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ODOT Experts Solve Windmill Transportation Challenges By ODOT Staff

When Vestas Wind Systems, a company specializing in the siting and construction of wind energy farms, sought to capitalize on the winds of eastern Oregon and Washington, it faced a logistical challenge. Vestas needed to transport 127 wind turbines from the Port of Vancouver, Wash., nearly 300 miles to the Wild Horse Wind Power Project north of Yakima in Ellensburg, Wash. The safest and most efficient route for the project involved traveling 150 miles on Interstate 84 through Oregon. Luckily, Vestas was able to call upon a powerful resource for success – the Oregon Department of Transportation.

ODOT regularly provides guidance and leadership to maintain safety on the road while moving goods efficiently. In this case, the agency called upon its expert staff in overdimensional shipping and issues of mobility. The staff looked at matters such as bridge and highway load restrictions, tunnel and overpass height clearance, and highway and road traffic management. And they worked closely with the shipping company, Wilhelm Trucking & Rigging Co., to coordinate their activities.

This close coordination has become especially important as ODOT undertakes a 10-year program to repair or replace nearly 300 bridges across the state. As part of the 2003 Oregon Transportation Investment Act, the $1.3 billion OTIA III State Bridge Delivery Program has effectively doubled the volume of ODOT work. Despite these unprecedented levels of highway construction, ODOT has kept freight and commuter traffic moving.

"The support from ODOT has been flawless," said Duane Downs, vice president and general manager of Wilhelm. "It has been one of the most smoothly run projects of the year for Vestas. In fact, we're ahead of schedule by two weeks thanks to ODOT's support."

During the busy 2006 summer construction season, ODOT facilitated the transport of 1,047 individual loads to deliver the windmill components from the Port of Vancouver to the Wild Horse Wind Power Project. Nearly 1,000 of the 1,047 loads required permits, but most of them did not need special permitting; that is, the weight could be distributed so the total cargo fell within the guidelines, or load rating tables, that ODOT uses to calculate how much freight a bridge can bear.

When a load did exceed the weight tables, Bill Spofford, program coordinator for ODOT's overdimensional permit unit, and Bert Hartman, ODOT's interim bridge program unit manager, along with a team of four load raters, entered the picture to calculate and issue special permits. They figured out ways to distribute the weight evenly so that the supporting structures "shared" the load and minimized the effect of heavy freight on a given bridge, for example, by directing the freight company to use a route over a column or over a lane that runs between two steel girders.

Though the word windmill may evoke picturesque scenes of Holland, the wind turbines of the 21st century are generations ahead in size and power. The physical dimensions of a single wind turbine are awe-inspiring. Each wind turbine is composed of a tower, a rotor of three wind blades, and a generator system called a nacelle. Each nacelle weighs 250,000 pounds.

Transporting each nacelle requires a vehicle more than 220 feet long, comprising a truck, a jeep, a semi-trailer, a booster axle—another trailer—and a non-load-bearing truck. The tower, when erected, stands more than 220 feet tall. It splits into three segments for transport; when assembled, a tower can weigh as much as 450,000 pounds. Even the rotors are transportation challenges: Each wind blade is more than 60 feet long and weighs more than 12 tons.

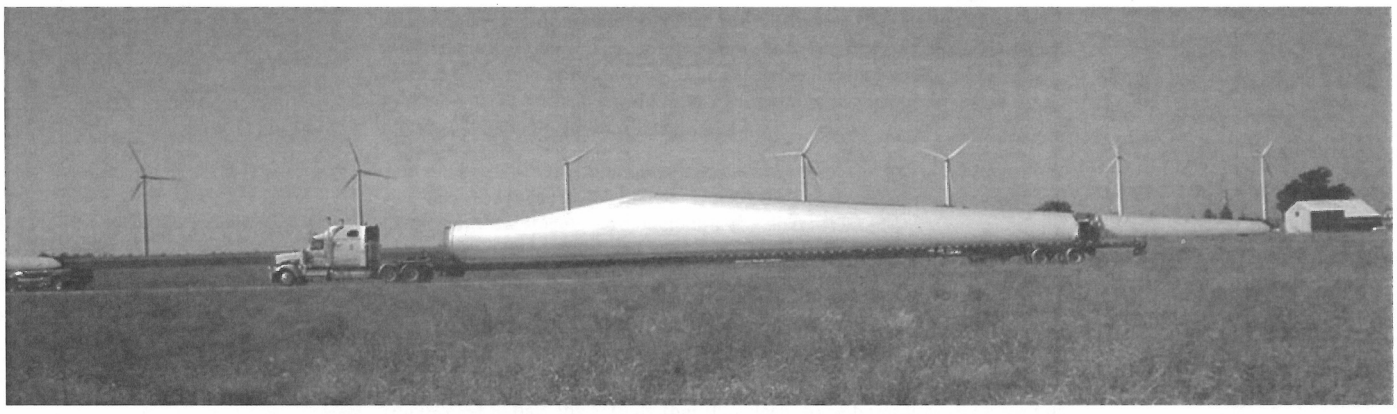
Shipping the windmills is truly a massive undertaking. The extra weight has to be distributed across numerous axles; for 250,000 pounds, 19 are required. The more the weight is distributed across many axles, the less strain the load puts on the bridge below.

Take these numbers for one wind turbine, multiply them by 127, and it's easy to see how overwhelming a hauling challenge this project would be, without expert guidance.

While traveling I-84, the components passed safely over 26 bridges slated for repair or replacement in the Columbia River Gorge National Scenic Area through ODOT's bridge program. Construction on these projects will peak in 2008 to 2010. Vestas will still be transporting windmills at that time, and ODOT is already planning how to handle the shipments smoothly during construction.

"Mobility is a closely coordinated activity that takes place up front," said Gregg dal Ponte, ODOT Motor Carrier Transportation Division administrator. "Concrete barriers used during construction, for example, may not accommodate an extra-long load like a windmill blade, so we use a template for how an unusual vehicle moves and turns to lay out the traffic control."

ODOT is committed to both passenger and commercial access to roads and bridges. "The bridges are for everyone's use," said Hartman. "Our goal is to serve as responsible keepers of the state's transportation assets. And safety is the industry's top priority right now."



During the busy 2006 summer construction season, ODOT helped 1,047 individual windmill parts travel from the Port of Vancouver to the Wild Horse Wind Power Project