Subsector: ORGANISATION AND DEVELOPMENT OF SOLAR PHOTOVOLTAIC INSTALLATION PROJECTS

Title of the LO	**To determine the feasibility of photovoltaic solar installation projects**		
Learning Outcome Definition	To analyse energy needs and define the solar potential of a specific area in order to draw up proposals for PV solar installations, in compliance with required standards, technical requirements and regulations.	**Nº of ECVET credits:**	**EQF level**:5

UNITS of the LO

- Analysis of energy needs
- Defining the solar potential
- Drawing up proposals for solar installations

U1. Title: Analysis of energy needs	**Description** To classify, quantify and analyse the energy needs of various types of users, in order to diagnose the possibility of installing PV solar power.
U2. Title: Defining the solar potential	**Description** To define the solar potential is a specific area in order to install PV solar power, using the best means and complying with required standards and regulations.
U3. Title: Drawing up proposals for solar installations	**Description** To draw up proposals for PV solar installations, aimed at clients, and containing the features of the specific installation based on the space available and the technical and functional requirements, apart from the analysis of the regulatory framework, and subsidies available.

Title of the LO	To determine the feasibility of photovoltaic solar installation projects
Title UNIT 1:	Analysis of energy needs
Nº of ECVET credits:	**EQF level**: 5
Knowledge	• Basics of PV solar energy • The sun as a source of energy. • Converting solar energy in electricity. • Accumulating PV solar energy. Self-consumption / sale network • Integrated PV energy systems.
Skills	• Classifying users' energy needs depending on application, receiver specifications and characteristics of the demand for energy to be met. • Quantitative determination of electrical energy needs, and establishing basic parameters from the type of receiver. • Quantitative determination of electric energy needs and establishing basic parameters. • Establishing average annual seasonal performance of units and installations, depending on their state of maintenance. • Determining the seasonal use variable, times of use, operating temperatures and the coincidence factor, and represent these based on recognised information sources and data provided by the user. • Prepare the diagnosis and energy needs for a specific user, by determining the various types of supply, overall costs and energy return time of the installation.
Competence	• Independence and responsibility in organising one's own work. • Readiness to plan one's own tasks and self-assessment of achievements. • Commitment to deadlines for finishing tasks. • Rigorous planning and control of work. • Rigorous calculations.
Performance Criteria	• In a practical case, properly described, for a building with several dwellings demanding electrical and thermal energy for hot water for domestic and heating use: -Detail lifestyles and services required. -Quantify the electrical energy required for lighting and power, and to serve the community in general. -To evaluate electricity consumption and use information for planning systems

	-Describe seasonal variability, times of electricity consumption and the coincidence factor. -Determine the reference nominal electrical power and electrical parameters arising from it. -Define the possibilities for supplying different types of energy: electricity, natural gas or other fuels. -Study and specify the legal and technical possibilities of installing solar energy. -Prepare a document stating the results obtained from the studies on energy consumption. • In a practical case, properly described, for a single-family dwelling demanding electrical energy: -Detail uses and services required. -Quantify electrical energy required for lighting, power and other uses. -Describe seasonal variability and times of electricity consumption. -Determine the reference nominal electrical power and electrical parameters arising from it. -Define the possibilities for supplying different types of energy: electricity, natural gas or other fuels. -Study and specify the legal and technical possibilities of installing solar energy. -Prepare a document stating the results obtained from the studies on energy consumption.

