. In general, evaluation process is focused on knowing in which extent students have acquired the theoretical-practical contents and achieved the learning objectives. Also a course evaluation is included to know the students opinions and suggestions. Both evaluations seem adequate according the social and professional environment of the courses.

The first evaluation is aimed at students. It is a web-based questionnaire to do at the end of each module. The questionnaire is a test of 10 multiple-choice questions. Then it is a self-evaluation test, which enhances the idea of self-learning process. The questionnaire should reflect the specific objectives and evaluation criteria. We will use the evaluation results to verify the professional competences and skills acquired by students.

The second type is a questionnaire to assess the training process: organization, general information, enrollment, didactic materials, available resources, course length, etc. The questionnaire included mainly closed-questions and one or two opened-questions.

Both evaluations are based on the commitment of the partners for quality training. In addition, another questionnaire will design to know why potential students do not have finally decided to study the course.

8.1- Evaluation criteria: Student

We will evaluate the results of the learning and the level of the competence achieved by the participants, according the following evaluation criteria:

- 1.- Student implements the acquired contents (theoretical and practical) to analyze the energy consumption of a building and report proposals concerning the improvements of energy efficiency in buildings, with positive impact on economic and environmental aspect.
- 2.- Student knows main contents as the energy sources, the production and consumption. Also student appreciates the economic and environmental benefits resulting from the energy efficiency. All within the European framework and focused on the building sector.

- 3.- Student knows the corresponding legislation at European level and specially, at the national level in the building sector and to analyze the impacts of such legislation.
- 4.- Student analyzes deeply the Technical Building Code and the Regulations on Building Heating Installations in order to study the basic conditions and requirements to apply them.
- 5.- Student finds out about efficient building projects and recognizes the practical energy efficiency applications and amount of energy saving achieved. Also student knows several successful cases of study.
- 6.- Student knows and recognizes the implications of a certified energy management system, an energy certification or an energy efficiency label as key and useful tools in the development of energy efficiency.
- 7.- Student acquires further knowledge and skills related not only to their specialty field but also to aspects of professions that are closely interrelated to their own, in a context of an integrated training course on energy efficiency.
- 8.- Students take an overall view of the need of energy efficiency in the building sector, knowing the implications in order to achieve a more eco friendly life style in accordance with current needs of comfort and wellbeing of the population.
- 9.- Student studies constantly and progressively and uses the available learning materials
- 10.- Student is interested in participating in forums and maintains a two-way communication with the tutor

8.2- Evaluation criteria: learning process

To ensure the quality of the training process, the following aspects will be evaluated:

- Information received at the start of the course
- The tutor's role explaining the planning, monitoring of students, resolution of doubts clearly and in due time
- Contents: understandable and updated
- The level of use of supplementary materials placed on the platform
- Management and coordination
- Methodology: effective and appropriate
- Expectations and achieved objectives
- The employability or the new work tasks to carry out

9.- CONCLUSIONS

The present Pedagogic Guide of “Efficiency Jobs” Project is a document to design the training actions and teaching materials of the courses for professionals of constructor sector and in particular, in the energy efficiency field.

The main conclusions are:

- The proposed training presents a modular structure, which allows an open and flexible training due to the number and variety of the offered training courses.
- The theoretical and practical contents allow participants to study common matters and to unify a main knowledge in energy efficiency issues. Moreover students can select some specialization modules at their convenience
- Due the European dimension of the Project, certain contents have been adapted to the professional and social environment of each country. In that way, it is important to notice that any student can choose the language of the training (Spanish, English, Italian, German and Slovenian).
- The methodology is based on self-learning process, harmonizing theoretical contents and practicum through Virtual Laboratory.
- The methodology has two versions: online and face-to-face teaching sessions. Online course takes 60 hours and classroom course is up to 20 hours.
- The evaluation process has two parts: 1) a questionnaire to know the results of the learning and the level of the competence achieved by the participants and 2) a questionnaire to assess the quality of the training process.
- As a pilot action, all suggestions and evaluation results will be analyzed in order to improve the training and always with the aim to reinforce key competences for professional employment in the construction sector in relation to the possibilities offered by the directive on energy efficiency buildings.