ERASMUS+ PROJECT

windEXT

ADVANCED MAINTENANCE, LIFETIME EXTENSION & REPOWERING OF WIND FARMS SUPPORTED BY ADVANCED DIGITAL

Co-funded by the Erasmus+ Programme of the European Union

WEBINAR

29th March
10:00h-13:00h

windEXT moodle

1. Project Introduction. What is WINDEXT?
2. WINDEXT Moodle. How to use the Platform?

REGISTER HERE →

3. Section 1 Moodle. Introduction to Wind Turbine Technology
4. Section 2 Moodle. Maintenance. Handbooks & Virtual Tools
5. Section 3 Moodle. Life Extension, Repowering & HSE
6. How to download and use the VR simulator
7. Project Conclusions
8. Questions

Project Consortium

AEE 8.2 RSConsultant DP2I Tesicnor INESCTEC TU Delft FUCLM University of Cyprus UTEC SGS

PROJECT INTRODUCTION. WHAT IS WINDEXT?

ALBERTO CEÑA

PROJECT GOAL

THE GOAL OF THE PROJECT IS TO DEVELOP AND STANDARDIZE SPECIALIZED TRAINING INTEGRATING DIGITAL TOOLS LIKE VIRTUAL REALITY OR 360º VIDEO TOURS TO COMPLETE THE CLASSICAL THEORETICAL METHODS.

FURTHERMORE, THE PROJECT IS AN ADVANCED INTEGRATION OF PARTNERS OF DIFFERENT PROFILES AND EXPERIENCES TO FACILITATE THE EXCHANGE OF KNOWLEDGE BETWEEN UNIVERSITIES, VOCATIONAL TRAINING CENTERS AND PRIVATE COMPANIES, IN A MODEL THAT IT IS NOW FOLLOWED IN DIFFERENT COUNTRIES TO FACILITATE THE EMPLOYABILITY OF STUDENTS LEAVING BOTH TYPES OF CENTRES FROM DIFFERENT COUNTRIES.

