Wind machines have been spinning imagination and innovation for centuries, but only now is past fancy and contemporary fabrication melding into a composite reality for U.S. industry. Where wind blows, economic promise follows. The wind energy industry is taking over the world and the United States is center stage in an unfolding drama.
For all its current awe and wonder as a renewable energy source and driving force behind manufacturing development, wind has been turning millstones and heads for centuries—well before even Miguel de Cervantes’ characters tickled humanity with their whim and fancy.

The vista Don Quixote and Sancho Panza happened upon while traversing the arid plains of central Spain is not unlike what today’s casual travelers might find driving through remote stretches of the U.S. Midwest or along wind-swept coastlines. Strings of turbines stick out like hulking monoliths, seemingly stitched into and stretched across the horizon.

“Just then they came in sight of thirty or forty windmills that rise from that plain. And no sooner did Don Quixote see them that he said to his squire, ‘Fortune is guiding our affairs better than we ourselves could have wished. Do you see over yonder, friend Sancho, thirty or forty hulking giants? I intend to do battle with them and slay them.’”

—Don Quixote
The wind energy supply chain is no less awe-inspiring. It’s global, it’s green, it’s complex—and it’s capturing the attention and imagination of government, economic development, manufacturing, and transportation and logistics service providers alike.

**WINDS OF CHANGE**

“Wind doesn’t blow in the easiest places to get to,” says Dan Bingeman, assistant vice president of CN Specialized Services (CNSS).

As a logistics arm of CN WorldWide and Canadian National Railway, CNSS is well-rehearsed in covering hard-to-reach areas. It manages over-dimensional rail moves across a network that serves the main wind farm regions of Canada and the U.S. Midwest, as well as multiple ports that import wind turbine components.

Given the unwieldy and oversized nature of many wind shipments, the railroad is a likely vessel for transporting this type of cargo to and from ports and between U.S. manufacturing and installation locations.

“Customers are starting to look at siting facilities that are served by the railroad,” says Bingeman. “This way, they can pull inbound supply of raw materials and push outbound finished product more efficiently.”

More telling from a macro perspective, global wind turbine companies such as Vestas, GE Energy, Siemens, and Nordex are looking to site manufacturing facilities in the United States to achieve the same global objective.

More than 85,000 people are employed in the wind industry, up from 50,000 in 2007, according to 2008 data from the American Wind Energy Association (AWEA). This meteoric growth has accelerated job creation in manufacturing, where the share of domestically produced wind turbine components has grown from less than 30 percent in 2005 to nearly 50 percent in 2008.

The shift from global sourcing to domestic manufacturing, which essentially shortens the supply chain, mirrors a similar trend within the U.S. loop. Shippers and consignees are exploring new ways to reduce the length of haul and, where possible, exploit intermodal options to take over-dimensional shipments off the road.

“It makes sense for shippers to move very large, long, and wide components using multi-modal transportation. We’re challenged with tying these modes together—water to and from the port, rail to staging areas, then truck to customer,” says Bingeman.

**BARge IN TRANSIT**

The railroad isn’t alone in its quest for more wind business. Manufacturers, suppliers, and customers are closely following the wake of wind-tugged strings along coastal waterways into the U.S. heartland.

The Mississippi River System, which empties into the Gulf of Mexico at New Orleans, flows through the heart of the Midwest, coursing east and west via the Ohio, Illinois, and Arkansas rivers, among others. Lay this riverine schematic over a map of the primary U.S. wind corridor—which stretches from Texas north to the Dakotas and Alberta, Canada—and it’s a near-perfect match.

AEP River Operations, a Chesterfield, Mo.-headquartered barge company, has seen increasing interest from wind industry customers exploring water transport for over-dimensional cargo. AEP River Operations’ pedigree is hauling dry bulk commodities such as grain, project cargo, coal, steel, and ores. Its fleet of close to 3,000 barges and 56 towboats has the ability to group together 40-barge tow configurations to augment line-haul capacity, making it an ideal solution for wind components.

“If size and weight are factors, companies should consider shipping via America’s inland waterways system,” says Terrence Moore, director of business development for AEP River Operations. “River shipping is also better for the environment and typically less expensive per ton-mile.”

The barge company doesn’t have to look far to find unique project cargo. From an import perspective, wind turbine parts are coming in on large ships to Gulf Coast ports such as Brownsville, Texas, and Mobile, Ala. AEP River Operations currently manages the country’s largest barge-fleeting facility in Convent, La., as well as operations in Algiers, providing ship-to-barge services for the New Orleans harbor area.

