Smart meters are the way to go

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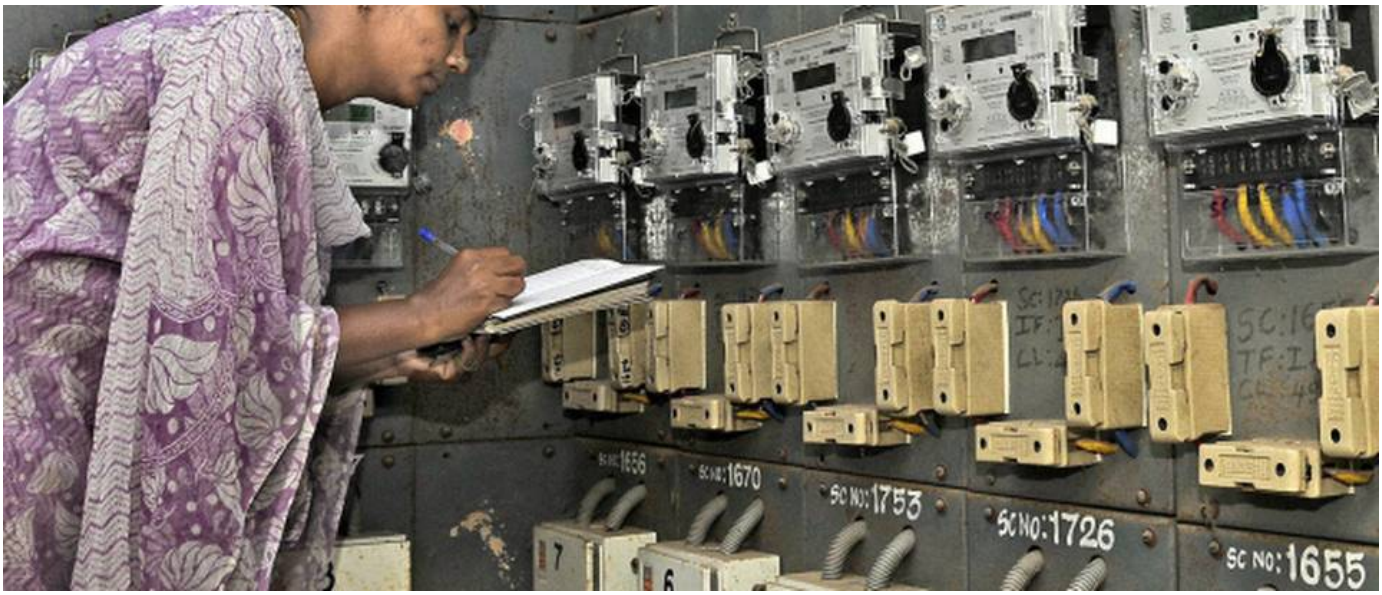

These won't do It's time to go smart with power M Srinath

Integral to UDAY, these meters can help discoms overhaul services. But picking the right technology is the issue

The announcement of the National Smart Grid Mission and the release of the Model Smart Grid Regulations by the Forum of Regulators (FoR) in 2015 have set the stage for a paradigm shift in India's electricity distribution system.

The Government recently launched the Ujwal Discom Assurance Yojana (UDAY) scheme with the objective of improving the financial and operational efficiencies of electricity distribution companies (discoms).

One of the commitments under the UDAY scheme is to make the installation of smart meters compulsory for all consumers using more than 200 units of electricity a month.

At present, there are some smart metering projects operating successfully on a pilot basis in India.

However, going forward, there is a growing interest by the Government in deploying smart meters at a large scale. The UDAY Scheme envisages fast track rollout of 35 million smart meters by the end of 2019.

Reading smartly

Smart meters have two basic parts: a metrology module — which measures and stores current and

power values — and a communication module — which transmits and receives messages and data from the utility.

Communication is the key distinguishing capability of smart metering over regular electricity meters. Stability and reliability of the technology behind the communication network is the key to the success of smart metering programmes.

The question that utilities face now is — How to customise communication technologies to suit their needs? In the context of having to supply millions of smart meters, the choice of communication module can be critical. Should communication modules be built-in or plugged-in?

While metrology modules are technologically mature and well-specified, communication modules are dependent on the performance of the chosen communication network available in the area.

In 2015, the Bureau of Indian Standards (BIS) released a standard (IS 16444) for smart meters in the country, applicable for two kinds of smart meters: those with built-in communication modules and those with the provision of plugging in a separate communication module.

A major drawback of smart meters with built-in communication modules is that they do not always offer flexibility in functionality for utilities.

In contrast, pluggable meters reduce the risk for utilities by allowing replacement of only communication modules rather than entire meters, thereby improving their ability to be repaired.

Hence, smart meters with plug-in modules allow utilities to experiment with a range of communication technologies and select the one that is best suited.

On the other hand, one of the biggest challenges faced by pluggable meters is ensuring compatibility between metrology component and communication modules.

In order to plug-in interoperable third-party modules into meters, it is necessary to have a set of standards specifying the plug-in interfaces.

However, the process of ratifying such standards follows a rigorous protocol and is typically time consuming. Currently utilities in India are specifying their own interfaces to ensure compatibility between metrology and communication.

In future, interface standards must be developed in India that would allow equipment manufacturers to converge and provide a robust platform that meets utilities' requirements.

The way forward

Smart electricity meters primarily enable utilities to monitor load and consumption patterns and allow consumers to understand the impact of their electricity usage. This is achieved without human intervention by transmitting the data through a communication network.

Experience around the world has shown that a given communication technology that works in one city may not be suitable for other cities due to a variety of geographical and communication network factors.

Robust communication technologies would enable utilities in taking advantage of features including facilitating demand response, enabling enforcement of sanctioned load limits, and detecting tampering and theft.

Currently, around 32 per cent of Indians live in urban areas. Specific geographical conditions of each city and different categories of consumers being served by the distribution grid make the deployment of urban smart metering communication networks very challenging.

Rural areas pose their own unique challenges in terms of network availability in spite of low density of consumers and reliability of power supply.

Smart metering infrastructure is expected to be a long-term asset for the utility, while smart meter technologies are dependent on the rapidly developing electronics design and manufacturing industry.

The overarching concern in smart meter technology for utilities still remains cost.

Additional factors such as economies of scale, consumer awareness, technological advances, innovative financial schemes can significantly influence costs of smart meters. Under these circumstances, the flexibility of communication technology provided by pluggable meters needs to be considered carefully.

A detailed feasibility analysis to understand the geographical topology, applications and the utility's requirement of communication capabilities in smart meters will provide utilities a holistic view on the choices and aid the process of planning smart meter deployment in an effective manner.

Since the decisions of a utility ultimately affect its consumers, utilities should consider weighing the advantages along with associated costs before choosing a particular smart meter technology especially during large-scale deployments.

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