LACK OF SPECIALIZED WORKERS

DIFFICULTIES TO GET ACCESS TO THE NACELLE OR TO BUY AN OLD ONE

INTEGRATION OF UNIVERSITIES WITH VOCATIONAL TEACHING CENTERS

PROJECT FUNDED BY THE ERASMUS + PROGRAMME OF THE EUROPEAN UNION

PROJECT

CONSORTIUM

11 partners from 7 different countries

+

COORDINATOR

AEE
Spanish Wind Energy Association

8.2 The Experts in Renewable Energy

RSConsultant

DP2I

Tesicnor

INESCTEC

TUDelft

UCLM

University of Cyprus

UTEC
Universidad Tecnológica

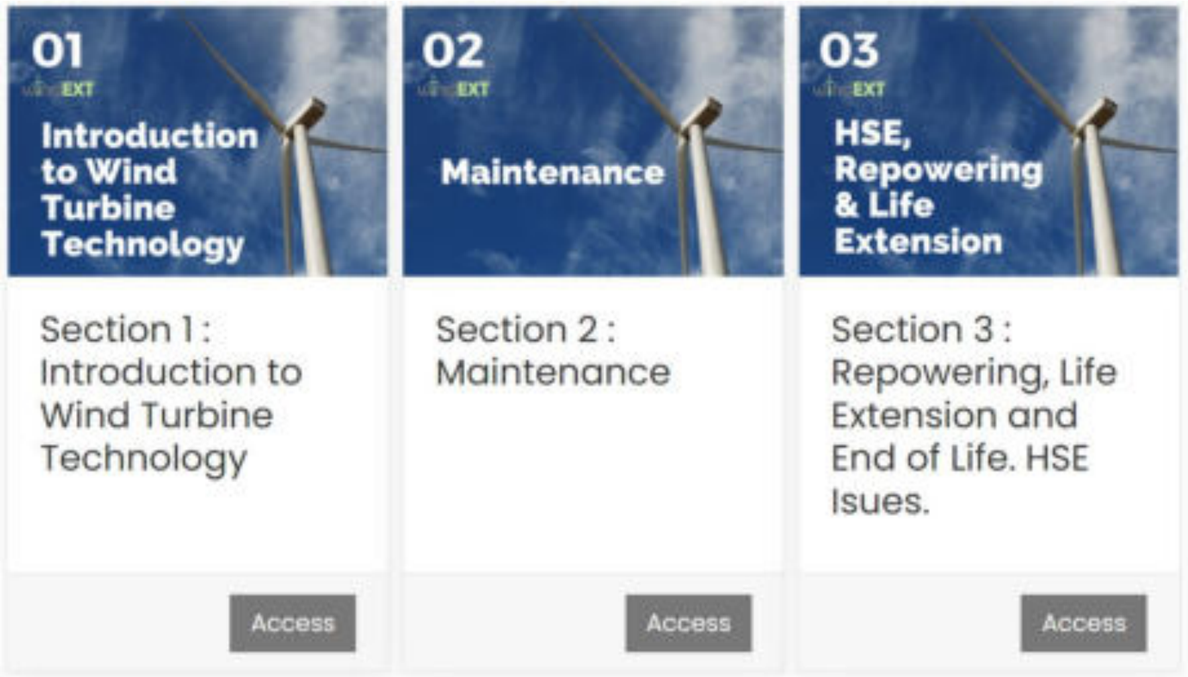
SGS

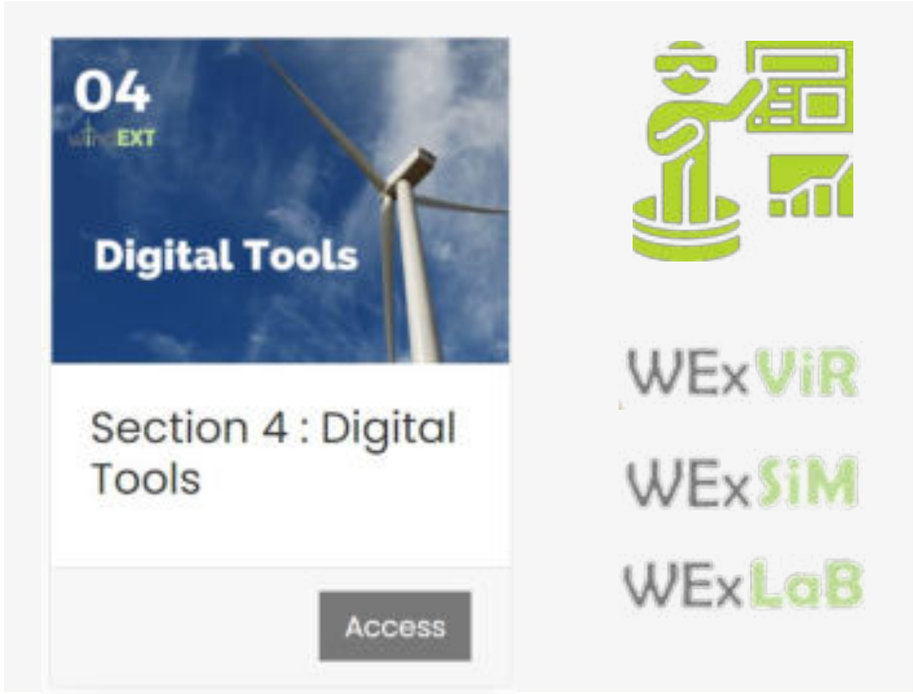
OUTCOMES

The main outcomes are in the WINDEXT MOODLE PLATFORM: http://windext.cs.ucy.ac.cy/moodle/

PROJECT STRUCTURE

Documentation + Virtual Reality





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windEXT moodle

WExVIR

WExSIM

WExLaB

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BY NC ND

AEE
Asociación Empresarial Eólica

WExSIM
OCULUS QUEST2

www.windext.com

SIMULWIND

Vive PRO
Vive PRO 2
OCULUS QUEST 2

www.simulwind.com

THE IMPORTANCE OF MAINTENANCE IN THE PROJECTS ASSET MANAGEMENT

LIFE CYCLE PROJECT MANAGEMENT

Lifecycle project management

Support to the owner throughout the project phases:

- Development
- Construction
- Operation
- Decommissioning

Contract scoping
Risk identification & tracking
Cost management
Execution of obligations

FINANCIAL MANAGEMENT

Commercial and Financial Asset Management

- Strategy management
- Corporate administrative services
- Financial reporting
- Accounting
- Customer relationship
- Accounting assistance
- Invoicing / billing and payments
- Revenue control
- Cash flow management
- Working capital reconciliation
- Financial control
- Contract management
- Suppliers account management
- Suppliers penalites invoicing
- Interface with banks and investors
- Equity/debt financing management
- Tax preparation, filing and administration

