

Tecnomatix

## Institute of Shipping Economics and Logistics

Logistics simulation helps lower offshore wind power project costs

### Industry

Energy and utilities

### Business challenges

Difficult environment for wind farm installations

Narrow weather window for assembling wind stations

Synchronization of production and logistics

Ensuring the customer's return-on-investment

Orchestrating a complex supplier network

### Keys to success

Logistics simulation with Tecnomatix Plant Simulation

Supply chain modeling

Ability to run what-if planning scenarios

Linking production to logistics for smooth project execution

### Results

Logistics costs reduced by 10 percent

Potential delays predicted; alternative plans established

**Using Tecnomatix, logistics processes are optimized to ensure projects can be executed in a short-weather window, boosting return on wind power investments**

### Offshore wind farms pose challenges to maritime logistics

The Institute of Shipping Economics and Logistics (ISL), founded in 1954, is one of Europe's leading institutes in the area of

maritime research, consulting and knowledge transfer. From offices in Bremen and Bremerhaven, Germany, the organization's interdisciplinary teams take on projects from all over the world, such as optimizing logistics of offshore wind power engineering.

Wind farm construction projects in the North, Irish and Baltic seas offer good examples of how the institute works to optimize maritime logistics. Approximately 10,000 new wind power stations will be



### Results (continued)

Ability to evaluate different supply chain strategies

Optimized use of valuable resources such as cranes, ships, ports, etc.

**“With Tecnomatix Plant Simulation software, production and logistics are synchronized perfectly.”**

Prof. Dr. Holger Schütt  
Head of Optimization Simulation  
ISL



erected in these seas by the year 2020. Each giant wind station is assembled offshore in a process that is extremely challenging. “Installation options at sea are limited by wind and waves. You need ideal summer weather, which in this region is often very brief,” says Roger Heidmann, managing director of LSA Logistik Service Agency. “You have to design your entire logistics chain in such a way that you hit the ideal weather window or the entire wind park installation will be delayed. Commissioning will be delayed, and the project becomes economically unfeasible.”

As a logistics consultant, Heidmann is well acquainted with the demands of offshore power engineering. He points out that a wind park investment costs about 1.3 billion Euros (\$1.76 billion USD). Logistics costs account for 20 to 25 percent of that sum. “If you are able to modify some small things to make the logistics more efficient, you can have huge effects on power generation costs and thus electricity prices,” he says.

### Simulation considers problems and probabilities

When ISL was asked to consult on the logistics for these wind farms, it teamed up with the Fraunhofer Institute for Factory Research to develop a computer simulation of the wind station assembly process. The simulation model, which depicts many of the logistical processes, is created with Tecnomatix® Plant Simulation software from Siemens PLM Software.

“Tecnomatix Plant Simulation software is well suited to our needs, because it lets us precisely evaluate all of the various problems and questions regarding offshore wind power assembly,” says Kerstin Lange, a project manager at ISL. “For example, the weather, which is the biggest and most important element of uncertainty. We can adjust its influences very well. We can depict other complicating factors, such as problems or losses that can occur during shipping, loading or transportation.” The ability to model and display the entire



supply chain is another aspect of Tecnomatix Plant Simulation that the institute uses frequently. “We not only look at marine processes, but those on land as well, such as the port, the suppliers, the suppliers’ suppliers,” Lange adds. “This assembly process involves a huge network, and problems can arise anywhere in it. We can easily depict all those probabilities with Tecnomatix Plant Simulation software.”



## Solutions/Services

Tecnomatix Plant Simulation  
[www.siemens.com/tecomatix](http://www.siemens.com/tecomatix)

## Customer's primary business

The Institute of Shipping Economics and Logistics is a research-based consulting institute, advising both public and private organizations on maritime logistics.  
[www.isl.org](http://www.isl.org)

## Customer location

Bremen, Germany

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Kerstin Lange  
Project Manager  
ISL

## Thinking the project through

The simulation, created with Tecnomatix Plant Simulation, not only outlined all of the individual processes of wind turbine assembly, it also forced planners to think through the entire sequence of processes, all the way to the point where construction is ready to begin. "In logistics, you try to synchronize a number of individual processes, so that everything you need arrives at the same time and in the same place," explains Prof. Dr. Holger Schütt, head of optimization simulation at ISL. "How to accomplish this is what we are able to find out with Tecnomatix Plant Simulation software."

Schütt gives the example of components coming from overseas. If customs papers aren't issued, that interruption in the supply chain can delay or stop the entire project. "Small errors can have huge effects," he says. "In the planning stage, we want to be able to predict the consequences of problems such as these." Logistics simulation created with Tecnomatix Plant Simulation enables the evaluation of different supply chain strategies. In addition, valuable resources such as cranes, ships and platforms are used to their optimal capacities. "With Tecnomatix Plant Simulation software, production and logistics are synchronized perfectly," Schütt adds.

On the wind farm project, a number of simulation runs were needed to create an efficient, practical logistics plan. The results more than justified the effort, according to Heidmann.

"Actually, the simulation verified our expectations that efficient logistic systems can positively affect power generation costs," he notes. "That effect is on a scale of about ten percent. If you compare this with other technology developments,



better rotor blades, better stations, then this definitely is a huge step.

"There are plans to install approximately 10,000 offshore stations in the North Sea, Baltic Sea and Irish Sea within the next ten years, and logistics will have massive effects on these projects," notes Heidmann. Logistics optimization ultimately affects the return on project investment. He adds, "With the savings we can achieve using Tecnomatix Plant Simulation, everyone benefits, because it expands the availability of cost-efficient and eco-friendly power."

## Siemens Industry Software

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