“We haul cargo from ships and ports to destinations as far north as Minnesota on the Mississippi River, to Milwaukee,
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Source: '2009 Texas Transportation Institute Study “A Modal Comparison of Freight Transportation Effects on the General Public”
Chicago, and the Great Lakes via the Illinois Waterway, Pittsburgh on the Ohio River, and as far west as Tulsa on the Arkansas Waterway,” Moore adds. “We also bring together other waterway shippers who enable cargo to transit beyond the gulf to foreign destinations or West Coast ports via the Panama Canal. It’s truly an intermodal partnership.”

AEP River Operations also runs services laterally across the Gulf Intracoastal Waterway, as far east as Port St. Joe, Fla., and as far west as Brownsville. As with growing customer preference for facilities situated near rail spurs, the same strategy applies to inland water access where companies can leverage multiple modes to move cargo.

“Why limit yourself to two modes when the river system provides one of the most efficient and environmentally friendly ways to ship cargo?” Moore says.

Barge transport also lends itself to over-dimensional cargo for safety and security reasons. AEP River Operations works with stevedores and rigging companies to properly engineer and load barges for transporting turbine components. Using different dunnage and cribbage configurations, they distribute loads evenly over a greater square footage, then use cable and chains to anchor cargo so it doesn’t shift during transit.

“One thing often overlooked about barge transportation is how secure and protected barge movements can be,” says Moore. “We haul sensitive and valuable product for many customers, including the U.S. military. There is 24/7 security, with a captain and crew watching over shipments. Components don’t sit at a rail siding or truck stop overnight.”

The challenges of moving large components over land play into the barge industry’s growing value proposition. Road and bridge-strength restrictions and varying state-to-state regulations complicate planning, permitting, and execution. Equipment availability and capacity are also limiting factors.

“Towboat and barge operators have capacity,” says Moore. “So we’re ratcheting up efforts to diversify from primarily dry bulk into project and

Continues on page 9

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GEORGIA PORTS BULLISH ON WIND

The Port of Savannah’s Ocean Terminal is the Georgia Port Authority’s (GPA) pride of project logistics, boasting five deep-water berths, convenient rail and truck access, and extensive heavy-lift equipment for maneuvering dimensionally large, overweight, and delicate precision equipment. With wind turbine imports and exports growing in volume, the port is making a concerted play for that business. Bill Barrs, cargo sales representative, Georgia Ports Authority, shares his perspective on how the port is tacking its sails to the wind.

IL: What is the state of the wind industry in the Southeast?
BB: While offshore wind energy production potential is excellent, there are currently no wind industry projects under construction in the U.S. Southeast, according to the American Wind Energy Association. The Port of Savannah, however, continues to impact U.S. wind energy development with a steady flow of critical dimensional and heavyweight parts and pieces feeding plants engaged in the construction and/or expansion of wind energy operations in the U.S. Midwest and Ohio Valley.

We’ve identified about one dozen large-scale wind energy opportunities in Indiana, Illinois, Michigan, Ohio, Kentucky, and Tennessee. These wind farms will combine to operate 779 new units and generate a power capacity of more than 1,360 megawatts.

IL: How does the GPA’s pedigree in other industries translate to wind turbine components?
BB: It’s all about combining experience with terminal capabilities. Moving, for example, 150-foot-plus rotor blades essentially requires the same knowledge, resources, equipment, and customer service we’ve utilized for more than five decades to transport other dimensional and overweight shipments.

Looking strictly at customer service, I can’t overemphasize the importance of the GPA’s customer care team in this area. We have a Wind Energy Action Team that works hand-in-hand with the customer prior to arrival, during mid-project, and after the cargo has cleared our gates. Our message to the customer is, we will be proactive in establishing and building on our relationship, general understandings, opportunities for improvement, and accountability. GPA’s customer care philosophy has proven invaluable in growing this important segment of our business.

IL: Has the GPA made any specific investments in equipment, terminals, or partnerships to accommodate wind shipments?
BB: Through the GPA’s long-term strategic development plan, FOCUS 2020, we were well-prepared to meet the challenges of wind energy equipment. As a port historically versed in the movement of dimensionally large and overweight cargos, the necessary infrastructure, knowledge, and other required resources were already in place. In fact, Savannah will soon add to our lifting power. A barge crane with a lift capacity of 500 short tons will arrive in 2010.

We have a proven track record to effectively open the lines of communication between the customer and the Georgia Department of Transportation should overweight permitting be involved for over-the-road transport. Georgia requires superload permits, for example, for weights exceeding 180,000 pounds.