MAIN PROJECT TECHNICAL TASKS

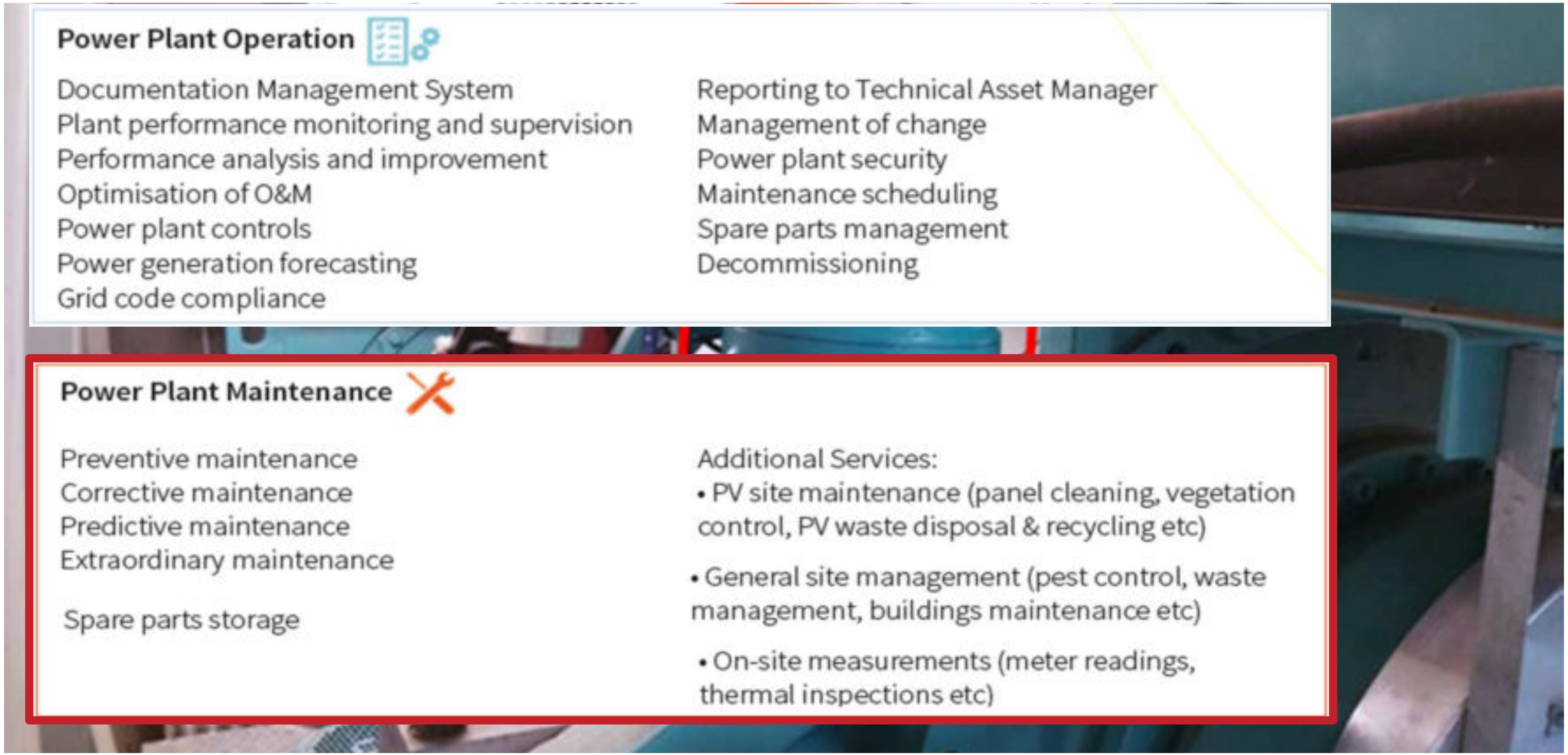
Procurement

Supplier selection and evaluation
Supply account control
Supply chain control

Technical Asset Management

Reporting to asset owner
Site visits and non-instrusive inspections
Management of ancillary service providers
Interface with local energy authorities
Regulatory compliance
Warranty management
Insurance claims
Contract management
Asset optimisation
Environmental management
Health & safety mangement

MAIN O&M PHASES



Power Plant Operation

Documentation Management System
Plant performance monitoring and supervision
Performance analysis and improvement
Optimisation of O&M
Power plant controls
Power generation forecasting
Grid code compliance

Reporting to Technical Asset Manager
Management of change
Power plant security
Maintenance scheduling
Spare parts management
Decommissioning

Power Plant Maintenance

Preventive maintenance
Corrective maintenance
Predictive maintenance
Extraordinary maintenance

