

Case Study

Texas Wind Farm Project

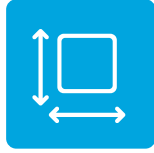




Industry
Onshore wind energy



Volume
250,000 FRT



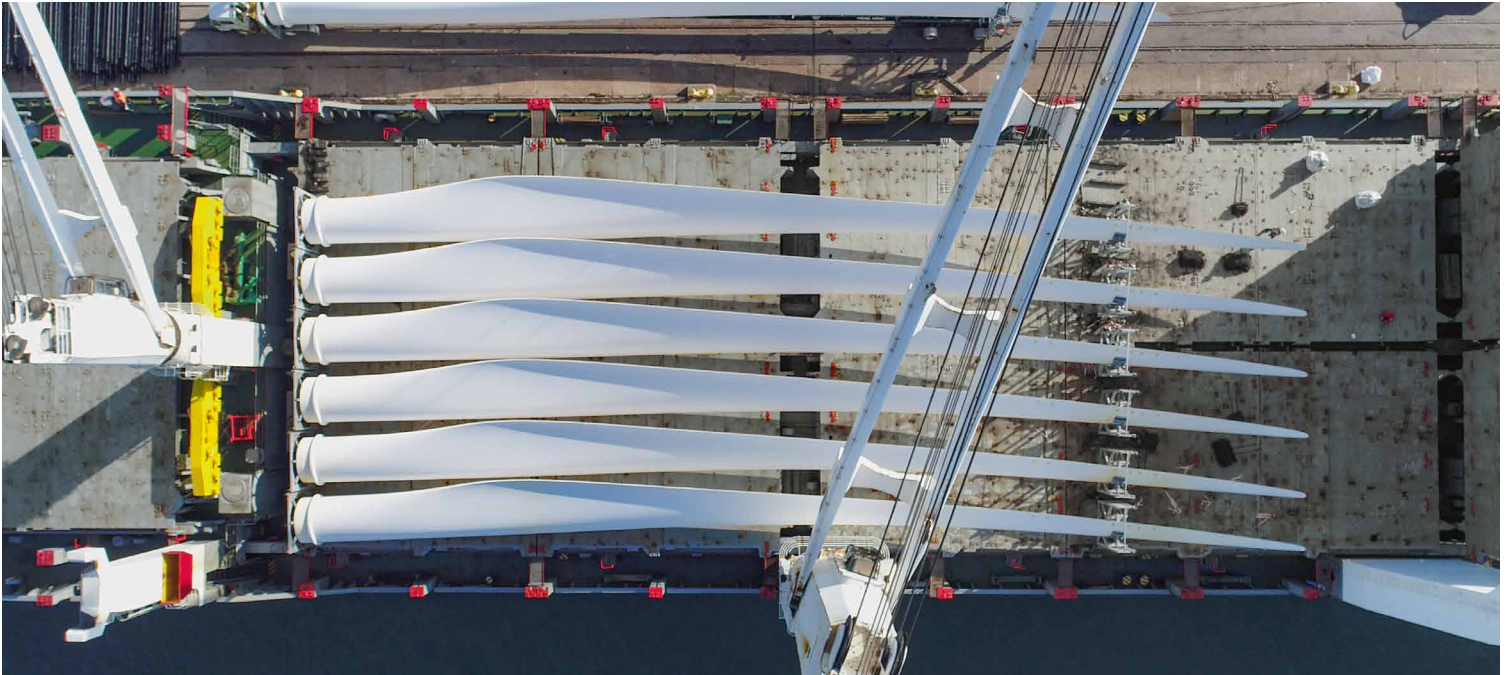
Biggest items
Blades of
53.50 x 3.68 x
3.09 m



Heaviest items
Nacelles
weighing 53 MT



Chartering
11 full and part
charters in less
than 2.5 months



Case Study: Texas Wind Farm Project

For a Wind Farm Project in Texas, USA, deugro shipped 64 sets of wind turbine generators (WTGs) producing 2.5 megawatts of power each and with a total volume of 250,000 freight tons from China and South Korea to the USA. The shipments included hubs, nacelles, generators and tower sections with weights of up to 53 metric tons and dimensions of up to 53.50 x 3.68 x 3.09 meters.

The wind farm is located in central Texas, USA, about 125 miles northwest of Austin. The wind turbines are expected to generate 626.9 gigawatt hours of sustainable energy to support the power demands of approximately 48,000 local households.

The project was executed in close collaboration between deugro China, USA and Korea.

With its in-house chartering and engineering divisions, deugro managed and executed 11 full and part charters in less than 10 weeks.

