



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

Load Commitment in a Smart Home

by

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The Chinese University of Hong Kong

Abstract

Smart grid (SG) as a state-of-the-art technology makes two-way communication and even electricity flow between end-users and utilities possible. Reliability improvement of distribution networks, exploiting the sustainable energy resources, and energy efficiency are the three fundamental consequences of SG realization. In the context of energy efficiency, demand response (DR) is an underlying program at the distribution level. The customers, who have traditionally used to pay a fixed rate for the electricity, are now able to manage their electricity consumption mainly with respect to the variable prices. DR is a voluntary program for each customer, and the volunteer has an opportunity to monitor, reduce, or shift the associated consumption in a way that a considerable saving is reflected in the utility bills issued. Although DR potentially brings miscellaneous advantages, it is currently faced with challenges in its implementation due to customers' difficulty in manually responding to the time-varying prices. In this talk, an optimal and automatic residential load control framework, designated as load commitment (LC), is presented to achieve the household minimum payment. Problem decision variables are the operating status of responsive appliances and charging/discharging cycles of battery storage and plug-in hybrid electric vehicles (PHEVs). Storage capability in residential centers provide the customers with this opportunity to not only supply the local demand during the high price hours but also sell the energy back to the utility. The optimization-based LC shifts the responsive loads to inexpensive periods which rationally coincide with the valley of consumption profile.

Biography

Mahmud Fotuhi-Firuzabad (IEEE-SM'98) received the B.Sc. degree in Electrical Engineering from Sharif University of Technology, Tehran, Iran, in 1986 and the M.Sc. degree in Electrical Engineering from Tehran University, Tehran, Iran in 1989, and the M.Sc. and Ph.D. degrees in Electrical Engineering from the University of Saskatchewan, Saskatoon, SK, Canada, in 1993 and 1997, respectively.

Currently, he is a Professor and Head of the Department of Electrical Engineering, Sharif University of Technology. He is also an Honorary Professor in the Universiti Teknologi Mara (UiTM), Shah Alam, Malaysia. He is a member of the Center of Excellence in Power System Management and Control. Dr. Fotuhi-Firuzabad serves as an Editor of the IEEE TRANSACTIONS ON SMART GRID.

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