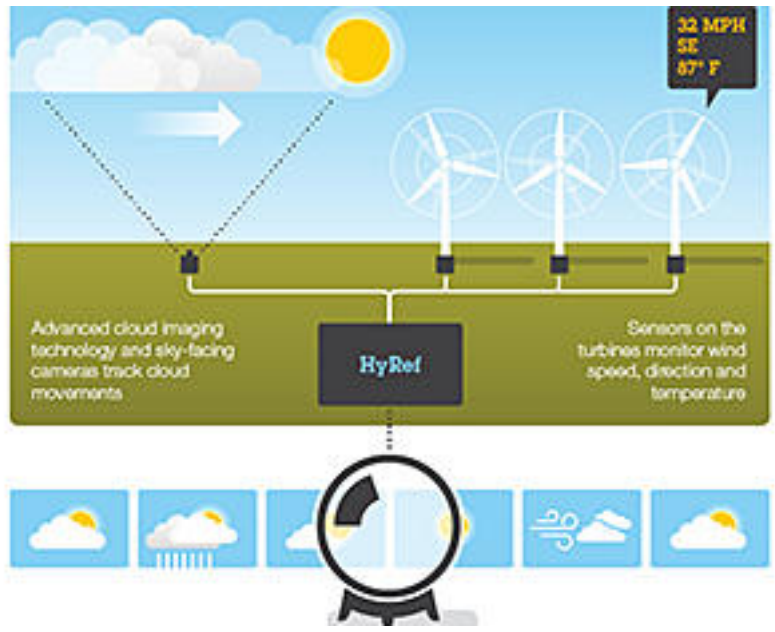
Driving the Future of Renewable Energy with Advanced Power and Weather Forecasting

IBM



ARMONK, NY — IBM has announced an advanced power and weather modeling technology that will help utilities increase the reliability of renewable energy resources. The solution combines weather prediction and analytics to accurately forecast the availability of wind power and solar energy. This will enable utilities to integrate more renewable energy into the power grid, helping to reduce carbon emissions while significantly improving clean energy output for consumers and businesses.

The solution, named "Hybrid Renewable Energy Forecasting" (HyRef) uses weather modeling capabilities, advanced cloud imaging technology and sky-facing cameras to track cloud movements, while sensors on the turbines monitor wind speed, temperature and direction. When combined with analytics technology, the data-assimilation based solution can produce accurate local weather forecasts within a wind farm as far as one month in advance, or in 15-minute increments.

By utilizing local weather forecasts, HyRef can predict the performance of each individual wind turbine and estimate the amount of generated renewable energy. This level of insight will enable utilities to better manage the variable nature of wind and solar, and more accurately forecast the amount of power that can be redirected into the power grid or stored. It will also allow energy organizations to easily integrate other conventional sources such as coal and natural gas.

"Utilities around the world are employing a host of strategies to integrate new renewable energy resources into their operating systems in order to reach a baseline goal of a 25 percent renewable energy mix globally by 2025," said Vice Admiral Dennis McGinn, President and CEO of the American Council on Renewable Energy (ACORE). "The weather modeling and forecasting data generated from HyRef will significantly improve this process and, in turn, put us one step closer to maximizing the full potential of renewable resources."

State Grid Jibei Electricity Power Company Limited (SG-JBEPC), a subsidiary company of the State Grid Corporation of China (SGCC), is using HyRef to integrate renewable energy into the grid. This initiative led by SG-JBEPC is phase one of the Zhangbei 670MW demonstration project, the world's largest renewable energy initiative that combines wind and solar power, energy storage and transmission. This project contributes to China's five-year plan to reduce its reliance on fossil fuels.

By using the IBM wind forecasting technology, phase one of the Zhangbei project aims to increase the integration of renewable power generation by 10 percent. This amount of additional energy can power roughly more than 14,000 homes. The efficient use of generated energy allows the utility to reduce wind and solar curtailment while analytics provides the needed intelligence to enhance grid operations.

"Applying analytics and harnessing big data will allow utilities to tackle the intermittent nature of renewable energy and forecast power production from solar and wind, in a way that has never been done before," said Brad Gammons, General Manager IBM's Global Energy and Utilities Industry. "We have developed an intelligent system that combines weather and power forecasting to increase system availability and optimize power grid performance."

This project builds upon another IBM smarter analytics initiative at Denmark's Vestas Wind Systems [1], the world's manufacturer of wind power turbines. Vestas, together with IBM's big data analytics and supercomputing technology, is able to strategically place wind turbines based on petabytes of data from weather reporters, tidal phases, sensors, satellite images, deforestation maps, and weather modeling research. This insight cannot only deliver improvements in energy generation but also reduce maintenance and operational costs over the life of the project.

The Hybrid Renewable Energy Forecaster represents advancements in weather modeling technology, stemming from other game-changing innovations such as Deep Thunder [2]. Developed by IBM, Deep Thunder provides high-resolution, micro-forecasts for weather in a region — ranging from a metropolitan area up to an entire state — with calculations as fine as every square kilometer. When coupled with business data, it can help businesses and governments tailor services, change routes and deploy equipment-to minimize the effects of major weather events by reducing costs, improving service and even saving lives.

IBM and Smart Grid

IBM is involved in more than 150 smart grid engagements around the world, in both mature and emerging markets. More about IBM's vision to bring a new level of intelligence to how the world works — how every person, business, organization, government, natural system, and man-made system interacts, can be found here: http://www.ibm.com/smarterplanet [3].

Source URL (retrieved on *09/03/2015 - 9:37pm*):
http://www.scientificcomputing.com/news/2013/08/driving-future-renewable-energy-advanced-power-and-weather-forecasting

Links:
[1] http://www-03.ibm.com/press/us/en/pressrelease/35737.wss
[2] http://www-03.ibm.com/ibm/history/ibm100/us/en/icons/deepthunder/
[3] http://www.ibm.com/smarterplanet