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Renewable energy in smart grid

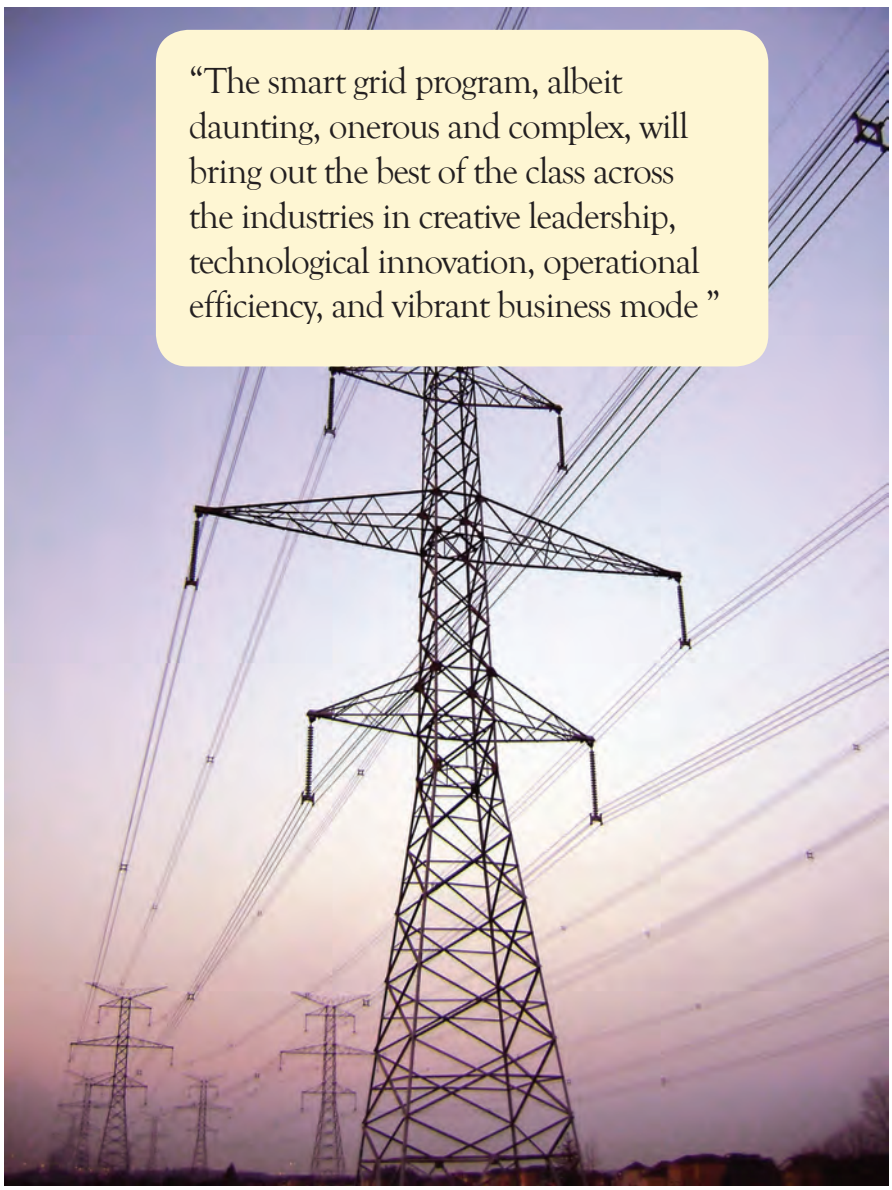
Synchronizing renewable energy with the evolving smart grid makes perfect sense, and this should be a top priority on the national agenda. A successful smart grid system enables the deployment of renewable energy, such as solar and wind, to its intended reach and desired efficiency. It is also expected to accelerate the fulfillment of the ultimate energy economics.

Countries around the globe are launching concerted activities in addressing energy independence, as well as climate and environmental issues. As the world's energy needs continue to increase (after going through the current economic pause or recession), the energy generation, distribution and consumption must resort to a more sustainable model.

