Smart Grid Consumer Standards

Consumer Information Standards

These standards provide data to the consumer regarding their interaction with the smart grid, including energy usage information, pricing information, billing information, demand response events, and prepayment functionality.

1) **ZigBee Smart Energy 1.x**

ZigBee Smart Energy 1.x is an application for providing consumer information to devices in a home (commonly called the "home area network (HAN)"), often via a smart meter. ZigBee Smart Energy 1.x is designed to work with ZigBee technology, a low-power wireless networking technology. This standard is not necessarily limited to transmission of energy usage information from the smart meter and can support many other types of information (e.g., pricing information, demand response events) and commodities (e.g., natural gas, water).

2) **Smart Energy Profile 2.0 / IEEE 2030.5-2013**

Smart Energy Profile 2.0 (SEP 2.0) is an application for providing consumer information to devices in a home (also a HAN), often via a smart meter. SEP 2.0 is an evolution of ZigBee Smart Energy 1.x, designed to work over any technology that supports the Internet Protocol (IP). This standard is not necessarily limited to transmission of energy usage information from the smart meter and can support many other types of information (e.g., pricing information, demand response events, billing information, prepayment information) and commodities (e.g., natural gas, water). SEP 2.0 is also used for communication between an electric vehicle and a charging station.

3) **Green Button / Energy Services Provider Interface (ESPI) / NAESB REQ 21 (NAESB)**

Green Button is the common marketing name for the ESPI standard. This standard is an application for providing customer information from a "data custodian" (e.g., utility) to an authorized third party or customer. Green Button is designed to work on top of the Internet Protocol (IP) transmitting data over the Internet.

Demand Response Standards

These standards provide information to the consumer to enable their participation in demand response programs.

1) **OpenADR**

   OpenADR is an application for providing demand response information and events to customers. OpenADR is designed to work on top of the Internet Protocol (IP) and transmit data over the Internet. Primarily, OpenADR is used by commercial and industrial (C&I) customers.

2) **ZigBee Smart Energy 1.x**
   See above.

3) **Smart Energy Profile 2.0 / IEEE 2030.5-2013**
   See above.

Solar and other Distributed Energy Resources (DER)

These standards specify how to and what information that is needed to connect solar and DER to the smart grid.

1) **IEC 61850**

   IEC 61850 is a standard that specifies both physical interconnection requirements as well as information elements for solar and DER.

2) **IEEE 1547**

   IEEE 1547 is a standard that specifies physical interconnection requirements for solar and DER.

3) **UL 1741**

   UL 1741 is a standard that specifies physical interconnection requirements for solar and DER.

4) **Smart Energy Profile 2.0 / IEEE 2030.5-2013**
   SEP 2.0 has been initially recognized in California for the provisioning of data and grid/market signals and information for solar inverters. See further information regarding this standard above.

Electric Vehicles

1) **SAE J1772**

   SAE J1772 is a standard that specifies the physical connector or plug between the electrical vehicle and the charging station.

More Information

For further information regarding smart grid standards, see the SGIP Catalog of Standards. Pursuant to the Energy Independence and Security Act of 2007, the National Institute of Standards and Technology (NIST) was charged with leading the effort to catalog all standards that will support interoperability across the Smart Grid. In order to develop this catalog, NIST created the Smart Grid Interoperability Panel (SGIP), which reviews potential standards for inclusion in the catalog of standards. These standards tend to be more technical in nature, and less customer facing.

Many in-home technologies may rely on already existing standards that are well known across the customer sphere and are not specific to the smart grid market. For example, many currently available thermostats come preloaded with Wi-Fi, which allows the device to connect to the Internet via a customers' own wireless network.

Finally, NAESB has developed a stand-alone standard on customer privacy practices. This standard, REQ 22, details requirements for a third party or utility to ensure that customer data privacy is protected.