Industry subsector: MANAGEMENT OF MAINTENANCE IN WIND ENERGY

KPA 1	MAINTAIN WIND POWER PLANTS		
KPA Description	Carry out the coordination of the assembling and management of the operation and maintenance of parks and installations of wind energy, with the quality and safety required and in compliance with the regulations in force.	Nº of ECVET credits:	EQF level: 4

UNITS of the LO

- Develop a working plan
- Carry out the assembly operations
- Carry out the preventive maintenance operations
- Carry out the corrective maintenance operations

U1. Title:	Description
Develop a working plan	Develop a working plan from an assembly project or a particular maintenance work
U2. Title:	**Description**
Carry out the assembly operations	Carry out the assembly operations of a wind turbine in a wind plant.
U3. Title:	**Description**
Carry out the preventive maintenance operations	Carry out the preventive maintenance operations for a wind plant, interpreting suitably the maintenance manuals and following general instructions on the performances to carry out.

U4. Title:	Description
Carry out the corrective maintenance operations	Carry out the corrective maintenance operations in a wind plant, interpreting suitably the instructions, projects, drawings and maintenance manuals

Title of the LO	MAINTAIN WIND POWER PLANTS		
Title UNIT 1:	Develop a working plan		
LO UNIT Reference info:	Reference document / link		
Nº of ECVET credits:		EQF level:	4
Knowledge	• Technical documentation. • Kind of plants. • Assembly of wind parks and wind turbines. • Methodological specifications for the assembly of wind turbines and wind parks. • Procedures and operations to prepare and rearrange the plants. • Assembly stages, organisation and safety plan.		
Skills	• Identify and find the placement of the different components of the assembly or plant • Interpret the technical drawings and specifications of the equipment and the plant to be maintained. • Determine the possible dysfunction between the plant project and the features of the received materials or the placement itself. • Establish the sequence for the assembly tasks basing on technical instructions, drawings and documents. • Choose the materials, tools and other technical resources required for the kind of wind plant to perform. • Prepare the working area according to the work requirements and according to established working proceedings.		
Competence	- Commitment with the established plans for the execution of tasks - Perseverance against difficulties - Tidy and methodical attitude when performing the tasks.		

Means of verification	• Develop a working plan from an specific assembly project or a maintenance work. • Identify the different elements of a wind plant in an assembly project or technical memorandum • Draw simple symbol diagrams related with the assembly detail or with a maintenance performance • Describe the tasks to carry out in the assembly or maintenance, sequencing them and describing the tools and equipments to use. • Define the features of the working environment before starting the maintenance activity, pointing out the safety requirements.

Title of the LO	MAINTAIN WIND POWER PLANTS		
Title UNIT 2:	Carry out the assembly operations		
LO UNIT Reference info:	Reference document / link		
Nº of ECVET credits:		EQF level:	4
Knowledge	• Assembly, sitting, alignment and fastening techniques • Assembly of nacelles and blades. • Assembly of protection boards, automatisms and electric networks • Assembly of sensors, measurement machines and accessories. • Assembly of transformers. • Assembly quality. Technical prescription specifications. • Safety systems. • Work technical document process. Parts of the work.		
Skills	• Perform the movement and placement of materials and equipment according to the Project logistics, the means of transport and lifting required and under safety conditions. • Carry out the assembly of the tower stretches, checking their alignment, verticality, grip torques and sealing. • Assemble the transformer at the tower base, according to established procedures • Place the nacelle in the tower, checking its suitable alignment and verticality. • Assemble the rotor according to established procedures, checking the horizontality of the bush, the grip torques and the state and setting of the blade. • Perform the medium and low power electric installation and control according to the established procedures. • Perform the assembly of an autonomous wind electric power plant, wireless, according to the project and drawings.		
Competence	- Collaboration and integration in a working team - Tidy and clean works and activities - Autonomy and responsibility to organize and control one’s own work		

Means of verification	• Carry out the on-the-spot rearrangement of the necessary materials and equipments, determining their placement for their assembly. • Describe the procedures for the assembly of the tower parts or the corresponding structure, establishing the alignment, verticality and fastening requirements. • Carry out the operations to place the nacelle, or the turbine in the tower, with the required safety and quality criteria. • Carry out the electric connexions of the different equipments, the generator and the transformer. • Carry out the Assembly operations of small wireless wind plants.

Title of the LO	MAINTAIN WIND POWER PLANTS		
Title UNIT 3:	Carry out the preventive maintenance operations		
LO UNIT Reference info:	Reference document / link		
Nº of ECVET credits:		EQF level:	4
Knowledge	• Kinds of breakdowns. • Preventive maintenance • Maintenance program • Operations to exchange equipments • Mechanic operations in the wind plant maintenance • Electric operations in the circuit maintenance. • Usual equipments and tools. • Cleaning equipments and premises. Kinds and procedures. • Greasing equipments: Kinds and procedures.		
Skills	• Check the general setting of the grip torques with the regulatory frequency. • Perform greasing and changing oil according to the established procedures and under the required safety conditions • Perform the equipment and plant cleaning operations with the suitable means and according to the established procedures. • Check the correct sealing and the absence of rust in the equipment and plant with the corresponding frequency. • Check the electric isolation state of the equipments and the plant with the corresponding frequency. • Inspect and keep the used equipment and tools in perfect state of operation • Write the corresponding report of the inspections and operations results.		
Competence	- Evaluate the importance of the preventive management - Commitment with the encouragement of safe behaviours - Controlled and safe attitude against possible contingencies. - Initiative in emergency situations.		

Means of verification	• Check and scale the grip torques of the different equipments and elements. • Grease and change the multiplier oil and that of other dynamic elements of the wind turbine. • Check and maintain in the suitable state of cleaning and sealing, the wind equipment and plants • Check and maintain the electric equipments to ensure their good work. • Write the reports and documents associated to the preventive maintenance tasks.

Title of the LO	MAINTAIN WIND POWER PLANTS		
Title UNIT 4:	Carry out the corrective maintenance operations		
LO UNIT Reference info:	Reference document / link		
Nº of ECVET credits:		EQF level:	4
Knowledge	• Breakdown diagnose in wind plants • Procedures of mechanic and electric isolation of the different components. • Methods to repair the different components in the plants. • Disassembly and repair or replacement of equipments and components. • Economic analysis of the performances. • Usual equipments and tools. • Systems to check and procedures to start installation.		
Skills	• Detect and analyse the different breakdowns. • Evaluate the causes of breakdowns • Establish a performance sequence in case of breakdown, optimising the process, regarding safety, method and time. • Choose the suitable equipment, tools, materials, instruments and auxiliary means required to repair the breakdown. • Perform the repair or replacement of the damaged element, following the sequence of the established disassembly and assembly process, within the planned time with the required quality and checking its operation. • Bring the plant functionality back as soon as required, with the required quality and safety. • Fill in suitably the reports of the repair carried out.		
Competence	- Evaluate the importance of the preventive management - Commitment with the encouragement of safe behaviours - Controlled and safe attitude against possible contingencies. - Initiative in emergency situations.		

Means of verification	• Detect, analyze and evaluate the usual unspecialised breakdowns. • Develop a performance sequence complying with the systematic methods and procedures to solve breakdowns, ensuring quality and safety in the performance. • Define the equipments, tools and instruments required to repair the detected breakdown • Repair or replace the broken element and check its good work before restoring the service. • Define the necessary protocols for the reestablishment of the wind turbine to its nominal operation. • Write the reports and documents linked to the corrective maintenance tasks.