

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA

*Técnico Superior en Energías Renovables*

## TRANSLATED TITLE OF THE DIPLOMA (EN)<sup>(1)</sup>

*Higher Technician in Renewable Energy Sources*

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(1) This translation has no legal status.

## DIPLOMA DESCRIPTION

**The holder of this diploma will have acquired the General Competence with regard to:**

Coordinating the assembly process, the commissioning and the management of the operation and the maintenance of wind energy installations. Moreover the holder will have the competence to develop installations, promote projects and manage and carry out the assembly and the maintenance of photovoltaic solar installations. Likewise, the holder will be able to manage and to monitor the assembly and the maintenance, and to carry out first level operations and maintenance of electricity substations.

**Within this framework, the PROFESSIONAL MODULES and their respective LEARNING OUTCOMES acquired by the holder are listed below.**

### "Electrical Systems at Plants"

The holder:

- Characterises electrical systems, interpreting schemes and identifying their characteristics.
- Classifies electric and magnetic materials, recognising their properties and characteristics.
- Calculates circuits in single and three-phase electrical installations used in power plants, using configuration tables and techniques.
- Distinguishes the characteristics of static and rotating electric machines, specifying their constitution and values.
- Characterises the switchgear and control gear and electrical protections in power plants and electrical substations, describing their constitution and operation and interpreting their basic magnitudes.
- Configures secondary back-up systems (safe voltage and continuous stream, amongst others), distinguishing installations and interpreting schemes.
- Carries out electrical measures, using the appropriate equipment and interpreting the results obtained.
- Characterises quality parameters for electric power, applying national and international current regulations and relating them to feed and supply systems.

### "Electricity Substations"

The holder:

- Characterises electricity substations, recognising the different configurations.
- Interprets substation projects, identifying the characteristics and the function of their parts.
- Plans assembly processes of electricity substations, recognising the elements and the assembly characteristics.
- Programs supply plans for the building of electricity substations, specifying their stages and organising logistics.
- Plans controlling and monitoring operations for assembly and commissioning, identifying their specific techniques for systems and elements.
- Carries out the setting out of electricity substations elements and civil works, identifying their use and characteristics.
- Plans the maintenance of electricity substations, recognising their critical points and drafting the safety plan.
- Carries out first level corrective maintenance operations in electricity substations, interpreting technical documentation and applying set procedures.
- Carries out basic operations of the electricity substations systems, equipment and instruments, applying specific techniques.

### **"Remote Control and Automatism"**

The holder:

- Characterises instrumentation, control and measuring elements used in electric power generation installations, selecting elements and assessing parameters.
- Assembles driving devices used in electric power generation installations, recognising their operation and using technical documentation.
- Controls the electric and electronic equipment, setting and adjusting their parameters.
- Determines control electric and electronic equipment at plants, setting and adjusting their control systems.
- Configures automated installations to be applied in processes, recognising the elements and adjusting the parameters.
- Characterises transmission and communication systems for process remote control, recognising their parts and signals.
- Uses automatic control applications with SCADA type software, simulating controls and recognising system adjustments.
- Verifies surveillance and access control networks, operating and setting up elements and systems

### **"Electrical Hazard Avoidance"**

The holder:

- Characterises the physiological effects of electric current, depending upon the level of exposure to it.
- Assesses work risks in the vicinity of voltage, applying set procedures.
- Applies safety protocols to remove voltage from installations and to restore it afterwards, following the established procedure.
- Classifies safety and protective equipment used to avoid electrical hazard, identifying its characteristics and use.
- Applies safety protocols to works in the vicinity of voltage, simulating a safe action.
- Tests performance techniques in the event of an emergency related to high voltage, applying safety and first aid procedures.

### **"Renewable Energy Systems"**

The holder:

- Distinguishes different kinds of renewable energy sources, describing their characteristics and assessing their use.
- Classifies different solar thermal harnessing technologies, recognising their characteristics and their field of application.
- Characterises the operation of small-scale hydroelectric stations, recognising their types and equipment.
- Categorises different marine energy harnessing systems, assessing existing technologies.
- Evaluates the different systems of biofuel harnessing, differentiating technologies and production processes and defining the technologies employed.
- Differentiates the advantages and disadvantages of biomass power stations, recognising their operation and the types of systems.
- Assesses the different types of geothermal energy harnessing systems, describing systems and equipment and identifying their application.
- Evaluates production, use and hydrogen storage systems, recognising their applications.
- Characterises nuclear power stations, recognising their parts and the technology used.

