



The 189 MW Manzana Wind Power Project in Kern County, California

INSIDE THIS ISSUE:

SoCal Adding Wind Power	1
Turbine Technology Advancements	2
Safety Tips for Crop Dusting Season	3
Welcome, New Readers!	4

Southern California Bringing More Renewable Power to the Grid

Be it fashion, music or cars, Southern California has always been known as a trendsetting region of the United States. Today, SoCal is also proving to be a leader in utilizing alternative energy.

Iberdrola Renewables' Manzana Wind Power Project in Kern County is now providing clean, renewable energy to Californians from Silicon Valley to San Diego, as Los Angeles Water & Power (LADWP) joins City of Santa Clara's Silicon Valley Power (SVP) and San Diego Gas & Electric (SDG&E) as customers of the plant.

California's reputation for bringing clean, alternative resources to the grid continues as wind energy flows to these communities. Manzana's 189 megawatts of clean energy represents an offset in carbon emissions comparable to removing more than 21,500 cars from California roads each year. James P. Avery, senior vice president of power supply for SDG&E, expressed the importance of emissions-free projects like Manzana when his company signed with Iberdrola Renewables last year.

"These contracts continue the significant momentum SDG&E has built over the past decade in acquiring valuable green energy resources," said Avery. "In 2011, renewable energy sources such as wind, solar, geothermal, biomass and hydroelectric represented more than 20 percent of the power provided to our 1.4 million electric customers. This is a terrific accomplishment given the fact that we had just one percent renewable power in our portfolio 10 years ago and about 12 percent renewables in our power portfolio in 2010. We are well on our way toward meeting the state's goal and attaining 33 percent of our power from renewable sources in 2020."

Completed late last year, Manzana is located in the wind-rich Tehachapi area near the town of Rosamond, about 80 miles north of Los Angeles. The area has a history of commercial-scale wind generation dating back to the 1980s, and today has some 5,000 turbines in operation. Many residents of the surrounding desert communities have a personal connection through family, friends or neighbors who work in the wind industry.

Long the national leader in installed wind energy capacity, and often considered the birthplace of the modern wind turbine, California recently overtook Iowa as the state with the second most wind energy in operation, behind Texas. 🌱

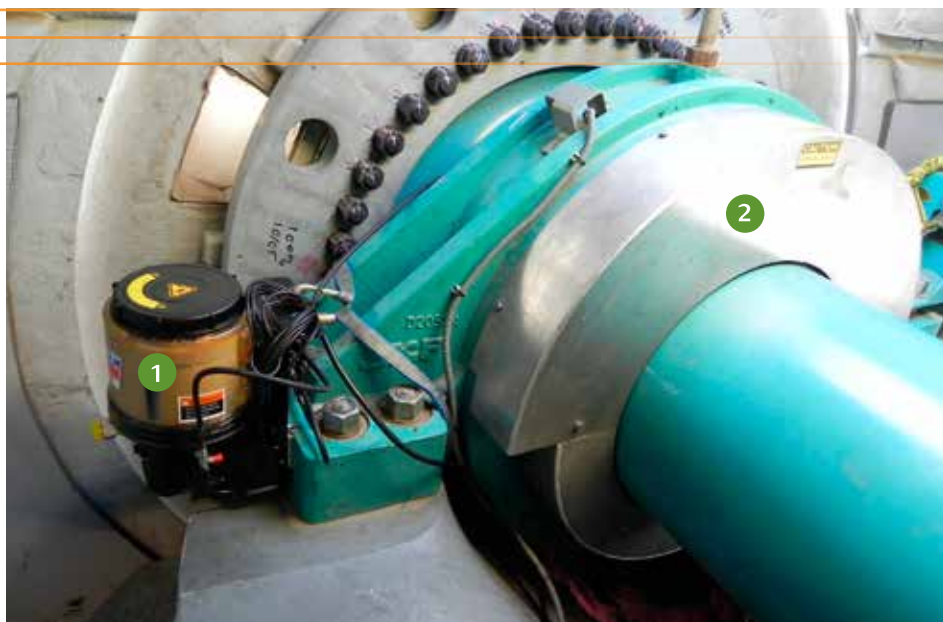


Innovation Goes a Long Way in Turbine Technology

Wind energy, like other industries, is benefiting greatly from innovation. The rapid advancements in turbine technology are leading to less expensive wind power and new designs that are unlimited in their potential to revolutionize the business.