A sustainable model needs to embrace all energy sources and have the ability to deliver reliability, stability, safety and security while offering cost efficiency. How to achieve these goals? It takes unwavering vision, revolutionary-style execution, broad-based support and pervasive deployment. A comprehensive smart grid system is the viable strategy.

A smart grid system holds high promise to revolutionize how electricity is generated, distributed, consumed and conserved by automatically monitoring and controlling two-way energy flow. It can also integrate renewable and alternative energy more effectively, efficiently and intelligently, thus potentially transforming today's economy. It should further expand to environmentally friendly transportation, the electric vehicle, making it a truly sustainable energy model.

The success of smart grids culminates in the fulfillment of the combined and integrated abilities to enhance the power grid's reliability, efficiency safety and security through real-time communication;



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to provide the flexibility of power consumption; to enable decentralized power generation; to reduce electricity cost; to create the fluid capacity of utilizing renewable energy; and to increase the nation's economic growth by harnessing

renewable energy sources and creating green jobs.

By using real-time information from embedded sensors and automated controls, power outages, power quality problems and service disruptions can be mitigated. The ability to anticipate, detect and respond to system problems and to isolate affected areas and redirect power flows around damaged facilities can function as a self-healing loop. The optimizd power flows reduce waste and maximize the use of lowest-cost generation resources. Through seamlessly interconnecting renewable energy sources and other distributed generation technologies at local and regional levels, energy efficiency is maximized. The decentralized power generation provided by smart grids also can increase the fault tolerance level.

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Multi-front technologies are needed. Technologies in communication, sensing, control, monitoring, measurement metering, digital infrastructure and complex computer models are some of the key elements of smart grids. And innovations in superconductivity, fault tolerance, storage, power electronics and diagnostics components constitute its foundation. On top of many facets of a smart grid system, the system's security is of the ultimate importance. To secure the nation's electrical power critical infrastructure, "smart encryption" is a necessity. This should be taken into consideration at the outset of the program.

The smart grid program, albeit daunting, onerous and complex, will bring out the best of the class across the industries in creative leadership, technological innovation, operational efficiency and vibrant business model. It will profoundly change the country's future electricity generation portfolio.

Today, the smart grid concept is seeded. Leadership is coming into play. The effort in deliberating, planning, structuring and supporting a well thought-out national program is in order.

Energy is the racing game of technology and deployment in the global competitive landscape. Globally, countries including the European Union, Canada, and China have put forth government policies to endorse smart grid initiatives.

In the United States, with the passage of the American Recovery and Reinvestment Act of 2009, $11 billion is set aside for the creation of a smart grid. The Federal Energy Regulatory Commission (FERC) is also looking at the growth in renewable, clean energy accommodated by the evolving smart grid system. In renewable energy, policy proposals now before the Congress include the House bill that requires utilities to deliver at six percent of their power from renewable source in 2012 and 25 percent in 2025 by the House Energy and Commerce Committee. And the Senate Energy and Natural Resources Committee sets a four percent target in 2012 and 20 percent by 2021. If enacted, the impact on renewable energy deployment will be immense.

With the fervent global energy activities, the success of the integrated smart grid system will epitomize the United States' commercial leadership and technological prowess.

Challenges are ahead and obstacles in sight, yet the smart grid system integrating the renewable energy is another timely opportunity for the United States to lead the world.

Dr. Jennie S. Hwang has extensive experience in global market and international business in her executive capacities with both corporate America and entrepreneurial businesses. She is inducted to the WIT International Hall of Fame, elected to the National Academy of Engineering, and named an R&D-Stars-to-Watch (Industry Week). Dr. Hwang is a member of the U.S. Commerce Department's Export Council, and serves on university, civic and Fortune 500 NYSE company boards. Among others, she has served on National Research Council's "Globalization Committee" and " Forecasting Emerging, Disruptive Technologies Committee". Her education includes Ph.D., M.S., M.A., B.S. degrees in engineering and sciences, respectively, and Harvard Business School Executive Program. An author of 300+ publications, she is also a worldwide speaker on trade, technology, business, education, and social issues.

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