



Stanford University

TomKat Center for Sustainable Energy
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Civil and Environmental Engineering
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Stanford SmartGrid Seminar

ARPA-E's Investments in Grid Power Flow Control and Optimization

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1:15pm-2:15pm, Thursday, Oct 16th, Y2E2 101

Abstract: ARPA-E's GENI (Green Electricity Network Integration) program, launched in 2011, focuses on enabling ubiquitous power flow control and optimization in the grid as a means to improve the flexibility, efficiency, and security of the U.S. power delivery. The program is funding 15 projects, equally divided between "hardware" and "software" innovations. The hardware projects are aimed at developing cost effective grid power flow control devices. These devices utilize new circuit topologies, control strategies, and recent advances in power electronics. The software projects are directed at enabling the near real-time optimal operation of power transmission networks. Many of these algorithms seeks to enable the optimal dispatch of large numbers of new power electronic-based devices, including power flow controllers, that are embedded throughout large, complex networks. These projects draw on dramatic recent advances in algorithms and solvers within the optimization community and advances in computational capabilities including cloud computing systems and "Big Data" tools. All of the projects have a strong emphasis on near term commercial viability.

Bio: Dr. Tim Heidel currently serves as a Program Director at the Advanced Research Projects Agency-Energy (ARPA-E). His focus at ARPA-E includes new approaches for controlling and optimizing the transmission and delivery of electric power, particularly in the context of high renewables penetrations. Dr. Heidel also manages several programs at ARPA-E focused on high-efficiency power electronics, including new magnetic materials, new capacitor technologies, and wide band gap semiconductor devices. Prior to joining ARPA-E, Dr. Heidel was a Postdoctoral Associate at MIT and served as the Research Director for MIT's 2011 "Future of the Electric Grid" study. Dr. Heidel holds S.B., M.Eng., and Ph.D. degrees in Electrical Engineering and an M.S. in Technology and Policy from MIT.