

RESEARCH TOPIC ACCEPTANCE REQUEST (RTAR)

Submitted by: TC 7.5 Smart Building Systems

Title: Status and Benefits of Demand Response Program for Residential Buildings

Research Category: Operation and Maintenance Tools

Research Classification: Basic/Applied

TC/TG Priority: #

TC/TG Vote:

Estimated Cost: \$95,000

Other Interested TC/TGs: TC 9.5??.

Possible Co-funding Organizations: California Energy Commission, Others??

Handbook Chapters to be Affected By Results of this Project:

The results of this project may be appropriate for inclusion in Chapters A01 (Residences) and F15 (Fundamentals of Control), or in a separate handbook chapter devoted to demand response operation and program.

State-of-the-Art (Background):

In the United States, **21%** of primary energy, including 23% of nature gas and 36 % of electricity, is consumed by residential houses, which is more than the energy consumed by commercial buildings (17% primary energy). Residential buildings are also one of the primary contributors to the peak electrical load and are responsible for about 20% (REF) of total demand.

Pilot studies that examine the feasibility and benefit of demand response program for residential buildings have been implemented by several states, such as, California, New York, and Wisconsin (REF). Preliminary reports demonstrate that DR programs for residential buildings are feasible and beneficial.

Meanwhile, with the development of sensor and computer technologies, new products, such as power sensor and DR enabled thermostat, are emerging in the market.

A systematic study is needed to evaluate current existing DR programs, market available hardware, DR program benefit in different weather zones, and user feedbacks.

Advancement to the State -of-the-Art:

A status report of current available technologies

A simulation model to evaluate benefit of DR program in diff weather zone/bldg type etc

Justification and Value to ASHRAE:

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Objective:

Two major objectives: 1) literature review of existing DR programs, DR related hardware, DR related operation strategies; 2) simulation study to evaluate potential benefit for DR program in residential sector.

References:

1. DOE, 2006, 2006 Buildings Energy Data Book, US Department of Energy, http://buildingsdatabook.eere.energy.gov/?id=view_book#bookmark7-1.