

## Module 5: Economics of offshore wind farms

Hochschule Bremerhaven, Bremerhaven, Germany  
& Business Academy Southwest, Esbjerg, Denmark

Module Type: Core Module

ECTS/weighting: 5 ECTS / 0.083 Full-time equivalent

Contact time: 30 hours

Self-Study: 120 hours

Frequency offered: Every 18 months

Offered in: Delft, The Netherlands

Group size: max. 15 participants

### Course theme

Most of the factors affecting the costs associated with the different phases of the lifecycle of offshore wind projects are site-specific, complex, interrelated, and dynamic. This situation complicates the decision making process when trying to compare among various alternatives for a given situation.

Systems thinking is an interdisciplinary field focusing on how the interaction of subsystems in complex projects, such as offshore wind farms, affect the overall performance over their lifecycles, including design, development, testing, construction, operation and decommissioning.

### Module specific learning outcomes

Students will be able to...

- financially and strategically model different scenarios, taking most of the variables affecting the lifecycle of offshore wind projects into consideration
- increase the predictability in the economic effect of a decision on the overall lifecycle of a project
- provide support in the evaluation of new technologies or in evaluating new methods to speed up harbor and vessel operations
- determine whether investments make economic sense

### Content

During this module, the students will learn how to:

- Translate offshore wind specific situations into measurable requirements and model systems to create and evaluate different scenarios.
- Learn the fundamentals of finance and financial modelling to analyse economic risks over the lifecycle of offshore wind farms.
- Calculate the impact of changing parameters in the different scenarios and provide estimations of the time and costs to be incurred in each of them.
- Explain how the different components of an offshore wind farm system interrelates with each other

- Approach different stakeholders to understand their needs and examine feasible alternatives before selecting a solution.
- Participate in multidisciplinary teams to produce models that are robust, high quality and responsive.

### Teaching methods

- Innovative teaching methods: We strive for actual competencies needed in the industry . During class, actual consultancy tasks and problems will be presented and the MBA students will then apply theory in a real-time scenario and solve actual problems for the partner firms.
- Self-study: We expect the participants to hold a high degree of self-discipline and show up well prepared to class, being motivated to share their knowledge.
- Live cases: Business cases will be analysed to prepare the participants for future leadership requirements within wind energy.
- Workshops: Students will meet up physically two times during the module, to solve actual problems raised by partner firms.
- Forum, chat and messaging: All students can get in contact with their lecturer and fellow students to discuss, elaborate and clarify issues, ask questions and exchange views.

### Examination:

To be able to pass the course, the participants must show understanding of the theory, be able to put the theory into a practical context and create good solutions for the study cases. They will create models to simulate different scenarios along the lifecycle of an offshore wind farm, and will present recommendations of strategies to be followed by “the Board of Directors”. They will also have individually feedback, where their solution, role in the team and teamwork will be discussed and evaluated.

The form of evaluation is a portfolio, which will consist of:

- Active involvement during physical workshops
- Oral and written presentation of assignments (including eventual updates)
- Reflection over the course and feedback

### General learning outcomes

The following general learning outcomes are covered by this module. Students will be able to..:

- Autonomously read on new theories and methods (LO1)
- Apply new theories and methods to practical challenges (LO2)
- Evaluate upon application of theory and methods (LO3)
- Identify risks and challenges by analyzing data gathered and use them for decision making (LO5)

- Integrate business knowledge, analytical skills and management techniques for planning and controlling (LO6)
- Evaluate consequences of solutions (LO7)
- Communicate challenges and solutions to relevant stakeholders (LO9)

**Subject director:**

Prof. Dr. Wolfgang Lukas

**Lecturers:**

Ivan F. Martinez-Neri, PhD

Tobias van Baarsen, Green Giraffe

**Literature:**

- Levitt, A.C., Kempton, W., Smith, A.P., Musial, W. and Firestone, J., 2011. Pricing offshore wind power. Energy Policy, 39(10), pp.6408-6421.
- Offshore Wind in Europe - Key trends and statistics 2018. Available at: <https://windeurope.org/about-wind/statistics/offshore/>
- Driving cost reductions in offshore wind. Available at: <https://windeurope.org/wp-content/uploads/files/about-wind/reports/LEANWIND-Driving-cost-reductions-in-offshore.pdf>
- Chapter 4 of The Power to Change: Solar and Wind Cost Reduction Potential to 2025. Available at: <https://www.irena.org/publications/2016/Jun/The-Power-to-Change-Solar-and-Wind-Cost-Reduction-Potential-to-2025>