

NITES AMI

Advanced Metering Infrastructure (AMI), that also goes by the name “smart metering” is a critical component, that necessitates the realization of the vision of “Smart Grid”.

NITES AMI also facilitates two-way communication between meter and distribution system operator. It represents advance to AMM (Automatic Meter Management) system that uses one-way communication from meters, over concentrators to Headend. The two-way communication enables several services for the distribution system operator that were difficult or impossible to implement without smart metering. For example, power outage is detected faster by system operator and without interaction with the customer.

Another service provided by smart metering is reporting the quality of power delivery (voltage, frequency). Smart metering also enables detailed monitoring of power flows within the distribution system that was previously available only at the substation level. Monitoring of power flows is important as it enables energy suppliers to react quickly on variations in consumption levels. The power flow monitoring information is also useful for real time pricing, that is handled by one technology in smart grid known as Demand Side Management (DSM).

NITES AMI System Structure: NITES AMI is perceived as an infrastructure that integrates several technologies for achieving certain specific objectives. The components of the NITES AMI system structure are briefly discussed below:

Smart Meters (SMs): Electrical meters that are responsible for providing two-way communication, automated meter data collection, outage management and also allow dynamic pricing. NITES is not smart meter producer and NITES AMI works with different smart meter producers.

Distributed Energy Resources (DERs): Small scale renewable electricity generation systems that are used for family and energy storage.

Gateways (GWs): Perform the task of implementing protocol conversion and communications between two heterogeneous networks, such as in-home network and wide area network.

Wide Area Communication Infrastructure: Provides bidirectional communication between customers domain and the utility system. Various architectures and medias are used like power line communication system, cellular networks, or IP based networks. Security, based on Key Management Subsystem, enables data integrity and protection against different attacks.

Meter Data Management System (MDMS): Acts as database system for storing, managing, and analyzing metering data for proposing dynamic pricing, better customer service, demand response and energy consumption management purposes.

Demand Response (DR) Program: is generally an agreement between the utility and its customers where the customer is ensured of reduced tariffs or discounts in the end-of-month electricity bill, provided that he agrees to reduce his electricity consumption in response to signals received by the grid. The basic concept of the demand response program is that if every customer conserves a little, there will be enough power for everyone.

Power Theft Prevention: The electro-mechanical meters used in traditional systems for metering purposes provide very low or no security and are easy to manipulate. Smart meters are capable of recording zero readings and informing the utility companies through AMI.