To ensure safe and smooth cargo movements across all interfaces, deugro conducted personal site visits together with the original equipment manufacturer (OEM), the client, the site contractor and the trucking company, as well as port meetings with the stevedores, the OEM and the trucking company.

deugro's logistics concept focused on optimizing the handling of the heavy and oversized turbine components, including the mixed stowage of hubs, nacelles, generators and tower sections, with optimal utilization of the vessels' capacity to save time and money.

Loading operations

The majority of the WTG components were shipped from the Port of Tianjin, China, while the tower sections were shipped from the Port of Gwangyang in South Korea.

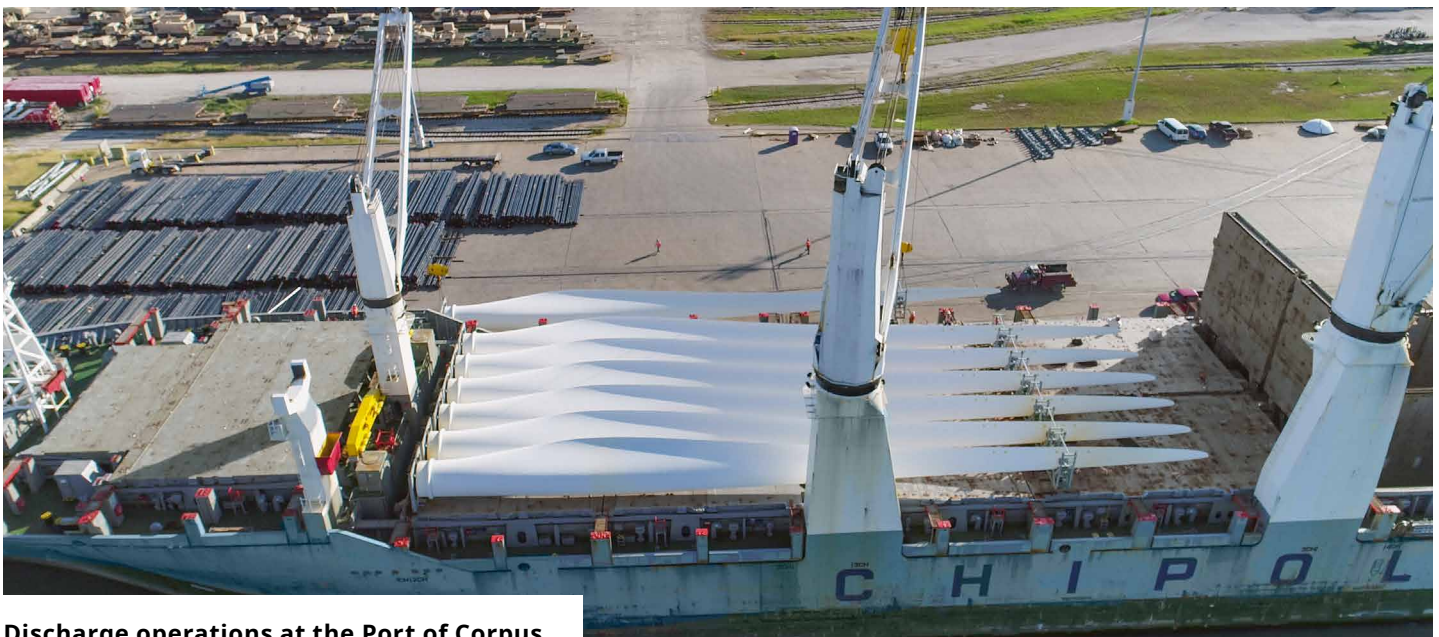
In view of the oversized and heavy cargo components, various analyses, technical studies and calculations were prepared during

the project planning phase to guarantee safe operations. These included evaluations of marine engineering, including stability and ballasting calculations, lifting and cargo securing calculations, as well as mooring analyses, which served as the basis for drawing up the corresponding method statements for safe loading processes.

In South Korea, the tower sections were delivered on trailers to the Port of Gwangyang and directly loaded and stowed on a total of four bulk vessels under the personal supervision of deugro Korea.

After successful cargo securing of the individual components, the vessels started their ocean voyage of approximately 9,760 nautical miles to the Port of Corpus Christi, Texas, USA.

In China, the WTG components were delivered to a storage area at the Port of Tianjin before being shipped. Although storage space is limited at this port, deugro Beijing's many years of experience enabled



Discharge operations at the Port of Corpus Christi, Texas, USA



A 53.50 x 3.86 x 3.09 m blade at the start of its 500 km journey to the construction site in central Texas

it to arrange for a suitable storage area to accommodate the large quantities of components delivered. The storage yard management, including cargo inspection and the preparation of regular status reports, was executed by deugro China.

