

Serving the Transportation Needs of the Wind Energy Market



Business Challenge:

According to the American Wind Energy Association (AWEA), wind energy production has grown at record rates in recent years. In 2009 alone,, the U.S. wind energy industry brought nearly 10,000 megawatts of new wind power capacity online.¹ That's enough electricity generation to supply power to more than 2 million average U.S. homes for a full year. As we seek to find alternative power sources to fossil fuels, this growth is only forecast to continue.

In the summer of 2009, a leading wind turbine manufacturer sought to transport the components (hubs, nacelles and blades) for 30 wind towers to a wind farm outside of Glen Rock, Wyo. With its turbine components being manufactured and arriving in ports throughout the country, the company needed an economical, efficient and environmentally-friendly way to transport all of the components from each of these locations to Wyoming. The components, however, are very large and incredibly heavy posing unique transport challenges.

The company has worked with BNSF Railway since 2003 to ship imported wind turbine components to other locations near wind farms in the Western region. When the companies began working together, the wind energy market in the U.S. was still quite new, and the company had not previously utilized rail to ship its wind components. However, through the partnership, the manufacturer realized \$1 million in savings. That initial project marked the beginning of a strong relationship between the two companies, so when the company faced this new challenge in shipping components cross-country, it again turned to BNSF for a solution.

Solution:

In previous collaborative wind projects, BNSF had worked with the manufacturer to come up with the concept of strategically locating transload centers in key locations along BNSF's network, which is positioned in the heart of many major wind areas in the U.S. These centers allowed BNSF to transport the oversized wind components via train to locations within 100-150 miles of their ultimate wind farm destinations. The components were transferred from train to truck at these transload facilities, and the trucks were then able to deliver the components to the wind farms, usually within just one day. The two companies worked together to open their first wind-centric transload facility in Lubbock, Texas, in 2007.

They decided to take a similar approach with the wind farm in Wyoming. As with previous projects, BNSF sought and found land near its network of tracks – this time in Casper, Wyo. – for a new transload facility. It also worked with the company to select a third-party company to lease the land, to provide all of the necessary cranes and other equipment and to handle the general operations.

Developing the transload facilities was only one aspect of the shipment challenge that needed to be addressed, however. While the hubs and heavy nacelles could be transported on standard railcars used for heavy duty shipments, the blades required that intermodal flat cars be retrofitted to accommodate them. The two companies therefore worked with an engineering company to develop a twist-lock mechanism to allow the blades to be mounted onto a flat car and locked into place.

Furthermore, due to its large size and/or massive weight, each of the components was considered a dimensional shipment and therefore required special consideration when it came to route planning.

¹ AWEA Year-End 2009 Market Report – January 2010

On the BNSF network, any shipment that exceeds 17 feet above the top of the rails, is more than 11 feet wide or overhangs the end sills of a railcar (the longest rail car is only 89 feet long) is considered a dimensional shipment. Since each blade was more than 100 feet long and the nacelles weighed approximately 125,000 pounds each, BNSF's clearance team had to carefully evaluate the proposed routes from origin to destination to determine which were feasible.

The nacelles' clearance issues stemmed from their weight as it prevented them from being able to travel over certain bridges, overpasses, etc. Meanwhile, planners had to ensure the routes intended for the blades didn't have sharp curves that the blades couldn't make. Due to these special considerations, as it does before every dimensional shipment, BNSF met with all of the stakeholders involved and outlined the entire transport process, including clearances, routes and crew changes.

Once all of the logistics were confirmed (transload facilities, retrofitting railcars, route planning and determining clearance), it was time to transport the various components to their new home in Glen Rock. Because the hubs and nacelles had to be transported from the eastern part of the country, BNSF needed to partner with two different railways due to the geographic parameters of their networks.

CSX transported the hubs (six per railcar) and nacelles (two per railcar) to BNSF's facility in Memphis, Tenn., where they were transferred to the BNSF network for the rest of their journey by rail. Meanwhile, BNSF picked up the imported blades in Corpus Christi and transported them to Casper. To accomplish this, BNSF ran two unit trains – each more than a mile in length and holding 60 blades.

At the transload facility in Casper, the various components were offloaded from the train onto the ground. Trucks then came and picked them up for the final leg of their journey to the wind farm.

Results, Learnings and Outcomes:

Shipping the wind components by rail to the Glen Rock wind farm produced significant cost and time savings for the turbine manufacturer. It also provided an environmentally-friendly transportation option for a green industry.

Shipping via rail produced significant time savings in that many more components could be shipped at once. For instance, it only required one train and 90 hours to get 60 blades from Corpus Christi to Wyoming.

This ability to ship so many components at once by rail not only gave the company better control over the arrival of the inventory, it also provided a distinct environmental advantage. While 60 blades could be shipped on one train, the same shipment would have required 180 vehicles (60 trucks plus two escort vehicles apiece) to transport via truck alone, thus resulting in sporadic inventory arrival and leaving a larger carbon footprint ... a much larger carbon footprint. In fact, the company's decision to ship by rail kept about 156 metric tons of CO₂ equivalent from being emitted into the atmosphere – a 73 percent carbon footprint savings on that one shipment alone. Putting that into perspective, that's the equivalent of the CO₂ emissions from the total annual electricity use of about 19 average homes.

BNSF's trucking partners remained a critical part of the supply chain and benefited from the solution as well. They were able to use their trucks for the short-distance hauls to deliver the components from the transload facility directly to the wind farm, enabling them to turn their trucks faster and thus be more profitable.

About BNSF Railway Company:

BNSF Railway, a Berkshire Hathaway Company, operates one of the largest North American rail networks, with about 32,000 route miles in 28 states and two Canadian provinces. BNSF is among the world's top transporters of intermodal traffic, moves more grain than any other American railroad and carries the components of many of the products we depend on daily. BNSF is an industry leader in Web-enabling a variety of customer transactions at www.bnsf.com.