



IEA Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD)

Annex I Briefing Sheet “Metering”

Annex I: Information Collation and Dissemination

Introduction

Metering is essential to the electricity industry, to know how much electricity has been generated and consumed by the numerous parties involved. The meters installed in power stations and large consumers are typically more complex than those used in domestic and SME (Small to Medium Enterprises) settings as these smaller consumers and their suppliers have not required the same complexity of data. The possibility of introducing some form of ‘Smart’ metering for these consumers is increasingly being debated.

Smart Meters

A basic electricity meter as used by most domestic consumers is a cumulative measure of the electricity consumed within the premises. Suppliers will then arrange for meter readers to visit on a regular basis to record the electricity used between visits. A smart meter refers to any advanced meter that is able to provide more data on consumption than a traditional electricity meter.

A Smart Meter could facilitate Automated Meter Reading (AMR) to the supplier allowing meters to be read remotely; facilitate Automated Meter Management (AMM) with two way communications between the meter and the supplier and/or provide Interval Metering, with frequent (maybe half-hourly or hourly) collecting of data.

Smart Meters could also offer the benefit of notifying suppliers and/or distributors if there is a disruption to a property’s supply. Presently, suppliers and distributors are often dependent on customers contacting them to highlight a problem, especially in more remote areas. Smart Metering could enable suppliers and distributors to respond quicker and thereby minimise the amount of Customer Minutes Lost.

Smart Meters are expected to enable suppliers to offer consumers flexible tariffs, based on their level of consumption and when their consumption occurs. They are also expected to support microgeneration with a single meter point for of electricity imported and exported. This could encourage households to consider microgeneration as the need for a separate, recognised meter would no longer be required to spill electricity onto the local network.

A number of devices are available commercially that enable consumers to become more conscious of their energy consumption by working in conjunction with their existing basic meter. Often referred to as Electrical Display Devices (EDDs), these devices offer a real-time display of the electricity consumed within a property but do not provide any information to the supplier.

Example Schemes

A number of countries have trialed Smart Meters already. In Italy, ENEL have deployed 30million Smart Meters across its domestic customer base and Oxxio in the Netherlands has also been rolling out a similar scheme for their customers since 2006. The majority of trials are still in progress and relatively little information is available at present due to the commercial concerns involved.

The Ontario Energy Board, Canada, has been working on the roll-out of Smart Meters since 2004, with a target of the whole province having Smart Meters fitted by 2010. This is part of a wider state programme to try and reduce energy consumption and take the strain from the Province’s energy system. Smart Meters are being installed with a multiple tariff and a public information campaign.

Benefits of Smart Meters

Smart Meters have the potential to provide a number of benefits to different elements of the electricity industry. For consumers, these include a better understanding and awareness of energy consumption; more accurate (and possibly more frequent) billing; and possibility of cheaper energy costs through involvement in Demand Side Management programmes or Time Of Use (TOU) pricing.

For suppliers, benefits could include a better understanding of domestic consumption profiles; reduced levels of complaints; and improved customer retention. Distributors are also likely to benefit from a reduced peak load and provision of better information for forecasting.

New and emerging possibilities for future electricity networks are also likely to benefit from the introduction of smart metering. The ability to aggregate consumers is likely to be beneficial for the development of Virtual Power Plants, which could combine localised generation and consumption to create a single balancing entity. The development of SmartGrids and Microgrids could also benefit from a more widespread operation of smart metering.

Time of Use Pricing

TOU Pricing has the potential to enable consumers to reduce their energy bills through signing up to a multiple tariff that charges differently in different periods of the day based on demand. These tariffs would essentially reward customers who use less energy at peak times, either through their current behaviour or by making conscious changes.

TOU tariffs could be a fixed number of tariffs per day. The scheme operating in Ontario currently offers consumers three price bands ranging from 2.7¢/kWh to 9.3 ¢/kWh, for example.

Alternatively, TOU pricing could use a Dynamic Tariff where the current day's domestic prices reflect the previous day's wholesale prices, for example. This type of tariff is likely to be more popular with system operators and suppliers as it allows abnormal system issues to be factored into pricing. This type of tariff, however, is likely to be more problematic for the consumer who faces greater uncertainty, making planning problematic.

Challenges

The biggest challenge facing widespread deployment of Smart Meters in many countries is who will take

responsibility for financing and installing the actual meters. This is particularly acute in disaggregated industries, where the potential benefit is spread over a number of market players.

Communication systems may also be a significant challenge. Most domestic meters have an anticipated lifespan of 40-50 years. Communication technology, however, has changed dramatically over the last four decades. Future-proofing meters to work with changes in communication technologies is a daunting prospect, especially if Smart Meters are likely to incorporate the means for remote triggering of Demand Side Management. This does not rule out Smart Meters but may mean that a more regular replacement factor has to be incorporated into calculations to assess their economic benefits.

There are also challenges relating to the mode of communication used, especially for areas with poor mobile coverage for example. There is likely to be a need for meters to connect to a number of different communication systems to facilitate take up by different types of consumer and for properties in different locations.

In countries with liberalised energy markets, one challenge for Smart Meters is to ensure that they can be operated by any supplier to ensure consumers retain the option of changing supplier. This would require developers supplying to a single market either to agree on a basic specification that all meters would comply with or for that market to have a degree of regulatory intervention to provide such a specification.

References

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