

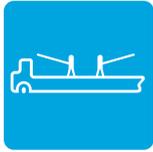
Case Study

Saskatchewan, Wind Farm Project





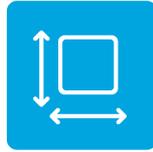
Industry
Wind energy



Chartering
6 chartered vessels



Volume
Approx.
337,000 FRT



Biggest items
150 blades with
a length of 76 m
each



Heaviest items
50 generators/
nacelles with a
unit weight of
101 MT



**Stowage
concept**
8-9 WTGs per
shipment



**Fully loaded vessel at the Port of
Lianyungang, China**

Case Study: Saskatchewan, Wind Farm Project

deugro China, in cooperation with deugro USA, delivered 50 sets of wind turbine generators (WTGs) for a Canadian Wind Farm Project from China to the USA for further on-carriage to the province of Saskatchewan in Canada.

The total cargo volume of around 337,000 freight tons was shipped on six chartered general cargo vessels from the Port of Lianyungang in China to the Port of Vancouver, Washington, USA. The cargo included hubs, 200 tower sections, 150 blades with a length of 76 meters each, and 50 generators/

nacelles with a unit weight of 101 metric tons, as well as further equipment in three to four shipper-owned containers (SOC) per set. The wind farm is located on approximately 34,000 acres of agricultural land near the town of Assiniboia, Saskatchewan, Canada. In terms of size, it is



Loading of a generator at the Port of Lianyungang, China

one of the 10 largest wind farms in Canada. Consisting of 50 turbines, its generation capacity of 200 megawatts (MW) will power approximately 90,000 households in the Saskatchewan area with clean and sustainable energy.

deugro Beijing received this order due to its sophisticated technical concept for stowing and securing eight to nine sets of WTGs per vessel and ocean voyage. The concept led to a reduction in the number of ocean voyages required, resulting in significant cost and time savings for the client.

» deugro's logistical concept led to significant cost and time savings for the client. «

Since the project coincided with the outbreak of the COVID-19 pandemic, the focus was not only on the safe operational execution, but also on the personal safety of all persons involved in the project. Therefore, deugro conducted virtual COVID-19 QHSES trainings and informed its clients through proactive, biweekly COVID-19 reports on the impact

of the pandemic on the global logistics landscape and different transportation modes, while also outlining the operational and commercial impact on logistics services.

During the project execution, deugro Beijing managed and coordinated the various stakeholders and played a decisive role in critical connections and interfaces between customs, the carrier, the terminal, the shipper and trucking agents. This ensured smooth documentation, reduced documentation-related delays and successfully avoided additional costs.

The project

After approximately one and a half years of project preparation, the operations began with the delivery of the WTG components to the Port of Lianyungang, China. The close communication between deugro and the trucking agent ensured a smooth and orderly delivery into the port and the designated areas.

To ensure the health and safety of all stakeholders at the Port of

Lianyungang during the COVID-19 pandemic, while maintaining smooth and safe operations, deugro's local team quickly provided appropriate personal protective equipment (PPE) and ensured that the subcontractors and personnel involved followed and complied with the applicable pandemic prevention measures.

Since the cargo to be received by deugro was ahead of schedule, a storage area was required on short notice. Although appropriate storage space for such large cargo volumes is very limited in the Port of Lianyungang, the experienced team of deugro Beijing managed to arrange for and allocate appropriate storage space through negotiations with the Lianyungang Terminal, the port agent and the client. The storage space management, including personal supervision and coordination of all activities as well as cargo inspection and provision of regular status reports, was executed by the local deugro teams.

Upon the vessels' arrival, the various WTG components were safely loaded onto lowbed trailers and extendable blade trailers using two 30-metric-ton mobile port cranes. After the individual components were secured on the trailers, they were moved from the storage area to the berth.

In accordance with deugro's customized stowage concept, the components were loaded onto the vessels using the lift-on/lift-off (LO/LO) method. Two port cranes with a lifting capacity of 40 metric tons each and a port floating crane with an SWL of 250 metric tons were used for this purpose.

The loading and the precise stowage and load securing on the vessels according to the method statements required an average of four to five days before the vessels were ready to set sail. All operations were managed and supervised by the local deugro teams, in addition to an independent surveyor.

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Project challenges

- Stowage and securement of 8 to 9 WTG sets per vessel in accordance with IMO standards
- Safe project execution during the height of the COVID-19 pandemic
- Coordination of huge cargo volumes arriving at the port
- Safe handling of cargo units with lengths of up to 76 m and weights of up to 101 MT



To ensure safe operations, various analyses, technical studies, simulations and calculations were prepared, including evaluations of marine engineering covering stability and ballasting calculations, lifting and cargo securing calculations, and mooring analyses.

