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The Real Reasons We Must Have a Smart Grid for the 21st Century

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With Guest Lecturer Dr. Merwin Brown

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Dr. Merwin Brown

Abstract:

The "smart grid" is a must is for keeping the lights on and electricity prices in check for the early 21st century. The reasons have their roots in trends that started in the 1960s in the electricity industry, largely driven by energy-related public policies responding to changing circumstances in the environment, economics, fuel supplies, technologies and electricity usage practices. By the end of the 20th century, the ways electric systems were planned, owned, built, operated, regulated, used, and bought and paid for would never be the same. The 21st century electric grid owner, operator, planner and regulator face growing uncertainty, complexity, inadequacy, conflict, and the need for flexibility, robustness, real-time situation awareness, probabilistic forecasting and rapid response. No longer can the grid planners and owners "build" their way out of these problems using traditional wires, towers and power plants alone. New technologies will be needed to make grid planning, permitting, building and operating easier and less costly, especially technologies that make the grid smarter.

The choice in the late 19th century of the alternating current (AC) electric grid, which was promoted by Westinghouse and Tesla and became the grid of the 20th century, instead of the direct current (DC) grid, championed by Edison, was enabled by electric transformer technology. Similarly, the emergence of electronic technology, essentially and ironically about the time the problematic trends began for the 20th century grid, is enabling the smart grid needed for the 21st century.

This lecture will examination significant events and trends in the electric industry community that over the last 5 decades exerted a compounding influence of growing complexities and uncertainties for our electric institutions, and their infrastructure and its operation. Examples of key new technologies being developed as solutions will be described.

Abridged Biography:

Dr. Merwin Brown, is Co-Director of Electric Grid Research (EGR) for the California Institute for Energy and Environment (CIEE), University of California. EGR conducts technology research to modernize electric grids for implementing California's environmental policies. He is a member of the US Department of Energy Advisory Committee (in 2nd term) and chairman of Energy Storage subcommittee. He has served as an Arizona Solar Energy Commissioner, on the Board of the American Council for an Energy Efficiency Economy, and with groups from the Electric Power Research Institute and the National Renewable Energy Laboratory. He has numerous technical publications and presentations to his credit, and holds B.S. and Ph.D. degrees in nuclear engineering from Kansas State University.

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