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Demand Response from Residential Air Conditioning Load Using a Programmable Communication Thermostat

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Abstract : Demand response is getting increased attention these days due to the increase in electricity demand and introduction of renewable resources in the existing power grid. Traditionally demand response programs involve large industrial consumers but with technological advancement, demand response is being implemented for small residential and commercial consumers also. In this paper, demand response program aims to reduce the peak demand as well as overall energy consumption of the residential customers. Air conditioners are the major reason of peak load in residential sector in summer, so a dynamic model of air conditioning load with thermostat action has been considered for applying demand response programs. A programmable communicating thermostat (PCT) is a device that uses real time pricing (RTP) signals to control the thermostat setting. A new model incorporating PCT in air conditioning load has been proposed in this paper. Results show that introduction of PCT in air conditioner is useful in reducing the electricity payments of customers as well as reducing the peak demand.

Keywords : demand response, home energy management, programmable communicating thermostat, thermostatically controlled appliances
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