

Title

Plugged Into the Matrix: The North American Power Grid: Past, Present and Future

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Abstract

The North American Power Grid, the creation of “a not always friendly collaboration” between Thomas Edison and Nikola Tesla, has often been termed the greatest machine ever assembled by humankind. Its modern embodiment, a unique combination of private investment, financial return and regulatory control, was synthesized by Samuel Insull, a protégée of Edison, and founder of Commonwealth Edison in the late 1920s (please visit my Nature review of Phil Schewes 2007 book, “The Grid, [“http://w2agz.com/Publications/Book%20Reviews/06%20\(2007\)%20Plugged%20Into%20the%20Matrix.pdf](http://w2agz.com/Publications/Book%20Reviews/06%20(2007)%20Plugged%20Into%20the%20Matrix.pdf)”). We briefly discuss the evolution of the national grid from the days of Insull to the present, and suggest possible paths forward to address a scenario of concern for climate change, consequences of continuing carbonaceous fuel combustion and promoting energy efficiency in generation, transport and end use of electricity. To support progress in all three areas, we propose a future symbiosis of safe nuclear fission, solar panel-roofed habitats, hydrogen derived from water and high temperature superconductors. I have elucidated this vision in a number of papers and presentations over the past decade and a half in peer-reviewed scientific journals, on TV, science magazines as well as in the popular press. Please visit <http://w2agz.com/PMG%20SuperGrid%20Home.htm> . We have suggested to DOE/DHS that a modest “engineering economy” study be undertaken to explore the “dual use” of existing and expanding natural gas pipeline rights-of-ways, to eventually co-transport both chemical and electrical power from nuclear plants located on the now-exhausted methane fields.

Brief Bio

Paul Michael Grant (PMG) was born in the mid-1930s in the Hudson Valley of New York State, the only child of Mary Whalen Grant, a career staff associate at the Central Hudson Gas and Electric Company since age 16, and her husband, Paul Archibald Grant, who in the 1940s was hired by IBM as an instrument technician in its original Poughkeepsie product development laboratory. During the 1920-30s decades, his father was one of the pioneer Ham Radio operators, W2AGZ, in Southern New York State. In his senior year in high school at age 17, (1953), PMG was hired part time by IBM, and within a year following graduation was trained as a system programmer, hence assigned to the SAGE-NORAD computer prototype project at MIT Lincoln Laboratory. He subsequently attended Clarkson and Harvard Universities, while remaining an IBM employee, obtaining a BSEE from the former (and the presidency of the local HKN chapter), and the AM and PhD degrees in physics from the latter, then subsequently posted by IBM in 1965 to its newly established San Jose Research Laboratory where he conducted basic materials science and physics research on magnetic field sensors, laboratory data acquisition methodology, computational electronic structure of organic metals, and unique superconductor materials including the high temperature HTSC compounds discovered in the mid-1980s. He is a co-holder of the fundamental international copper oxide HTSC materials preparation patent. Upon retiring from IBM in 1993, Grant accepted a position as Science Fellow at the Electric Power Research, where he funded various R&D projects in universities, industries and national laboratories targeting a broad range of technologies underlying the “smart grid” vision. In collaboration with EPRI’s founder, Chauncey Starr, he formulated the concept of the Energy SuperGrid, a symbiosis of Nuclear/Hydrogen/Solar Roofs/ and Superconductivity to supply non-intrusive energy for all inhabitants of planet Earth.