With the sheer number of turbines and megawatts Iberdrola Renewables has installed (3,156 turbines, 5,685 MW), the company is a working laboratory in which to improve wind energy generation technology through incremental improvements to the existing operations. The goal is to constantly look for safer and better ways to harness the wind by improving operations. Here's one interesting example:

Autolube devices have been around about 15 years and are used to automatically grease certain rotating components in wind turbines. However, they have been plagued with reliability issues; either they insert too much grease, or they inject grease in the wrong area, or they fail completely. When they fail, no grease is injected into the bearing or gear mesh, resulting in advanced wear. Even autolubers in new turbines can suffer from poor performance.



Above: The new and improved autolube system (1), implemented by Iberdrola Renewables' technical personnel, is mounted next to the main shaft bearing (2).

Bearing manufacturers prefer that a little grease is added in regular cycles rather than injecting a large amount of grease one or two times each year. This process needs to be done manually or we need a working automatic system. The ideal scenario would be to improve reliability, add some basic operational "intelligence" and get automatic notifications when it doesn't work properly.

Our technical personnel, whose task is to look for and implement these types of incremental improvements to the fleet, came up with a new system. For the first application of a new and improved autolube system, the team is targeting the kitchen table-sized main shaft bearing, **(continued, pg 3)**

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5 Questions with Scott Holliday, Senior Technician



Scott Holliday works in the wheat fields of eastern Oregon as a senior technician for Iberdrola Renewables' Klondike III and Klondike IIIA wind power projects. Since joining the company in 2007, Scott has watched wind turbines populate the area—a process he had a hand in. When the aluminum smelter he worked at closed 10 years ago, Scott went to work for the plant owner's new venture—a network of met towers to test the feasibility of wind farms in the Columbia River Gorge. *Landowner News* recently caught up with Scott to learn more about his job and responsibilities.

Landowner News: What's your professional background, and how did it lead you to this particular job?

Holliday: The owner of the aluminum plant I used to work for in Goldendale, Wash. had an idea that the wind out here could become a major source of electricity. So he formed a company that put up a network of met towers all over Sherman, Wasco and Gilliam counties in Oregon and Klickitat County in Washington. I went around taking readings from those towers, never having any idea I'd eventually work on one of the wind farms myself.

LN: What is a typical day on the job like for you?

Holliday: We start early—at 6:30 a.m. Jim Harger, our site manager, partners us up in teams of two so our skills complement each other. He's also assigned each team its own specific groups of turbines we take "ownership" of. It's like they're our children. Next time you come back to a turbine to do maintenance or repairs, you're the recipient of your previous efforts. We also have a lot of ground and equipment to keep secure, but fortunately, we have some really good neighbors out here.

LN: What do you like best about your job?

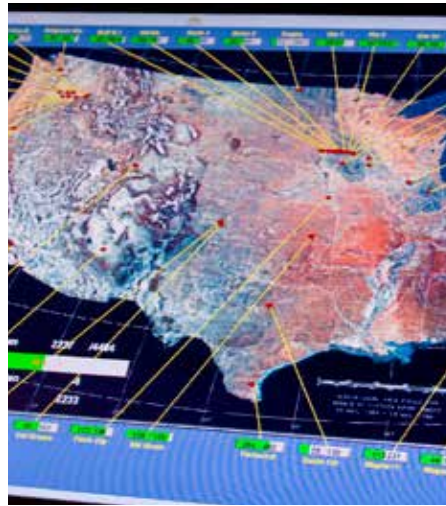
Holliday: The responsibility of taking care of valuable assets for this company. This is a big deal for Iberdrola Renewables, and our operations rely on strict regulatory compliance. There are no do-overs.