Title of the LO	To determine the feasibility of solar installation projects		
Title UNIT 2:	Defining the photovoltaic solar potential		
Nº of ECVET credits:		**EQF level**: 5	
Knowledge	• Classification of photovoltaic solar installations. Operating overview. • Solar panels. Operation, composition and connection. Elements of a photovoltaic solar installation connected to a network, and specifications. • Size grid connected photovoltaic systems • Stand alone systems • Elements of a photovoltaic stand-alone solar installation, and specifications. • Systems to back-up and accumulate energy. • Self-consumption – Energetic management • Regulations applicable.		
Skills	• Obtaining global solar radiation parameters, average day-time ambient temperature and the temperature of cold water in the mains water system, based on data from official statistics, or sufficiently reliable, gathered from tables. • Correlating data when the information required is not given directly in tables or statistics. • Collaborating in applying models to determine direct, diffuse and global solar radiation, using computer programs. • Measuring and recording solar data by means of a pyranometer, pyrheliometer, datalogger, automatic stations and other systems. • Justifying the use of PV solar energy based on the available assessment of solar potential.		
Competence	• Rigorous planning and control of work. • Initiative in searching for technical information. • Organisation and method in work. • Rigorous calculations. • Rigorous use of technical documentation. • Coherence in justifying decisions taken on technical grounds for the cases proposed.		
Performance Criteria	• To determine solar radiation parameters in a specific site, for which there are tables providing the required values directly. • To determine solar radiation in a specific site for which there are tables where several results have to be interpreted and		

	correlated to provide a reasonable estimate. • To give an overview of the most common models in determining empirically the various types of solar radiation. • To measure and record solar radiation data via a pyranometer, pyrheliometer and other recording devices. • To determine, for a given site and surface area, the possibility of installing thermal and/or photovoltaic solar plant, by calculating the potential and possible energy use.

Title of the LO	To determine the feasibility of photovoltaic solar installation projects		
Title UNIT 3:	Drawing up proposals for PV solar installations		
Nº of ECVET credits:		EQF level: 5	
Knowledge	• Sites and feasibility of solar energy installations. • Energy needs. Calculations. • Solar potential of an area. Tables and measuring systems. • Site factors. Orientation, inclination and shadows. • Architectural and structural systems. Architectural integration. • Feasibility. Economic and financial factors. • Promotion of solar installations. • Promotion of renewable energy. • Energy models and policies. • International, national and regional contexts of solar energy. • Economic and financial studies on solar installations. • Technical Building Code, Town planning and regulations applicable. • Policy framework for subsidies. • Legislation and tenders.		
Skills	• Studying the components required for the solar installation, using the technical information provided by the manufacturers of solar units, making any calculations needed, and adapting it to the users needs. • Making a study of the best site, number and size of the collectors or panels, taking into account the building where it is to be placed, shadows, energetic efficiency, economy of means, simplicity, robustness, and maintenance conditions, and other factors in determining the best use of solar energy. • Making a study of the visual impact of the installation, ensuring that it is the least possible, depending on the user's interests, regulation requirements and how it can be positioned. • Specifying and preparing the proposal, including technical characteristics, general diagrams, additional sketches and orientation on compliance with regulations, possible subsidies and channels of finance. • Providing the user with the information and assessment in response to various issues that may arise on technical characteristics, regulations applying, economic viability, maintenance demands, reliability, guaranteed supply and other aspects relating to the		

	PV solar installation.
Competence	• Compliance with current standards and regulations. • Rigorous, reliable calculations. • Orderly and methodical attitude when carrying out tasks, and perseverance should difficulties arise. • Interest in updating knowledge. • Willingness to perform tasks assigned. • Organisation and method in work. • Commitment to deadlines for finishing tasks. • Compliance with reliability and quality parameter. • Coherence in justifying decisions taken on technical grounds for the cases proposed.
Performance Criteria	• To study and assess energy needs and justify the use of photovoltaic solar energy. • To calculate the best site for the collectors, panels and various units for solar installations, taking into account shadows, energetic efficiency, economy of means, simplicity, robustness, and maintenance conditions, and other factors in determining the best use of solar energy • To evaluate building construction • To perform shading analysis for projects using site observation, drawings, and other data • To make simulations and forecasting of photovoltaic system • To find the top performing and cost – effective variants • To calculate the characteristics of different elements and components in circuits in solar installations. • To calculate the characteristics of different elements and components in circuits in photovoltaic solar installations. • To provide information and a summary of the regulatory framework relating to authorising the installation and demands arising from the same. • To provide information and a summary of the legal framework relating to possible subsidies for the installation and demands arising from the same. • To make an estimate of the cost of a photovoltaic solar installation, detailing the site, schematic diagram, and costs and savings to be made. • To draw up a document with a formal proposal for a PV energy installation using non-specific computer programs.