From the storage yard, the heavy and oversized components were moved on flatbed trailers and extendable bucket trailers to the berth and directly loaded onto the individual vessels according to the schedule and loading sequence.

Loading, stowage and cargo securing on the vessels took an average of three to five days each and were personally managed and supervised by the local deugro teams and a surveyor.

The subsequent ocean voyage to the Port of Corpus Christi was 10,381 nautical miles and took an average of 30 to 35 days per vessel. Within just two and a half months, the WTG components, with a cargo

volume of 250,000 freight tons, were shipped to the Port of Corpus Christi on 11 fully and partially chartered multi-purpose heavy lift and bulk vessels.

Discharge operations

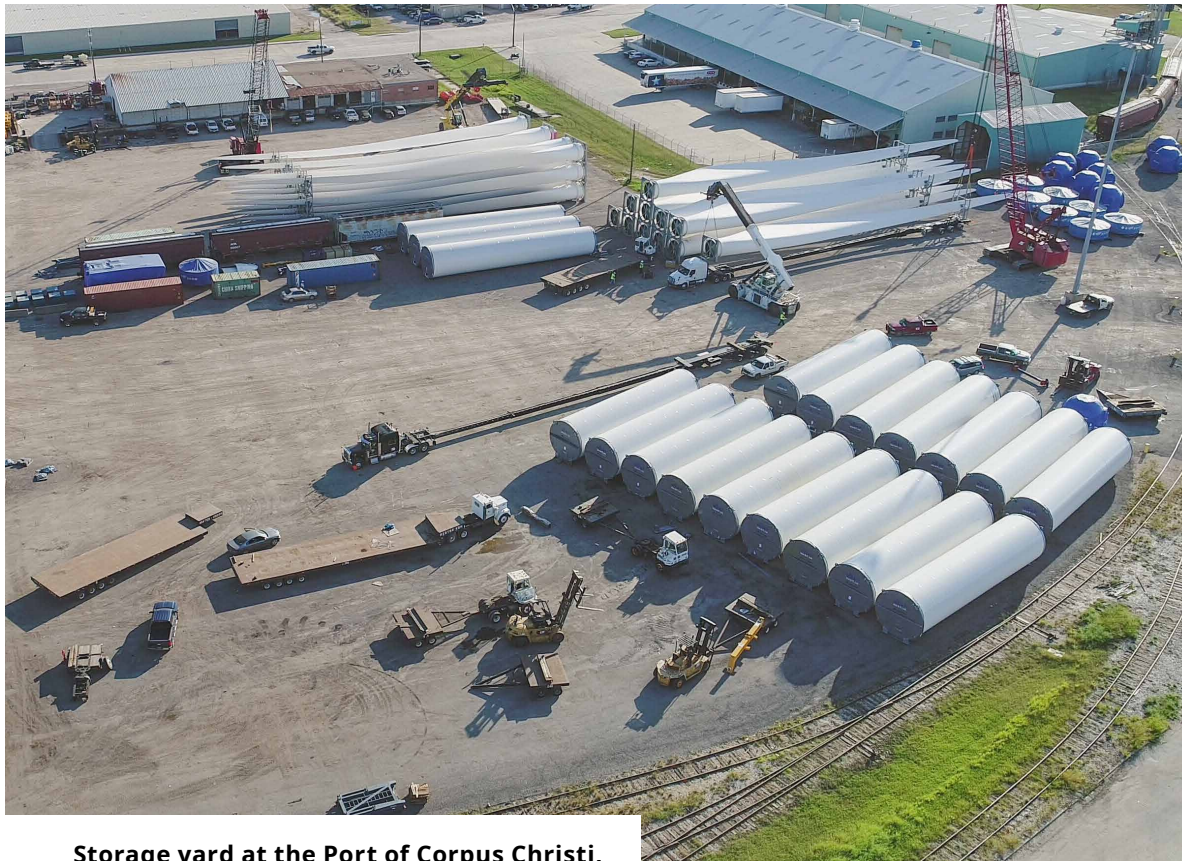
Upon arrival of each vessel, the cargo was discharged by vessel cranes directly onto lowbed and extendable blade trailers under personal supervision and coordination by the deugro Houston team, before being moved to a storage area that deugro USA arranged for within the port area. Here, the individual components were inspected and prepared for the subsequent nearly 500-kilometer road transport to the construction site.

The project's short shipping window meant large cargo volumes arrived at the Port of Corpus Christi from China and South Korea within a short period of time, placing high demands on stevedoring, load-out

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Project challenges

- Management and execution of 11 full and part charters in less than 2.5 months
- Coordination of large cargo volumes arriving at the port, while simultaneously transporting two complete WTGs per day to the construction site



Storage yard at the Port of Corpus Christi, managed by deugro Houston

equipment and personnel. The coordination and management of these high volumes of incoming and outgoing cargo components by vessel and truck at the Port of Corpus Christi were critical to meeting the delivery schedule.