LN: What's been the most surprising aspect of your job?

Holliday: How large our site has grown. None of us saw this coming. When I hired on here, there were only 66 turbines. Now they are all over out here. It's surprising to me how big the industry has gotten.

LN: Are there special challenges to working in your particular location?

Holliday: Our biggest challenge is the weather. For eight months out of the year, it's really nice, but July and August can be pretty uncomfortable. It gets in the high 90s or more by afternoon, and we wear FR (fire-rated) clothing 100 percent of the year. There are also the lightning strikes. We've got a system where the NCC (National Control Center) sends us warning texts to exit the turbine. I have my phone set for those so it rings for those with the sound of thunder. In winter, it's in the single digits for a couple of months. Fog and frost can be pretty bad to work around, too, if it gets slick. Fortunately the company has really strong safety rules. It is NEVER okay to deviate from the EHS (Environment, Health & Safety) manual. Turbine availability is very important, production is very important, but nothing is more important than safety. 🚧



(Innovation Goes a Long Way...continued)

The main shaft bearing carries the entire weight and thrust of the 3-bladed rotor assembly, which is 30-50 tons for a typical turbine. Needless to say, it is critical to the successful performance of the wind turbine. Initially, 75 total systems will be installed in 3-4 percent of the company's fleets of GE and Gamesa turbines. A mix of newer and older bearings will be selected for the first trial.

The eventual goal is to be able to monitor the status and the performance of the system remotely from each plant or our National Control Center in Oregon. However,

in this first application, the device will have a status panel installed inside the turbine nacelle, where a visiting technician can push a "press-to-test" button to determine if the autoluber is operating normally, or needs attention. 🚧

Communication Key to Safe Crop Dusting

Aerial application of chemicals to farm fields, aka crop dusting, is a common agricultural practice in many rural areas this time of year. That's why it's a good practice to keep the lines of communication open with neighbors about any plans for such operations. When wind turbines also occupy your land, it's especially important to keep wind farm personnel in the loop, too.

Crop dusting can and does regularly occur in fields with operating wind turbines. Recognizing that crops dusters and other low-flying craft may be using airspace above rural lands, wind farms are required by the Federal Aviation Administration (FAA) to meet standards that include blinking lights atop the turbines, white paint for visibility and notification on aviation maps. Any responsible pilot should be aware of wind turbines by reviewing FAA notifications for the area. In addition, in the interest of safety, Iberdrola Renewables is looking out for aerial applicators by voluntarily adopting a company policy for meteorological (met) tower visibility including additional high visibility paint markings, large marking balls on guy wires and highly visible sleeves on guy wires near anchor points on the ground.



Safety is important at ground level, too, and good communication is key. Just as a courteous landowner would inform neighboring property owners of plans for aerial application of chemicals, landowners should reach out to personnel who operate wind turbines. These workers are regularly in and around turbines performing both scheduled and unscheduled tasks. They need to be aware of application days and times for their personal safety. Providing notice a few days in advance helps with scheduling work, but good communication at any time is always appreciated. 🚧



Questions? Have a story to tell?

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Contact Landowner News via email: dlitchfield@iberdrolaren.com or regular mail: Landowner News, Attn: Ahnyah Kruppenacker 1125 NW Couch St., Suite 700 Portland, OR 97209

For questions about your land agreement or payments, contact us toll free at 866-441-4557 or via email at Leasing@iberdrolaren.com.

Welcome, New Readers!

Landowner News is excited to now be landing in the mailboxes of many new Iberdrola Renewables landowners across the country. This quarterly publication is designed to give you interesting stories from the wind power industry, provide you with insight into our company and pass along valuable seasonal safety tips. Please contact us with your questions and comments. We hope you enjoy the newsletter and find the information helpful and engaging.

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