Energy Management for Smart City

Anuradha Manikrao Patil[1], Sagar Gawande[2]
[1]*AnantraoPawar College of engineering & reasearch, Pune*
[2]*HOD, Civil Dept., Anantrao Pawar College of engineering & reasearch, Pune.*

***Abstract*— A smart home may be defined as a well-designed structure with sufficient access to assets, communication, controls, data, and information technologies for enhancing the occu-pants' quality of life through comfort, convenience, reduced costs, and increased connectivity. The idea has been widely acknowledged for decades, but few people have ever seen a smart home, and fewer still have occupied one. A commonly cited reason for this slow growth has been the exorbitant cost associated with upgrading existing building stock to include "smart" technologies such as network connected appliances. However, consumers have histori-cally been willing to incur significant costs for new communication technologies, such as cellular telephones, broadband internet connections, and television services.**

I. INTRODUCTION

A home is already a well-designed connector for power transfer between the electricity grid and energy-consuming appliances. A smart home also functions as a switchboard for data flow among appliances and participants such as the end-user, the electric utility and a third party aggregator.

Looking outward, a smart residential building has two-way communication with the utility grid, enabled by a smart meter, shown in Fig. 1, so that it can interact dynamically with the grid system, receiving signals from the service provider and responding with information on usage and diagnostics.This bidirectional information exchange is enabled by the rapid adoption of advanced metering infrastructure (AMI).

II. METHODOLOGY

Looking inward, a smart home employs automated home energy management (AHEM), an elegant network that self manages end-use systems based on information flowing from the occupants and the smart meter. The value of AHEM is in reconciliation of the energy use of connected systems in a house with the occupant's objectives of comfort and cost as well as the information received from the service provider. Sensors and controls work together via a wireless home area network (HAN) to gather relevant data, process the information using effective algorithms, and implement control strategies that simultaneously co-optimize several objectives: comfort and convenience at minimal cost to the occupant, efficiency in energy consumption, and timely response to the request of the service provider.

Fig.1. A smart meter at a residence.

In smart homes, many loads can be considered as assets that can participate in the efficient use of electric energy: thermal loads, electric vehicles, and smart appliances. By intelligently controlling their behavior in either a reactive or a coordinated manner, these assets can provide leverage for energy and cost savings.

Thermal loads, such as air conditioning, electric space heating and water heating, can be controlled by "intelligent" thermostats.Then, the thermostat adapts the room temperature efficiently, e.g., by auto-scheduling heating according to arrival and

departure times and by detecting when the users are away. These strategies can help reduce energy consumption, especially when traditional or programmable thermostats are not configured properly, or cannot detect that users are away.

Appliances also hold potential for smarter energy use. Dishwashers, washing machines and clothes dryers can be scheduled in advance, and do not need to be directly con-trolled by the user. The starting time can be postponed by several hours, with no impact on the user as long as the cycle is over when the user requested it initially. A similar strategy can be used to control freezer and refrigerator cycle so as to reduce peak demand by coordinating their operation.

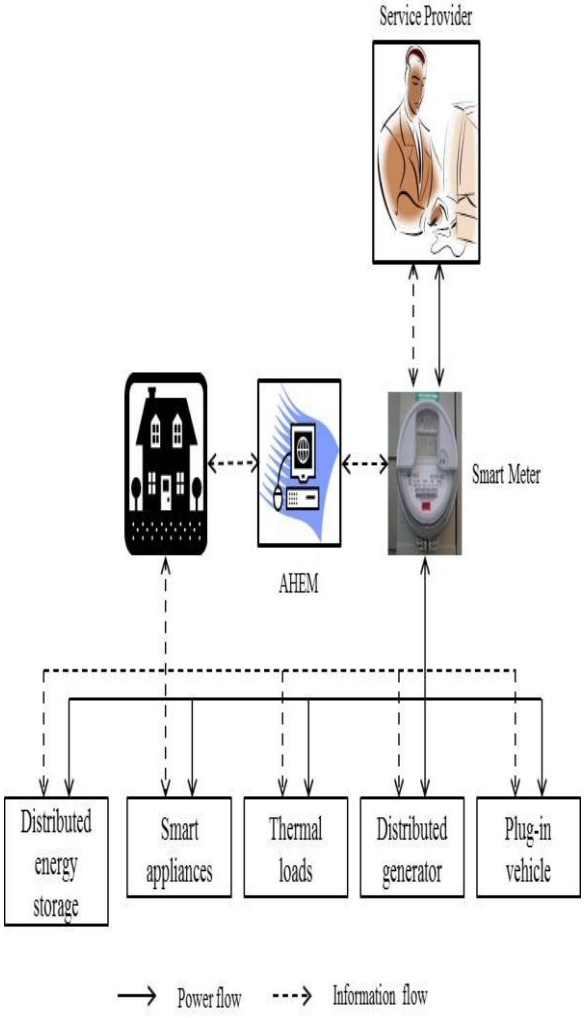

Fig.2. Schematic diagram of a centrally controlled smart home

For many utilities, a smart meter constitutes a smart grid. For others, these smart meters can be put to greater use and provide more substantial value to the utility, the grid, and the end-users via coordination.

REFERENCES

(Periodical style)

[1] Khan, A. Mahmood, N. Javaid, S. Razzaq, R. D. Khan, M. Ilahi, 'Home Energy Management Systems in Future Smart Grids'.

[2] A. Zipperer, P. A. Aloise-Young, Electric Energy Management in the Smart Home: Perspectives on Enabling Technologies and Consumer Behavior

[3] Rosario Miceli, Energy Management and Smart Grids.