» deugro's customized stowage concept in accordance with IMO standards reduced the number of ocean voyages to a minimum. «

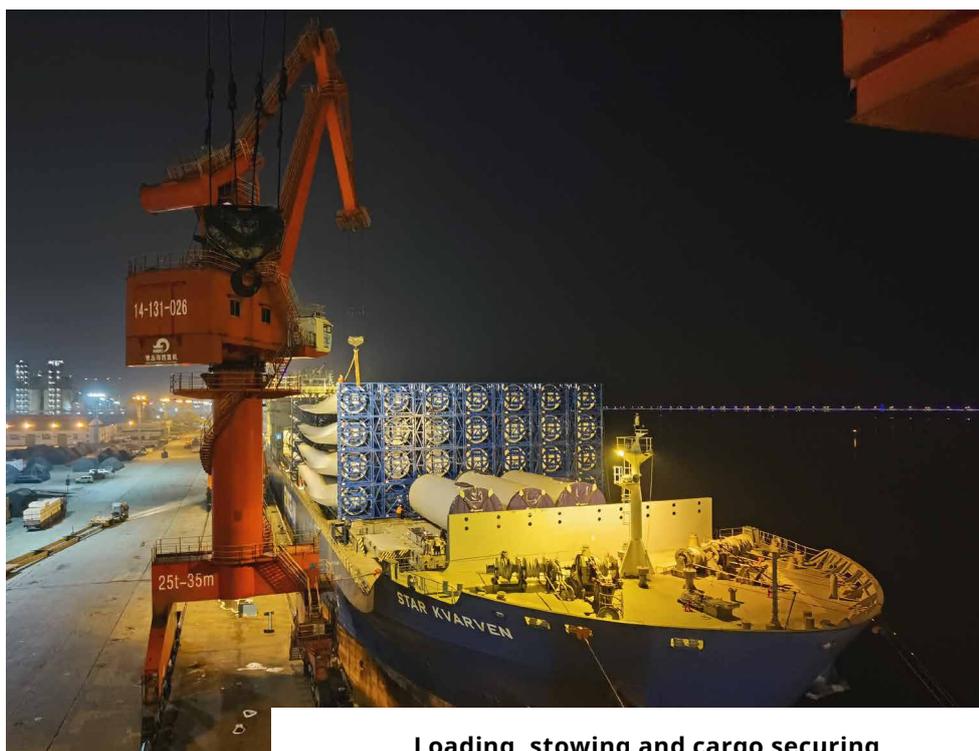
These were prepared in close cooperation with dteq, a company of the deugro group, and the carrier.

The biggest challenge was to accommodate and secure eight to nine WTG sets per vessel, as this would result in insufficient line of sight from the ship's bridge due to the number of oversized

cargo items. Therefore, deugro China's management, in close cooperation with dteq and the carrier, developed a customized solution for loading, stowing and discharging in accordance with IMO standards and to the satisfaction of the client.

To safely stow the components utilizing the available stowing capacities, and without restricting the unobstructed view beyond the cargo, deugro China identified a bulk carrier that was able to accommodate eight to nine complete WTG sets per sailing and arranged for an additional camera to be mounted on the mast above the flying bridge. This solution reduced the number of ocean voyages to a minimum. For the transport of all components with a total volume of 337,000 freight tons, deugro chartered a total of six K-class general cargo vessels.

After successful loading, stowing and securing, the vessels set sail for



Loading, stowing and cargo securing operations at the Port of Lianyungang, China



their 5,125-nautical-mile voyage to the Port of Vancouver, Washington, USA.

The transit times averaged 16 to 20 days, allowing for the discharge of each vessel to be executed according to the established schedule.

After nine months and six full-charter shipments, the project was successfully completed and the cargo safely delivered to the Port of Vancouver, Washington for on-carriage to the project site in Canada according to the project schedule.

Efficient collaboration between deugro, dteq, the client and all contractors ensured that various challenges such as stowage and storage issues were successfully resolved and that the project was executed on schedule and according to the client's requirements during the height of the COVID-19 pandemic.

» Teamwork and the full support of the client and all partners made this project an operational and HSE success even during the COVID-19 pandemic. «

Upon the vessels' arrival, the discharge operations were executed in compliance with strict COVID-19 safety regulations, using the LO/LO method with two Liebherr LHM 500 cranes under the personal supervision of deugro Houston and a surveyor.