

Training Course

WIND TURBINE PERFORMANCE OPTIMISATION

OVERVIEW

Maximising revenue from operational wind turbines is a challenging task with many technical and organisational aspects. Effective operation and maintenance strategies must be applied in order to achieve the highest possible turbine availability and performance at reasonable cost. In this course a methodology is presented for increasing profitability from

existing assets. The complete process consists of performance analysis, specialised turbine inspection, corrective measures and continuous monitoring. This proven approach is described in detail and the key techniques and tools required for its implementation are explained.

TYPICAL PARTICIPANTS

- Managers or engineering staff responsible for wind turbine operations
- Fleet analysts and control centre staff wishing to learn new techniques and applications for data analysis

MAIN SKILLS DEVELOPED

- Detailed understanding of theory relating to wind turbine performance
- Practical techniques for performance analysis using operational data
- Understanding of techniques for improving turbine performance
- Knowledge of the approach required to introduce new optimisation processes

LOCATION

- Training centre at Uptime Engineering in Graz, or on location at customer premises

LANGUAGE

- English

DURATION

- 2 day training course

PRICE

- €1.500 for 2 day training at Uptime Engineering in Graz



COURSE STRUCTURE

INTRODUCTION

- Holistic view of wind energy
- Turbine technology, wind power plants, wind energy markets
- Opportunities and challenges relating to maximising profitability of wind energy
- Overview of the main steps within an optimisation process

TECHNICAL ASPECTS

Turbine performance theory

- Wind turbine efficiency and blade aerodynamics
- Theoretical limits to performance increase
- Fundamentals of turbine power curves, turbine performance maps
- Wind resource: complex flows, veer, sheer, wake effects
- Instrumentation and measurement
- Alignment: pitch, yaw, anemometers
- Performance versus reliability

Performance analysis techniques

- Practical applications of turbine performance analysis
- Operational data access, taxonomy and data validation
- Hierarchical approach to large scale fleet analysis
- Real time monitoring and visualisation
- Information visualisation, KPIs
- Performance benchmarking and trending
- Root cause diagnosis, deriving actions from analysis results

Performance optimisation

- Major causes of underperformance, cost and reliability trade-offs
- Review of available technologies and techniques for optimisation
- Blade deterioration, inspection and repair
- Turbine alignment improvements
- Advanced techniques: wake control, control optimisation
- Production based availability, generation forecasting

PROCESS INTEGRATION & CONTINUOUS IMPROVEMENT

- Integrating techniques into a complete process
- Effective communication and coordination
- Documentation and tooling
- Continuous, online performance monitoring
- Energy markets, contracts and revenue optimisation

INCLUDED EXERCISES

- Power curve analysis including data filtering and correction techniques
- Hierarchical analysis: fleet level, site level, turbine level, root cause diagnosis
- Basics of wind resource assessment
- Data mining, aggregation, development of KPIs