

A sustainability-based approach to resource allocation in the Smart Grid

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1 Abstract

The electricity network is morphing into the Smart Grid with unprecedented changes in the distribution (end-user) side. Assets owned and operated by both utilities and consumers are expected to be pervasive, with stochastic characteristics, and capable of interacting with the grid through demand response (**DR**). Sustainability, which spans three realms—society (people), environment (planet) and economics (profits)—, is a topic germane to electric power systems. However, sustainability metrics for DR are few and far between. In this talk, we will introduce the concept of sustainability metrics to DR relating to deferring additional transmission capability and reducing the use of peaking generators. We will also introduce a unique infrastructural framework for a coordinated multi-voltage-level multi-aggregation-scale energy management system (**EMS**) for DR, extending from the individual end-user asset to the bulk transmission grid. We will utilize cyber-physical systems(**CPS**) concepts and high performance computing (**HPC**) to demonstrate our results on simulation models of real-size power systems.

2 Biography

Prof. Sid Suryanarayanan received the Ph.D. in electrical engineering from Arizona State University in 2004. Since 2010 he has been at Colorado State University where he performs sponsored research and teaches in the general area of modern electric power systems. Specifically, his research team works on design, operation, and economics of finite-inertia power systems, applications of cyber-physical social systems (CPSS) concepts to emerging Smart Grids, and integration of renewable energy to electric grids. For more information about Sid and his research visit <http://www.engr.colostate.edu/~ssuryana/>.

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