Seminar on Microgrids

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Date: June 30(Wed.), 2010

Time:10:30 to 11:30

Place: E3-112

Title & Abstract

Introduction to Microgrids: Concepts, Results, and the Status of U.S. Research

There are three parts to this presentation: 1. thoughts on the nature of our evolving electricity infrastructure, 2. results from Berkeley Lab's work on microgrid optimization, and 3. reports on the status of U.S. Department of Energy's SG R&D.

1. ***evolving electricity infrastructure*** – Our current power system may be entering a period of significant fundamental change of a kind not seen for a century. Some of the uncertainty revolves around the requirements of modern economies for high power quality and reliability (PQR) electricity service and the most cost effective way of providing it. One viable possibility is through local control of PQR in microgrids. A more dispersed structure for the industry could lead to changes to the high voltage grid as well as locally.
2. ***microgrid optimization*** – Berkeley Lab has been working on microgrid optimization for several years and this work has led to the the development of the Distributed Energy Resources Customer Adoption Model (DER-CAM). Using capabilities developed jointly with AIST, recent applications of DER-CAM have focused on the relationship between electric vehicles and building-scale microgrids and on a specific microgrid demonstration at a county jail near to Berkeley. Results from these and other recent projects show the value of mobile and stationary storage to microgrids.
3. ***U.S.DOE SG R&D*** – The Department has been charged with leading efforts for grid modernization, under its Office of Electricity Delivery and Energy Reliability (OE), which has historically been a primary funder of microgrids R&D. Funding under the American Recovery and Reinvestment Act, which totals about $4B, has provided an unprecedented opportunity for accelerated smart grid deployment. The status of work authorized by ARRA is reported and the goals of projects underway discussed.

Chris Marnay leads the microgrids research group within the Environmental Energy Technologies Division, where he has worked for 25 years. He models economic-environmental problems related to likely future adoption patterns of small-scale distributed energy resources (DER), especially when clustered in microgrids exercising local semiautonomous control. He is a member of the Consortium of Electric Reliability Solutions team, and has published a large body of research on microgrid principles, economics, and applications. Work on DER has led to development of the DER Customer Adoption Model that finds optimum technology neutral combinations of equipment and operating schedules, given prevailing economic circumstances and available equipment descriptions, including energy storage and electric vehicles. Other responsibilities involve maintaining, running, and enhancing the latest version of the Energy Information Administration's National Energy Modeling System for various policy analyses, and he leads development of the commercial and residential building modules for the U.S. Dept. of Energy's Stochastic Energy Deployment System. He has an A.B. in Development Studies, an M.S. in Agricultural and Resource Economics, and a Ph.D. in Energy and Resources, all from the University of California, Berkeley. He has also studied at the London School of Economics and the University of Hawaii, has worked at the University of Texas at Austin. He has lectured widely, and chairs the annual Micrgrids Symposiums. In spring 2006, he was a Japan Society for the Promotion of Science Fellow at the University of Kitakyushu. He is also Convenor for the *Microgrids Evolution Roadmap* Cigré working group