Spare parts storage

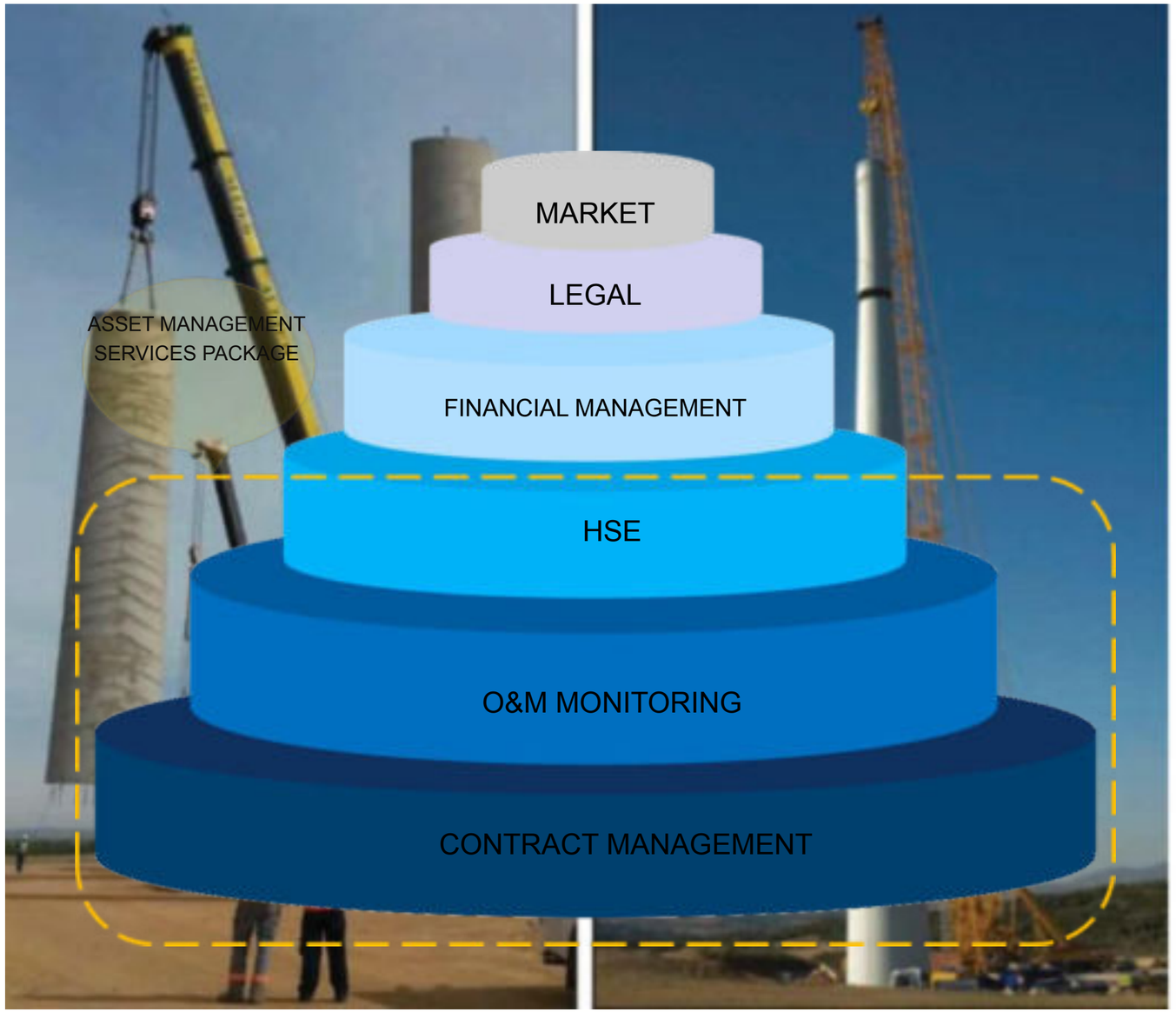
Additional Services:

- PV site maintenance (panel cleaning, vegetation control, PV waste disposal & recycling etc)
- General site management (pest control, waste management, buildings maintenance etc)
- On-site measurements (meter readings, thermal inspections etc)

MONITORING OF THE O&M TASKS

- MANAGEMENT OF THE O&M CONTRACT OF ALL CONTRACTORS AND MONITORING OF THE OBLIGATIONS OF GUARANTEE.
- ENSURE THE CORRECT MANAGEMENT OF THE STOCK, TOOLS AND SPARE PARTS
- ENSURE THAT THE CONTRACTOR HAS THE RIGHT STAFF AND RESOURCES WITH THE NECESSARY TRAINING AND SKILLS.
- VALIDATION OF ENERGY PRODUCTION AND STUDY OF THE REASONS THAT CAUSE DEVIATIONS AND ANALYSIS OF ALARMS AND ERRORS GENERATED BY THE SCADA.
- TRANSFER BEST PRCTICAES FOR OPTIMIZING O&M ASSETS.
- GENERATE THE REQUIRED CLAIMS AGAINST THE O&M PROVIDER.
- PARTICIPATION IN THE IMPLEMENTATION Y MONITORING OF THE PLAN ANNUAL OF MAINTENANCE.
- ANALYZE THE BEHAVIOR AND EVALUATE THE GUARANTEES OF THE WIND

CONTRACTING SUMMARY



CM

CONTRACT MANAGEMENT

CENTRALIZATION OF THE MANAGEMENT ALL SUPPLY CONTRACTS AND O&M.

