How to Generate Better Intelligence, More Wind Power and Increased Profits with Advanced Business Analytics

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Since 2007, more than 40,000 MW of new wind generation has been built in the U.S., according to the American Wind Energy Association (AWEA). Tens of thousands of new turbines are operating, a testament to the entrepreneurial and engineering spirit of renewable development firms, equipment suppliers and engineering, procurement and construction (EPC) companies.

Given the nation's massive build out of wind generation, the industry will be working for the next few years to operate these new turbines efficiently and integrate their output into the electrical grid.

There's much work to be done.

Variable energy resources (VERs) such as wind and solar power need to be backed by a dispatchable source of generation. In the Northwest, hydropower often backs wind power. In other parts of the country, thermal plants typically back wind and solar generation. The backup generation ensures power is on the wire when the wind stops blowing or the sun stops shining. Backup generation ensures the contracted amount of electricity is produced, balanced and put onto the grid to keep operators, regulators and customers happy.

But there are significant operational and financial costs built into the variable energy market. The inefficiencies caused by maintaining backup generation and the penalties for an operator that delivers more or less than its contracted amount of renewable energy impose significant costs on the system and customers.

Beyond establishing integration charges to offset the cost of integrating VERs, entities responsible for the integration of VERs have imposed charges over and above base integration charges—in some cases 10 percent of market price per megawatt—for each hour an operator is out of balance with its scheduled power deliveries. Penalties also can be imposed by system operators for operating outside of established business practices and consistent deviations between scheduled generation and actual generation. The integration of VERs brings additional challenges that can be mitigated through increased operational efficiencies.

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Intelligence. Empowered.

Using advanced business analytics software improves electric system efficiencies. Operators that use Versify Solutions Inc.'s V-RENEW® software applications report significant efficiency and profitability gains resulting from:

✔ Improving forecasting accuracy

✔ Running less backup generation and more effective use of capacity

✔ Increasing the efficiency of planning and operational activities

✔ Having detailed insight into how each turbine is performing, and

✔ Accessing real-time market prices for power so operators know whether they are in the money or out of it, which facilitates sound operational decision-making

> "*The time it takes to acquire, analyze and respond to the data presented becomes increasingly difficult as the volume of data multiplies.*"

The proliferation of variable generation in recent years has addressed some public policy challenges but created others. The U.S. generating fleet is cleaner, greener and more diverse than it was 10 or 20 years ago and has created a broad benefits stream that should last decades. Utilities in 30 states are making progress toward satisfying state renewable portfolio standards (RPS) that mandate certain percentages of electricity come from renewable sources by specific dates.

But the rapid expansion of renewable generation has created new stress points for plant operators, energy traders, power dispatchers and reliability organizations.

Big Data and How to Use It

An exponential increase in plant data threatens to overwhelm plant operators and power dispatchers. **More data does not mean more intelligence.** Without effective software technologies and fine-tuned industry analytics, Big Data will not be transformed into business intelligence. The primary focus of operators is to maintain system balance in a reliable manner. The time it takes to acquire, analyze and respond to the data presented becomes increasingly difficult as the volume of data multiplies. Operators need tools to understand the state of a system in an accessible and effective manner while facilitating a drill-down into the details if necessary. Gathering and sharing data is no longer enough. The ability to employ advanced analytics to transform data into business intelligence that guides operational decision-making is critical in today's electricity business.

*Edison Mission Energy
Spanish Fork Windfarm - Utah
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Peetz Windfarm - Colorado
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"In this topsy-turvy electricity market, timely knowledge of what it costs to acquire energy in the market can empower generation operators to make better decisions."

FERC Order 764 Creates New Demands

Operational decision-making is more difficult with today's data deluge. Order 764 from the Federal Energy Regulatory Commission (FERC) reduces barriers to integrating renewable generation resources into the electric grid by allowing increased flow of information, opportunity for alternative integration models and intrahour scheduling of resources. This means operators must have data and intelligence developed and displayed in a clear, accessible manner to use the new intrahour scheduling timelines. Without appropriate data analytics and related operational software applications, wind power operators do not have time to gather and analyze operational data.

New NERC Information Recommendations

The North American Electric Reliability Corp. (NERC) issued a set of recommendations after the Sept. 8, 2011, outage in southern California. A primary focus of the recommendations was the need for increased sharing of operational information between planners and operators so balancing area authorities and others responsible for system reliability have a more complete understanding of conditions in the electrical system to avoid a reoccurrence of the outage. The industry must approach this thoughtfully. **Simply pushing more data to everyone is not the answer.** The industry must re-evaluate how it shares data, increase the sharing of this data and share the data in a way that will provide intelligence to the people who must act on it. We must manage our data while transforming it into actionable intelligence.

Optimizing Performance With Real-time Intelligence

During 2012, spot natural gas prices occasionally were low enough that some gas-fired generation displaced some baseload coal generation. In this topsy-turvy electricity market, timely knowledge of what it costs to acquire energy in the market can empower generation operators to make better decisions: Should they run their generators, rely on the market to provide the energy or, in the case of VERs, activate some turbines but deactivate others based on market prices and operational costs?

Plant operators, power dispatchers and energy traders typically don't look at the same sets of data so some operational decisions with significant profit-and-loss implications, such as scheduling a turbine shutdown, may not be made with reference to market conditions. Plant operators typically focus on operational data acquired from systems such as supervisory control and data acquisition (SCADA) with little focus on market data such as demand and spot prices. Traders see spot prices but have limited visibility into operational conditions at plants and current grid conditions.

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Over 40,000 MW of new wind generation has been built since 2007.

This limited visibility is partly a result of regulatory restrictions but largely is a result of the lack of implementing enabling technologies.

Versify's V-RENEW advanced analytics software blends two critical data streams—operational and market—into **one flow of actionable intelligence.** The ability to have more meaningful intelligence available to all participants in the industry while respecting regulatory restrictions increases the efficiency, reliability and economics of electrical system operations. For operators, raw data does not provide the same value as data that has been transformed by an application into business intelligence, operational intelligence or both.

Clients who use V-RENEW report turning raw operational data into actionable intelligence that drives more profitable decision-making:

✓ Some renewable energy plant operators have deferred scheduled outages at their wind farms to take advantage of market prices for their power.

✓ Renewable energy plant owners have improved response times in shutting down or bringing up plants when they are "out of the money" or "in the money."

✓ Other operators decided not to activate some turbines when prices for spot power fell below a specific turbine's break-even level.

Constellation Energy Control & Dispatch (CECD) is a leading provider of balancing authority services, compliance management and energy management services. **CECD is a pioneer in variable generation integration.** It has transformed the way operators can efficiently and reliably operate balancing authority areas (BAAs) by using applications to turn Big Data into actionable intelligence and operational optimization of balancing resources. CECD leverages their expertise and use of applications developed by Versify to operate multiple BAAs at the same time in a reliable and economic manner 24 hours a day, 365 days a year.

A more complete discussion of the operational and financial benefits of V-RENEW can be found in a forthcoming white paper that will be available at *www.versify.com.*

Success in the dynamic renewable power business requires plant operators have increased access to operational data and the ability to transform that data into actionable intelligence to increase efficiencies and profits. Understanding market conditions at a more granular level ensures operators will increase the efficiencies and profitability of their generators by turning data into intelligence.

For more information about our products please visit us at www.versify.com or call us at 855.387.8700.
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