



Romax InSight engineering, operations and maintenance services help SunEdison optimize turbine assets

Client

Listed on the New York Stock Exchange (SUNE), SunEdison is the world's largest renewable energy development company, providing asset management, O&M, monitoring and reporting for energy customers globally.

Challenge

Better understand and optimize operations, reliability and lifespan for a diverse wind farm estate, with multiple assets in different locations.

Solution

Romax InSight software and engineering services: analytical and design expertise, personnel, software, hardware and bespoke client-focused solutions across multiple projects.

Benefits

Enhanced insight, reliability and replacement/maintenance activities to reduce costs and optimize operations including innovative bearing redesign and replacement, better understanding of cold weather operation, portable vibration analysis to detect and therefore avoid faults, supplier audit and analysis.

Headquartered in Belmont, CA, USA, SunEdison, Inc. is the largest global renewable energy development company and is transforming the way energy is generated, distributed, and owned around the world. The company develops, finances, installs, owns and operates renewable power plants, delivering predictably priced electricity to its residential, commercial, government and utility customers. SunEdison is one of the world's largest renewable energy asset managers and provides customers with asset management, operations and maintenance, monitoring and reporting services. Its fleet of assets include utility-scale wind energy projects with more than 1000 MW cumulative capacity, with owned or operated technology from GE, Clipper, Siemens, Nordex, and Vestas. "We have a strong in-house engineering team that supports our operating fleet, and we enhance those resources with companies like Romax - based on its expertise and its ability to provide thorough technical reviews and recommendations, and product improvements," says EJ Martin, Director of Field Service, GAM NA, SunEdison, Inc. Romax has provided expert engineering services across 10 projects, helping the business address operational and reliability issues across turbine assets: from improving the reliability of blade bearings, gearbox modelling, and specialist inspections to support for sub-supplier due diligence.

Increasing the reliability and lifetime of turbine assets

An industry-leader in wind turbine, drivetrain and gearbox design, and with expertise both onshore and off, Romax InSight wind farm solutions include condition monitoring software and services, engineering services, consulting, field engineering, operations and maintenance support, and life models for predictive maintenance and plant optimization. "SunEdison selected Romax for a suite of due diligence projects, due to Romax's expertise and global reach, for 7 OEMs and several operational wind farms," says Kelly O'Brien, Vice President, Business Development, SunEdison. "With Romax's expertise on the rotating machinery components, turbine issues, and O&M, SunEdison can reduce the risk of investment decisions. Romax's fast response times supported the tight schedules in asset purchasing."



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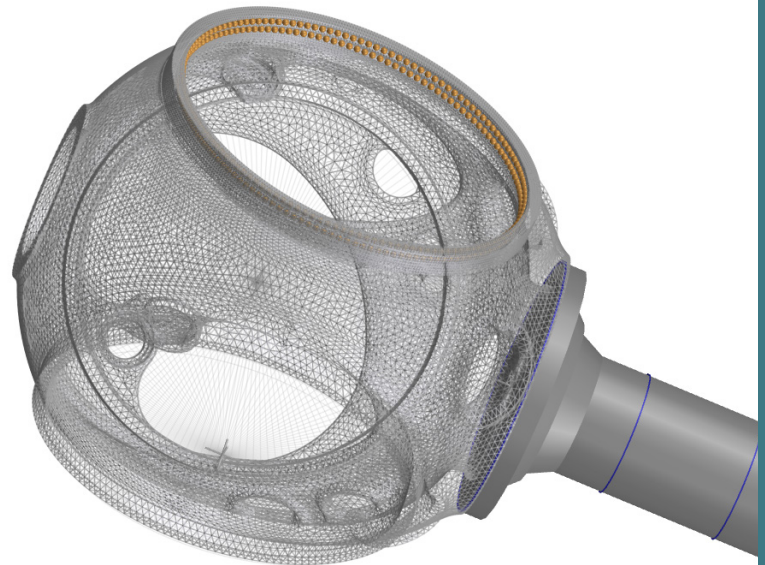
SunEdison

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EJ Martin

**Director of Field Service, GAM NA
SunEdison**

For a blade bearing re-engineering project, Romax collaborated with a leading manufacturer and third-party engineering firm to create a replacement bearing that could provide more reliable service for the remaining life of a turbine at the lowest possible cost. The redesign was enabled using Romax's industry-leading software tool *RomaxWIND* to identify the configuration offering the best performance at lowest cost. Advanced analysis included investigating the effects of hub and blade stiffness on the pitch bearing as well as compliance of the bearing rings, and performing sensitivity studies to manufacturing tolerances. The enhanced slewing ring bearing is now supplied for repairs. "In addition, we performed structural analysis to support replacement of intermediate bearings, helping the SunEdison team co-develop an *in situ* gearbox repair for the Clipper gearbox by performing a Finite Element Analysis of the gearbox deflections with the cover removed," says Dr. Chris Halse, Romax Technology.



RomaxWIND model of blade bearing and hub for re-engineering including system deflections

Moreover, Romax collaborated on a project to study the effects of cold weather operation on a particular type of turbine; this included simulating cold weather loads, effects on component material properties and effects on the turbine electrical system. Through a rigorous process of failure mode effects analysis and supporting simulation on elements, including lubrication flow on cold start and main bearing preload, key risks were evaluated and better understood. "Romax and a sub-contractor performed analysis and review of the function of the lubrication system while operating during cold weather, which concluded the oil-flow requirements were not being met. Ultimately, we were provided with the information we needed to help make control improvements," said Martin.

Condition monitoring and more

In a vibration analysis project, Romax deployed custom-designed portable condition monitoring units to several gearboxes in the SunEdison fleet with the resulting data analyzed by Romax vibration experts to formulate a list of potential defects. Later investigations showed correlation between actual gearbox conditions and Romax-identified faults. "We were pleased with the trial results of the portable units and are considering the Romax CMS offerings for a larger number of turbines. We feel the data provided by the OEM's CMS and Romax's InSight offerings will provide us with the information necessary to more efficiently plan for turbine repairs," said Martin.

Romax has also utilized its wide-ranging experience in supplier audit and analysis to evaluate second sources of the supply of major components to the fleet. During each audit, Romax reviewed manufacturing processes and interviewed vendor staff, provided a report on their capabilities and recommended actions to maximize the reliability of components from each vendor. "Our experience in auditing major component manufacturers around the world, and from designing 38 DNV GL certified wind turbine gearboxes, means we can provide a depth of review that significantly reduces the risks in supplier selection for turbine owners and operators," says Ashley Crowther, Global VP – InSight, Romax Technology.

"We value Romax's level of expertise and we'll continue to seek opportunities to work with Romax to meet our engineering requirements," concluded Martin.



To find out more

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