O&M

O&MMONITORING

Monitoring of the O&M of the contracted services

HSE

HSE MANAGEMENT

Management of the safety

FM

FINANCIAL MANAGEMENT

FINANCIAL MANAGEMENT, INVOICING, COLLECTIONS, ETC. OF THE SPV. CONTROL OF THE BUDGET.

L

LEGAL MANAGEMENT

LEGAL ADVICEWITHINTHE FRAMEWORK OF THE OPERATION OF THE PROJECT

M

ELECTRICAL MARKET

ENERGY MANAGEMENT WITH MARKET AGENTS

TRANSITION OF STATES: PROBLEMS

CONTRACTUAL IMPLICATIONS OF O&M SERVICES

• MAINTENANCE MANAGEMENT

ROOT CAUSE ANALYSIS

- INCIDENT TRACKING
- ANALYSIS OF INFORMATION AND IDENTIFICATION OF ROOT CAUSES
- PROPOSE IMPROVEMENT INITIATIVES
- EVALUATE POWER IMPACT
- MAINTENANCE EXECUTION

PROCESS DEFINITION AND IMPROVEMENT

- UPDATE IN THE MAINTENANCE MANUAL THE IMPROVEMENTS AND INITIATIVES LAUNCHED
- Establish guidelines for its implementation and monitoring

• LOGISTICS & WAREHOUSE

DEFINITION OF STOCK LEVELS

- DEFINE OPTIMAL STOCK OF LARGE COMPONENTS, SMALL MATERIALS AND CONSUMABLE SPARE PARTS, AS WELL AS LOCATION
- CONTINUOUS UPDATING OF STOCK LEVELS

WAREHOUSE MANAGEMENT

- LOCATE SUPPLIERS
- CONTRACTS FRAME FOR SUPPLY OF COMPONENTS Y MATERIAL
- CONTROL STOCK LEVELS
- COLLECT SPARE PARTS AND CONSUMABLES
- RENTAL SERVICES

• MAINTENANCE EXECUTION

FAULT IDENTIFICATION

- LOCALIZATION OF FAULTS AND INCIDENTS
- IMMEDIATE LOCAL OR REMOTE RESOLUTION IF POSSIBLE
- START LOCAL DIAGNOSTICS IF APPLICABLE

WORK ORDERS

- PREPARE WORK EXECUTIONS ORDEERS IN WIND FARMS
- LAUNCH PREVENTIVE MAINTENANCE ORDERS
- CONTROL THE QUALITY OF WORK EXECUTION

EXECUTION

- PERFORM WORK ACCORDING TO ORDERS ISSUED
- SUPPLY THE INFORMATION REPORT TO THE SYSTEM OF MANAGEMENT

WINDEXT MOODLE
HOW TO USE THE PLATFORM?

MARIOS KYPRIANOU
UCY

SECTION 1 MOODLE:
INTRODUCTION TO
WIND TURBINE TECNOLOGY

SIMON WATSON
TUDELFT

- Written material on Moodle platform
- Software
- Quizzes

windEXT

- Introduction to wind turbine components
- Design of a wind turbine rotor
- Load analysis
- Modal analysis
- Operation and control of a wind turbine
- Wind farm component layout and design criteria
- Reliability, failures, faults and fault tree analysis

- System level analysis
- Load analysis
- Modal analysis
- Operation and Control
- Fault tree spreadsheet

- Test knowledge on basis of written material
- Multiple choice/response
- Numerical answer
- Drag and drop

SECTION 2 MOODLE: MAINTENANCE. HANDBOOKS AND VIRTUAL TOOLS

ESTEFANÍA ARTIGAO
UCLM

SECTION 3 MOODLE: LIFE EXTENSION, REPOWERING & HSE

JAUME REINOSO

DP2I

HOW TO DOWNLOAD & USE THE VR SIMULATOR

DAVID GONZALEZ
TESICNOR

PROJECT CONCLUSIONS

SASCHA CLAES
ELENA TYLKO
RSC & SGS