

# Optimizing Asset Management For Wind Farms

IBM powers the way forward in smart energy solutions



## Highlights

- ***Lower costs through increased predictive maintenance***
- ***Minimize downtime and unplanned repairs***
- ***Improve visibility and control of wind operations by applying industry standards to aggregate data from multiple turbine manufacturers into a single view***
- ***Increase revenue through improved turbine availability and wind farm production***

### Growth Challenges Wind Power

Wind is turning into a powerful energy game-changer. In the U.S., the fast-growing wind power business is increasing total capacity by 30-50 percent annually, putting it on a trajectory to generate 20 percent of the nation's electricity by 2030.<sup>1</sup> Wind power is expanding worldwide as well, where healthy double-digit growth is expected this year despite the general economic crisis.<sup>2</sup>

Yet, as fast as wind farms rise in open plains and off shorelines, many operators realize they've been slow to implement asset management systems to minimize downtime and maximize productivity of their expensive wind turbines and machinery. Excessive and untimely repairs and upkeep threaten farm efficiency and revenues. Worse still, disparate management systems provide a limited view of wind farm operations, hampering an operator's ability to make effective decisions concerning operational efficiency.

## Technology Solution At A Glance

- IBM Tivoli® Maximo®
- IBM Cognos® Now!
- IBM DB2® Database Management
- @hand Field Mobility System
- OSIsoft™ PI System® Infrastructure
- SISCO Utility Integration Bus Adapter

IBM's virtual 42-megawatt wind farm—complete with a couple dozen turbines, control room, maintenance shop and substation—can be viewed as a smart energy alternative at the IBM Energy & Utilities Solution Lab in Austin, Texas.



The standards-based IBM Wind Asset Management solution gives wind operators the information required to monitor the health of wind assets from multiple manufacturers.

Wind power enterprises—with both single and multiple sites—need to integrate functions and processes to optimize and properly maintain these large, expensive, clean energy assets. Fortunately, there is a way to support today's rapidly growing wind power ecosystem, and IBM is leading the way.

### IBM Solution for Wind Operators

Asset management by IBM is a smart solution for today's wind farms. Using digital technology, intelligent sensors and analytics tools, the IBM Wind Asset Management solution allows wind farm operators to monitor, maintain, analyze and improve their equipment and asset performance in real-time. Wind power producers now have the technology to more effectively predict and prevent equipment failures, increase asset availability, and extend equipment life—all in a scalable system designed to meet the requirements of the smallest wind farm to multi-farm portfolios.

Leveraging a Service Oriented Architecture (SOA) platform and the Solution Architecture for Energy (SAFE), the Wind Asset Management solution integrates available operating and maintenance data,

from Supervisory Control And Data Acquisition (SCADA) systems, real-time historians, and maintenance management systems, to bring together data into actionable information. This allows operators to reduce time spent correlating data across disparate applications, enabling them to focus on the operational efficiency of their wind farms.

Additionally, this solution applies industry standards to aggregate data from multiple turbine manufacturers into a single comprehensive view. This visibility allows energy producers to use the data to make strategic decisions and lower the costs of maintenance, track key performance indicators, identify trends and help predict impending equipment breakdowns. The result is a considerable reduction in operational and maintenance costs and increased asset availability and utilization.

### Instrumented. Interconnected. Intelligent

In virtual and real world wind farms, IBM has demonstrated how an asset management solution can turn a conventional wind farm into a 'smart' farm that runs more efficiently and

profitably. IBM's total end-to-end solution utilizes a suite of proprietary and Business Partner solutions.

First, the turbines are instrumented with sensors, so that these components can be monitored with IBM's Cognos® Now!, a business intelligence monitoring solution. At a glance, the Cognos Now! dashboard gives operators a single view of the health of the farm.

Field data from the instrumented turbines is brought together, or interconnected, into a comprehensive data repository using SISCO's UIB adapter. Should any abnormal reading be detected, an alert can be directed immediately to operators, who utilize the OSIsoft™ PI System® to investigate the situation and begin a troubleshooting process that results in a notification directed to the wind farm maintenance team.

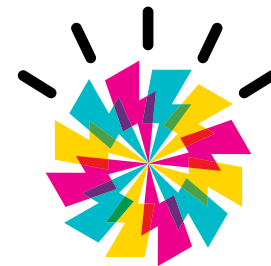
Next, utilizing IBM Tivoli® Maximo® asset management software, a technician is notified of the service request and a work order is created and planned to correct the trouble condition. @hand field mobility software then allows the technician to use a global positioning system (GPS)-equipped field device to find the correct turbine, diagnose the trouble condition, repair it and coordinate with operations to return the turbine to service.

All of this instrumentation and inter connectedness generates the data for proactive alerts and work orders, along with advanced analytics and insight to make better asset management decisions in near or real-time. In turn, the whole system becomes more efficient, reliable, adaptive—in a word, smart.

### **Smarter Farms Help Power a Smarter Planet**

On a macro scale, the planet stands to rid itself of billions of tons of carbon emissions with a clean, renewable energy source like wind. But at the farm level, the wind power business becomes more profitable once you implement a Wind Asset Management solution. Because of newfound efficiencies, you increase labor and asset utilization. You reduce spending on new equipment, lower inventory carrying costs, and save by increasing planned maintenance services. Inventory visibility is improved, along with warehouse productivity. Based on extensive studies, IBM estimates that when all the labor and cost benefits are added up, wind farms deploying an asset management solution stand to realize a 20 percent cost reduction in operations and maintenance.<sup>3</sup>

Based on today's growth levels, wind power is one of the leading sources of new power generation in the U.S. along with natural gas.<sup>4</sup>



Wind farms have the potential to meet the world's growing need for renewable and eco-friendly energy.





And that's just the beginning. IBM envisions even greater cost and efficiency gains once smart wind farms connect to a national smart grid and can use the asset management solution to aggregate wind power data for trading carbon credits and trading wind output as a commodity to other utilities.

### Why IBM

IBM is a leading innovator in asset management solutions and has pioneered efficiency solutions for the energy and utility industry, including wind, on a global basis. A simulated wind farm has been created to showcase IBM and our Business Partner's capabilities in wind power.

We bring the integration skills, leading-edge technology, partner ecosystem, and business and regulatory expertise required to support every level of an asset management implementation for a wind farm. We can provide planning and business case development, from pilot programs to full-scale execution.

No matter the size of your wind farm. IBM can help you manage all of your farm assets and business processes in one end-to-end solution. Based on a flexible, standards-based model, IBM Asset Management solution for wind farms can easily adapt to your changing farm needs, protecting your investment—today and for years ahead.

IBM can also help stretch your funding and fuel growth with capital from IBM Global Financing. Flexible options let you match your lease payments to anticipated funding so you can start your projects right away.

### For More Information

To learn more about how the IBM Wind Asset Management solution can benefit your wind farm, please contact your local IBM representative or visit:

[ibm.com/energy](http://ibm.com/energy)

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<sup>1,4</sup> American Wind Energy Association, 2008: Another Record Year for Wind Energy Installations, and the American Wind Energy Association Annual Wind Industry Report, 2008

<sup>2</sup> "Wind energy market worldwide continues strong growth," Worldwide Wind Association, June 23, 2009

<sup>3</sup> IBM Business Value Analysis, February 11, 2009