### **"Configuration of Photovoltaic Solar Installations"**

The holder:

- Calculates the solar potential of an area, relating it to the possibilities to implement solar installations.
- Prepares draft projects for different types of basic solar installations, identifying the energy needs and assessing their feasibility.
- Sets up stand alone photovoltaic solar installations, selecting and calculating equipment and elements.
- Sets up grid connected photovoltaic solar installations, analysing connectivity and assessing the cost.
- Selects supporting structures for photovoltaic solar installations, sizing and identifying materials and elements.
- Calculates indoor electrical installations, applying related legislation.
- Represents photovoltaic solar installations, recognising plans and projects and using CAD applications.
- Prepares technical documentation of photovoltaic solar installations, defining operations, procedures and criteria for assembly and maintenance.
- Fills in administrative documentation in order to obtain subsidies, identifying processes and legal documents for their processing.

### **“Assembly Management of Photovoltaic Solar Installations”**

The holder:

- Differentiates types of photovoltaic solar installations for assembly, interpreting technical documentation.
- Selects equipment and elements of photovoltaic solar installations, assessing their use and placement, and recognising their characteristics.
- Prepares documents to plan and monitor the assembly of photovoltaic solar installations, establishing the procedure of its stages and applying supply management techniques.
- Assembles stand alone photovoltaic solar installations, with or without energy support, according to the technical specifications of elements and equipment.
- Assembles grid connected photovoltaic solar installations, of different technologies, according to the legal specifications.
- Prepares the maintenance plan for photovoltaic solar installations, recognising the maintenance operations and breakdown recognition techniques.
- Monitors the maintenance for photovoltaic solar installations, recognising stages and action procedures in installations and systems.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and the equipment to prevent them.

### **"Assembly Management of Wind Farms"**

The holder:

- Characterises wind energy installations, considering their elements and recognising their function.
- Plans the assembly of wind energy installations, using projects and manuals.
- Characterises assembly processes used for offshore wind farm projects, recognising the differences with onshore wind farms.
- Prepares supply plans for the assembly of wind farms, using logistics management techniques and applying quality management methodologies.
- Sets up small power wind installations, calculating and selecting elements and systems.
- Carries out assembly operations for wind turbines at wind farms, using real or simulated situations.
- Assesses risks at offshore wind farms, recognising the own characteristics of the installation and the environment.
- Uses different safety and personal protective equipment used for assembly and maintenance tasks of wind farms, defining their use and determining their appropriateness for each installation or system.

### **“Wind Farm Operation and Maintenance”**

The holder:

- Characterises the commissioning processes of wind energy installations, using the existing documentation.
- Carries out commissioning, regulation and control operations in wind energy installations, simulating set procedures and meeting the specifications.
- Prepares the maintenance plan for wind energy installations, identifying specific procedures and actions for systems.
- Defines the procedures for preventive and corrective maintenance at wind energy installations using existing documentation.
- Performs preventive maintenance of wind energy installations, using facilities and set procedures.
- Performs corrective maintenance in wind energy installations, according to the technical features of the equipment and installations.
- Applies action protocols from the field of emergency situations and first aid at wind farms, in accordance with safety regulations, basic health care procedures and set emergency plans.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and the equipment to prevent them.

### **“Project on Renewable Energy Sources”**

The holder:

- Identifies the needs of the production sector, relating them to model projects which may fulfil them.
- Designs projects related to the competences described in the diploma, including and developing the stages making it up.
- Plans the implementation of the project, determining the intervention plan and the attached documentation.
- Defines the procedures for monitoring and control the implementation of the project, justifying the selection of the variables and tools used.

### **“Professional Training and Guidance”**

The holder:

- Selects job opportunities, identifying the different possibilities of labour integration, and the alternatives of lifelong learning.
- Applies teamwork strategies, assessing their effectiveness and efficiency on the achievement of the company's goals.
- Exercises rights and complies with the duties derived from labour relationships, recognising them in the different job contracts.
- Determines the protective action of the Spanish Health Service in view of the different covered eventualities, identifying the different types of assistance.
- Assesses the risks derived from his/her activity, analysing job conditions and risk factors present in his/her labour setting.
- Participates in the development of a risk prevention plan for a small enterprise, identifying the responsibilities of all the agents involved.
- Applies protection and prevention measures, analysing the risk situations in the labour setting of the Higher Technician in Renewable Energy Sources.

### **“Business and Entrepreneurial Initiative”**

The holder:

- Recognises the skills related to entrepreneurial initiative, analysing the requirements derived from job positions and business activities.
- Defines the opportunity of creating a small enterprise, assessing the impact on the sphere of action and incorporating ethic values.
- Carries out the activities for the setting-up and implementation of a company, choosing its legal structure and identifying the associated legal obligations.
- Carries out basic administrative and financial management activities of an SME, identifying the main accounting and tax obligations and filling in documentation.

