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STANDARD

ANSI/ASHRAE/NEMA Standard 201-2016

Facility Smart Grid Information Model

Approved by ASHRAE on April 29, 2016, by the National Electrical Manufacturer's Association on March 17, 2016, and by the American National Standards Institute on May 2, 2016.

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FOREWORD

The effort to substantially modernize and transform the national electric grid and create what has become known as a "smart grid" is an enormous undertaking that reflects both the size and importance of the electric grid. Viewed in its entirety, it is an international effort involving hundreds of organizations and companies, and it will impact billions of people. The standards infrastructure that will be needed to support this transformation may include over one hundred standards by the time that it is fully in place. This standard is one part of that infrastructure.

Almost all electricity is consumed in a building of some kind – homes, retail establishments, offices, schools, factories, hospitals – the list goes on. This standard attempts to capture the breadth and diversity of these consumers by using the term "facility." A facility is any kind of building or collection of buildings, and all of the electrical loads or local generation sources contained within them or controlled by the facility owner.

Historically, electricity consumption has been viewed as a collection of dumb loads at the end of a distribution system. There has been almost no interaction between the "loads" and those responsible for electricity generations and distribution. The vision of the smart grid changes this picture radically. In a smart grid world, facilities become full partners in supporting and managing the electric grid. Facilities become generators using local renewable or other generation capacity. Facilities moderate electrical demand in response to fluctuations in the price or availably of electricity. Facilities communicate and negotiate with energy providers, sharing information about the facility's projected electrical demand or ability to respond to the energy provider's needs for maintaining grid stability and reliability.

In some respects all facilities have common characteristics and needs with respect to interactions with a smart grid, regardless of whether the facility is a commercial, institutional, or industrial building, or a private home. The Facility Smart Grid Information Model (FSGIM) standard attempts to capture this commonality and standardize the content of the information that a facility manager needs to have, or, in some cases, needs to exchange with the energy provider, in order to manage the facility. Energy providers benefit from the FSGIM standard because it enables interaction with all different types of facilities in a common way. Facility owners benefit because products can be designed for use in multiple facility types and products designed primarily for one type of facility, a home for example, can more easily be used in another, say a commercial building.

An information model is an abstraction, not an implementation. This abstract representation is a way to account for the reality that the technology used to manage a facility may be quite different depending on the type of facility. It is intended that the FSGIM will be used to develop or enhance other standards that define technology and communication protocol specific implementations of the model for particular markets.

The FSGIM was developed in the context of a much larger framework of smart grid standards. It builds on some of those standards in a way that is intended to maintain consistency and harmony with established and developing standards that impact the information needed to managing the facility, while at the same time capturing all of the key information needed in one place.

If the smart grid is to become a reality there must be smart facilities of all types that interact with it. The considerable time and talent that went into developing the FSGIM was invested in order to lay a solid foundation upon which to fulfill this vision.

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1. PURPOSE

The purpose of this standard is to define an abstract, object-oriented information model to enable appliances and control systems in homes, buildings, and industrial facilities to manage electrical loads and generation sources in response to communication with a "smart" electrical grid and to communicate information about those electrical loads to utility and other electrical service providers.

2. SCOPE

This model provides the basis for common information exchange between control systems and end use devices found in single - and multi-family homes, commercial and institutional buildings, and industrial facilities that is independent of the communication protocol in use. It provides a common basis for electrical energy consumers to describe, manage, and communicate about electrical energy consumption and forecasts.

The model defines a comprehensive set of data objects and actions that support a wide range of energy management applications and electrical service provider interactions including:

a) on-site generation,
b) demand response,
c) electrical storage,
d) peak demand management,
e) forward power usage estimation,
f) load shedding capability estimation,
g) end load monitoring (sub metering),
h) power quality of service monitoring,
i) utilization of historical energy consumption data, and
j) direct load control.