IL: As an important modal hub for bringing these types of break bulk shipments into the United States, is there an economic development tie-in? Are you seeing traction from wind industry players locating facilities in the state?
BB: The state of Georgia, together with area development authorities, is actively searching for opportunities to meet the needs of, and create a favorable environment for, the energy generation and transmission industries. Recent developments include Efacec Power Transformers, which built a transformer plant in Rincon, Ga., as well as Mitsubishi Power Systems Americas, which announced in October 2009 that it would build a turbine generator plant in Savannah. Both companies will use the Port of Savannah.
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dimensional cargo. It is very much an interstate system via water—it has capacity to grow and it’s the greenest mode of transportation there is.”

GROUND SUPPORT

Intermodal transport is a necessary part of the U.S. wind industry’s continued growth. But as with any aspect of domestic transportation and logistics, motor freight remains the go-to mode for managing first- and last-mile deliveries, especially in remote areas.

Heavy freight haulers such as Carlisle, Pa.-based Daily Express hit the road in stride when wind manufacturing and supporting industries began to emerge as a viable economic force in the United States.

“We’ve been targeting heavy-haul wind shipments for the past seven years,” says Mark Eyer, Daily Express’ national wind accounts manager. “The alternative energy field has really taken off. The largest single user of heavy-haul tonnage used to be the construction sector; today 40 percent of over-dimensional hauls are wind-related.”

Daily Express’ business has similarly shifted with changing trade patterns. Starting out 75 years ago hauling farm equipment, it transitioned first to the construction sector, and now to the wind industry. The maturation of U.S. turbine manufacturing is blowing big things the carrier’s way and it has invested considerable capital in equipment to manage this growth. Over the past four years, Daily Express has acquired more than 100 new trailers to support wind shipments.

“In 2008 and 2009, wind-related cargo accounted for 40 percent of our business. Ten years ago, it was negligible,” says Eyer. “The wind industry has become a year-in, year-out growth vehicle. It has flattened with the economy, but it will continue to expand. Long term, this sector will grow as the United States expands its wind portfolio.”

Apart from widespread efforts to shorten supply lines for transporting turbine components, Eyer cites other reasons for the industry’s billowing sails.

“Part of this demand is driven by state legislation to reach 20 percent renewable energy sourcing by 2020. That brings wind and solar power into the mix,” he says. “We anticipate continued growth over this 10-year build out.”

The need for immediate capacity is yet another driver for manufacturing turbines domestically. In fact, the United States is now the global leader in terms of wind energy capacity, according to the National Renewable Energy Laboratory (NREL). In 2008, the U.S. wind energy sector installed 8,358 megawatts (MW) of new capacity, bringing the country’s total capacity to 25,170 MW, trumping Germany for that distinction.

It’s why wind manufacturing in the United States is rampant. “Five years ago, most production took place overseas. Now we have an entirely new manufacturing industry in the United States,” says Eyer.

MOVING ACROSS MODES

The complexity of “simply” transporting wind turbine components matches the diligence necessary to plan these projects to completion. Because of the multi-modal nature of most wind cargo moves, control over the process is important.

Shippers, consignees, and transportation and logistics partners go to great lengths planning, routing, permitting,
and executing transport. Much like automotive manufacturers and suppliers, each party in the wind supply chain is a pull point in the demand-triggered process.

“The wind industry is just-in-time (JIT) oriented,” says Bingeman. “The cost of having personnel and equipment in the field demands that shipments are staged efficiently and on time, that proper permitting is accounted for, and that there are minimal touches and handling.”

Daily Express employs an in-house staff of 15 dedicated to permitting and project planning, giving the carrier total control over the process.

“This is important because wind farms and manufacturing operations run on JIT deliveries,” says Eyer. “Customers depend on timeliness to manage supply chain complexity.”

For every wind project, Daily Express’ planning department surveys routings, explores turning radii, secures permitting, and double checks everything to make sure the job is done right.

The railroad has a little more flexibility in terms of documentation, but otherwise the rigors are familiar.

“With the railroad, there is no state or provincial permitting,” says Bingeman. “But the industry has its own dimensional clearance protocol to follow. We have to simulate rail cars moving across CN’s network and through any interchanges, bridges, tunnels, and curves.”

Because of the different mechanisms involved in managing wind project logistics, it’s important to have one point of control over myriad administrative and operational tasks. Increasingly, customers want the complete solution—service providers and overseers who can connect all the pieces. Daily Express does this by providing its own project management service rather than...
outsourcing it to a separate party.

As part of its own transportation management offering, CNSS monitors the wind project supply chain from point of manufacture to final destination. “One set of eyes looks at the planning stages,” observes Bingeman. “There are no external bodies for approval.”

Moving forward, equipment, labor, infrastructure, and cost will likely be recurring challenges as companies keep pace with swift growth and climb their way out of the current recession. But over the long term, wind manufacturing promises to be a major economic stimulus that drives job growth, and as the industry matures, even greater collaboration among supply chain partners.