Therefore, deugro USA supervised all port operations and assigned three full-time employees to coordinate the incoming vessels and unloading operations, as well as the loading of the incoming and outgoing trucks with subsequent onward transport to the construction site.

In close cooperation and daily coordination calls with the contracted trucking companies, stevedores, terminal operators and the construction site, deugro USA ensured safe and smooth operations as well as sufficient manpower and equipment.

On-carriage

For the on-carriage to the construction site and in accordance with the schedule and the site's requirements, the WTG components were loaded and secured on a variety of specialized trailers. The blades were moved on triple extendable blade trailers and the tower sections on Schnable trailers with tower attachments. For the transport of the nacelles and generators, multi-axle trailers were used, while the accessories were moved on lowbed and flatbed trailers as well as container chassis.

To safely transport the oversized components over the road to the job site, the convoys were accompanied by escort vehicles and escorts from the local traffic police.

A challenge during the comprehensive on-carriage

» Morning and afternoon curfews and restrictions for oversized and heavy lift transports along the route required a carefully prepared transport concept. «

operations arose when a city along the route to the site refused to accept the permits, which had already been approved, potentially jeopardizing the schedule. However, thanks to immediate action by the experienced deugro team, this was quickly resolved with the Texas Department of Transportation so that the transports could be carried out without interruption.

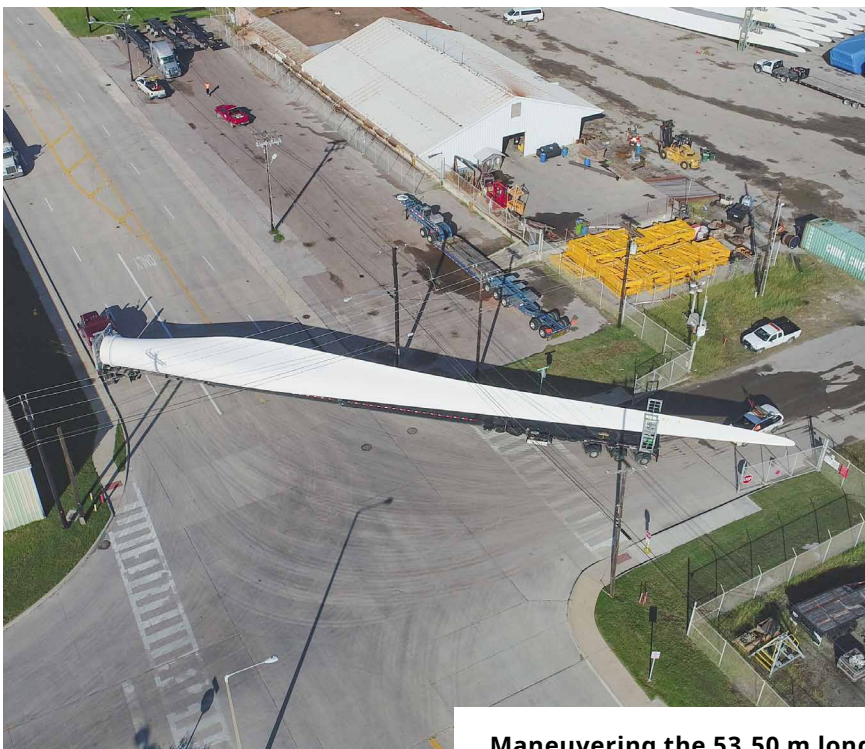
The consideration of morning and afternoon curfews and restrictions for oversized and heavy lift

transports along the route from the Port of Corpus Christi to the site, particularly in the San Antonio area, which was halfway along the route, was critical, because appropriate layover areas had to be identified and these areas had to be reached in a timely manner. Therefore, deugro Houston designed the operations and loading sequences, especially for the slower-moving trucks so that they could leave the port for these layover areas as early in the morning as possible to arrive on time.

On the last leg of the route, the delivery of the individual components from the main highway to the site entrance required various traffic management measures. Therefore, deugro worked closely with the local authorities on the appropriate signage and communicated daily with the truck drivers.

In accordance with the contract and the schedule, eight complete WTGs per week were successfully delivered from the Port of Corpus Christi to the construction site. This meant that two complete WTGs—18 oversized and permit-required loads—were loaded per day, while additional incoming cargo was received and managed at the same time.

The excellent and close cooperation of the international deugro teams with their client and subcontractors led to a safe and successful execution of this comprehensive project.



Maneuvering the 53.50 m long blades in the port area