

# Electric Power and Power Electronics Institute

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## WEEKLY SEMINAR SERIES – FALL 2015

Monday, October. 26<sup>th</sup>, 2015, 4:00 – 5:00 p.m., WEB 236C

### A CONTROL SYSTEM FRAMEWORK FOR DEMAND RESPONSE OF THERMAL INERTIAL LOADS

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#### Abstract

As the smart grid strives to integrate more renewables to reduce carbon emissions, uncertainties in power generation pose a challenge for the traditional “supply follows demand” model since we cannot directly control renewable sources such as solar irradiance or wind speed. As an alternative, modern power systems are undergoing an operational change from the “supply follows demand” model to one where the “demand follows supply”. This strategy to offset the supply side variability by adjusting the total energy consumption of a population of loads, is termed as *demand response*, and is expected to become a key enabler for future clean energy solutions.

In this talk, I will introduce an architecture for demand response where a service provider called *load serving entity (LSE)*, first plans, and then tracks the optimal total power consumption for a population of residential thermal inertial loads. The proposed architecture preserves the individual consumers’ privacy, and respects their comfort range constraints, modeled as contracts between the consumers and the LSE. Computational and analytical results will be given to demonstrate the framework.

#### Biography

Abhishek Halder is a Postdoctoral Research Associate at the Department of Electrical & Computer Engineering, Texas A&M University. He received his Bachelors and Masters in Aerospace Engineering from Indian Institute of Technology Kharagpur in 2008; and his PhD in Aerospace Engineering from Texas A&M University in 2014. His research area is systems, control and optimization, with current interests in density based analysis and control applied to energy systems.