### **“On the Job Training”**

The holder:

- Identifies the company's structure and organization relating them to the production and the marketing of electric power by means of renewable energy sources with photovoltaic and wind energy systems.
- Applies labour and ethic habits in his/her professional activity according to the characteristics of the job position and the procedures established by the company.
- Analyses the characteristics of photovoltaic and wind energy installations from a draft project or given conditions, applying relevant regulations and regulations.
- Plans the assembly of wind and/or solar farms, establishing stages and allocating resources from the project's technical documentation.
- Monitors operations in wind farms and photovoltaic solar installations, cooperating in their processes and observing safety and quality protocols set by the company.
- Performs the commissioning of wind and solar farms, monitoring and cooperating in the implementation and following set procedures.
- Monitors first-level maintenance interventions in wind and solar farms, cooperating with their implementations, verifying the achievement of set goals and optimising the available resources.
- Monitors the diagnosis and repairing of breakdowns and dysfunctions in equipment and installations, cooperating with their implementation and verifying the application of corrective maintenance techniques and procedures.

## **RANGE OF OCCUPATIONS ACCESIBLE TO THE HOLDER OF THE DIPLOMA**

The Higher Technician in Renewable Energy Sources works in companies dedicated to develop, assemble, exploit and maintain wind and photovoltaic energy installations intended to produce electric power. Moreover, he/she works in companies related to electric power generation, transport and distribution and companies having high voltage installations. Besides, he/she works in industrial companies carrying out assembly and maintenance tasks at electricity substations.

The most relevant occupations or jobs are the following:

- Management technician for operation and maintenance at wind energy installations.
- Technician responsible for assembly of wind farms.
- Technician responsible for assembly of wind turbines.
- Wind turbine assembly expert.
- Wind farms maintenance expert.

- Solar thermal installations developer.
- Photovoltaic solar installations designer.
- Technician responsible for assembly of photovoltaic solar installations.
- Technician responsible for maintenance of photovoltaic solar installations.
- Technician responsible for exploitation and maintenance of small photovoltaic solar installations.
- Photovoltaic solar installations fitter / operator.
- Person in charge of assembly electricity substations of wind and photovoltaic installations.
- Person in charge of maintenance electricity substations of wind and photovoltaic installations.
- Operator-maintainer at electricity substations of wind and photovoltaic installations.

### **AWARD, ACCREDITATION AND LEVEL OF THE DIPLOMA**

**Name of the body awarding the diploma on behalf of the King of Spain:** Spanish Ministry of Education or the different Autonomous Communities according to their areas of competence. The title has academic and professional validity throughout Spain.

**Official duration of the education/ training leading to the diploma:** 2000 hours.

**Level of the diploma (national or international)**

- NATIONAL: Non-University Higher Education
- INTERNATIONAL:
  - Level 5b of the International Standard Classification of Education (ISCED5b)
  - Level 5 of the European Qualifications Framework (EQF5).

**Entry requirements:** Holding the Certificate in Post-Compulsory Secondary Education (Bachillerato) or holding the corresponding access test.

**Access to next level of education/training:** This diploma provides access to University studies.

**Legal basis:** Basic regulation according to which the diploma is established:

- Minimum teaching requirements established by the State: Royal Decree 385/2011, of 18 March, according to which the diploma of Higher Technician in Renewable Energy Sources and its corresponding minimum teaching requirements are established.

**Explanatory note:** This document is designed to provide additional information about the specified diploma and does not have any legal status in itself.

**COURSE STRUCTURE OF THE OFFICIALLY RECOGNISED DIPLOMA**

<b>PROFESSIONAL MODULES IN THE DIPLOMA ROYAL DECREE</b>	<b>CREDITS ECTS</b>
<b>Electrical Systems at Plants</b>	10
<b>Electricity Substations</b>	11
<b>Remote Control and Automatism</b>	11
<b>Electrical Hazard Avoidance</b>	4
<b>Renewable Energy Systems</b>	7
<b>Configuration of Photovoltaic Solar Installations</b>	7
<b>Assembly Management of Photovoltaic Solar Installations</b>	11
<b>Assembly Management of Wind Farms</b>	11
<b>Wind Farm Operation and Maintenance</b>	12
<b>Project on Renewable Energy Sources</b>	5
<b>Professional Training and Guidance</b>	5
<b>Business and Entrepreneurial Initiative</b>	4
<b>On the Job Training</b>	22
	TOTAL CREDITS
	<b>120</b>
<b>OFFICIAL DURATION (HOURS)</b>	<b>2000</b>

\* The minimum teaching requirements shown in the table above comprise 55% official credit points valid throughout Spain. The remaining 45% corresponds to each Autonomous Community and can be described in the **Annex I** of this supplement.

## INFORMATION ABOUT THE EDUCATION SYSTEM

