

## MICROGRIDS AND HETEROGENEOUS POWER QUALITY AND RELIABILITY

*Chris Marnay*

*Technology Evaluation, Modeling, and Assessment  
Ernest Orlando Lawrence Berkeley National Laboratory  
MS90R4000, Berkeley, CA 94720-8136, USA  
Phone (+1) 510-486-7028, Fax (+1) 510-486-7976  
e-mail: C\_Marnay@lbl.gov*

*Keywords:* combined heat and power, dispersed storage and generation, microgrids, power quality, power system economics.

### **ABSTRACT**

This paper describes two stylized alternative visions of how the power system might evolve to meet future requirements for the high quality electricity service that modern digital economies demand, a supergrids paradigm and a dispersed paradigm. Some of the economics of the dispersed vision are explored, and perspectives are presented on both the choice of homogeneous universal power quality up-stream in the electricity supply chain and on the extremely heterogeneous requirements of end-use loads. It is argued that meeting the demanding requirements of sensitive loads by local provision of high quality power may be more cost effective than increasing the quality of universal homogeneous supply upstream in the legacy grid. Finally, the potential role of microgrids in delivering heterogeneous power quality is demonstrated by reference to two ongoing microgrid tests in the U.S. and Japan.