THE WIND BLOWS BIG IN TEXAS

Beyond transportation and logistics, the wind industry is having a major impact on U.S. economic development. The shift in manufacturing stateside has unleashed a flurry of secondary activity as supporting industries sprout up around wind farms. Nowhere is this more apparent than in Dumas, Texas.

Situated on the Texas panhandle, the city of 14,000 inhabitants is in the heart of the North American wind corridor. Wind turbines literally surround Dumas. More telling, it is within three hours of wind farms generating nearly 2,000 MW of energy and an estimated 4,000 MW of proposed developments.

“The fact that we are located along the Ports-to-Plains trade corridor and the wind corridor is a huge advantage for prospective wind business,” says Mike Running, executive director of the Dumas Economic Development Corporation (DEDC). “It’s a natural fit for companies, marrying transportation and wind power.”

As part of its economic development strategy, DEDC is looking to create a latticework of smaller companies and support industries to attract bigger wind turbine and component manufacturers.

For example, in June 2009, Anemometry Specialists, Alta, Iowa, announced plans to locate a new office in Dumas. The company, which does pre-development work to identify areas for siting wind farms, expects to bring

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as many as 16 technical wind energy jobs to the community. More recently, Wells Paint Service, an industrial paint company, joined the crowd.

The Kansas-based business is a good example of how the wind industry and areas such as Dumas are attracting unique investment opportunities. Wells Paint Service specializes in industrial painting for equipment such as oil and gas tank batteries, oil pump jacks, and fuel tanks. But it has also discovered a new niche in the wind industry—interior corrosion sealing for bolts used in assembling wind towers. The company has indicated growth plans that may bring as many as 30 new specialized painters to the community.

Wind manufacturing is triggering a cascading effect as supporting industries and suppliers give way to an infinite assemblage of other industries and suppliers.

“We’re just scraping the surface of the many service sectors that support wind manufacturing,” says Running. “The key is getting the word and our name out there, and showing companies how the dots connect.”

FROM RUST BELT TO GREEN BELT

Further afield in other areas of the United States, economic development agencies are making a concerted effort to attract bigger wind players. In some cases, they’re already there.

Toledo, Ohio, for example, is home to Owens Corning. The global glass fiber technology manufacturer, well-known for its building materials and composites applications, also produces 70 percent of the raw materials used to make turbine blades, says Steve Weathers, president and CEO of the Regional Growth Partnership (RGP), a nonprofit development corporation dedicated to fostering economic growth in Northwest Ohio.

The renewable energy industry is a logical evolution for economic development in Toledo.

“We have a history in heavy manufacturing, which positions us well for wind component manufacturing,” adds Weathers.

Then there is the transportation edge. Toledo is a major rail hub and has proximate access to the port, Lake Erie, and the St. Lawrence Seaway. The surrounding area offers well-entrenched intermodal access—rail, water, road, air, even blimp. Ohio Air Ship’s dirigibles provide heavy-lift services for project logistics moves.

As further proof of its wind manufacturing potential, two years ago RGP applied for a U.S. government program to locate a wind blade test facility in Toledo, citing its transportation accessibility and manufacturing pedigree. It finished second to Texas—a political casualty more than anything else, observes Weathers. Regardless, Northwest Ohio’s competitiveness is on solid footing.

“We won’t be a center for wind farms because we don’t have that type of energy capacity. But we do have a long-standing history of large-scale manufacturing and the ability to move product,” says Weathers. “The rust belt is turning into the green belt. The wind energy industry is reinventing the Midwestern town. It’s a natural evolution. We’re seeing a transition from the automotive sector into wind; the same applies for logistics support services.”

AS THE BLADE TURNS

For areas such as Dumas and Northwest Ohio, the wind industry’s peripheral appeal is quickly coming into focus. In turn, economic development interests are digging in and preparing for a future land grab—which includes creating a new skilled labor pool.

The DEDC has been actively involved with Amarillo College, recently granting the school $69,000 to establish a
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Don Quixote, in retrospect, might appreciate such sensibility.

So saying, and commending himself with all his heart to his lady Dulcinea, imploring her to support him in such a peril, with lance in rest and covered by his buckler, he charged at Rocinante’s fullest gallop and fell upon the first mill that stood in front of him; but as he drove his lance-point into the sail the wind whirled it round with such force that it shivered the lance to pieces, sweeping with it horse and rider…

“God bless me!” said Sancho, “did I not tell your worship to mind what you were about, for they were only windmills? And no one could have made any mistake about it but one who had something of the same kind in his head.”

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