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*DiUS*

MEETING THE  
CHALLENGES OF **AMI**

## MEETING THE CHALLENGES OF AMI

For over a century the operation of electricity meters on public electricity grids has been limited to a very basic set of features. These features have largely been limited to measuring accumulated energy use and providing a visible gauge for a meter reader to periodically inspect. Incremental developments have included the replacement of electromechanical components with semiconductor based electronics and a variety of mechanisms and systems to increase the efficiency with which readings are gathered, including automated meter reading (AMR) that allows readings to be communicated to the electricity utility.

The state-of-the-art in electricity metering is known as Advanced Metering Infrastructure (AMI). AMI introduces smart meters to the field of electricity distribution. Smart Meters combine classic metrology features for gathering energy usage readings (typically in interval format), but also a set of soft and hard mechanisms to control loads and distributed generating capacity. One of the keys to providing Smart Meter functionality is the availability of high performance, two-way communications between the utility and each Smart Meter in the grid.

Numerous challenges exist for a utility implementing AMI, the selection and implementation of an efficient and effective AMI communications network ranks as one of the most significant.

### CHALLENGES IN TECHNOLOGY SELECTION

Victoria is among the early adopters of AMI technology, as a result a number of the key requirements for supporting AMI in the field have been defined and are being incorporated into the supporting available technology. However, there are still many questions that need to be addressed for any organisation intending to implement AMI.

#### *Standardised or Proprietary Systems?*

The technologies are young, and formal standards covering the full stack of technology required to deliver AMI are yet to emerge. Where and how technical standards are applied has impact on the capability and predicted longevity of an AMI network. General industry trends are toward openness and interoperability and these align with smart grid visions, but implementing AMI with its various mix of standardised and proprietary systems in itself, presents a complex set of challenges.

#### *Single or Multiple Technologies?*

Despite the general similarities of electrical utilities, those implementing AMI will find unique aspects to the combination of territory, customer distribution, business environment, regulation, distribution network characteristics and other factors. In many cases a one-size-fits-all technical approach to providing communications to AMI Meters is not appropriate and a more complex, multiple-technology solution is often required. If multiple technologies are employed, then the balance between them must be set in terms of how much of the population each will serve, and how do these technologies ultimately integrate to common systems in the business?

#### *Build or Buy?*

Although electrical utilities often build and run their own communications networks; are they ready for the scale and complexity of a communications network covering each metering point? The principles of network design, implementation and operation will generally be similar to existing practices, however, the approaches, tools and techniques vary greatly with scale. Is it better to use a public or private telecommunications network or build a large, dedicated AMI communications network?

#### *Wired or Wireless?*

Options exist to provide AMI communications via wired telecommunications, either dedicated or through the electrical grid. Numerous wireless options also exist from public network operators and from AMI technology vendors. Wired systems can appear more predictable or offer the opportunity to employ electrical network assets for communications. Wireless systems can suffer from interference, require spectrum selection and radically differ from wired networks, but are often more flexible. Selecting an appropriate approach for a utility's circumstances is an important decision.

#### *DLC, PLC, Mesh, WiMAX, WiFi, GSM, GPRS, 3G, LTE, Fibre?*

The specific technologies employable for AMI are numerous and offer a broad choice of capabilities and characteristics. Choosing a technology because it's new and offers popular consumer features does not necessarily make it appropriate for a specific utility's circumstance.

- DLC and PLC re-use the electrical network, but do they have and do we need the bandwidth?
- Mesh radio is young and has few standards. Can the benefits be realised?
- WiMAX offers standards, blistering bandwidths and the credibility of telecommunications equipment industry heavyweights - but is it affordable?
- WiFi is popular, low cost, high bandwidth, but is it secure?

- GSM and GPRS are solid, reliable, backed by numerous telecommunications giants, but how long will they last?
- 3G and LTE are the latest telecoms offerings, but are they practical and economical when scaled to an AMI network?
- Fibre networks are often owned by utilities, how can these assets play a part in an AMI network?

Costs are crucial and in a complex technical landscape it is easy to lose focus on the commercial aspects of each technology. No analysis is complete without comprehensive technical and commercial models.

## NAVIGATING THESE CHALLENGES

Developing a commercially viable strategy for AMI is not as simple as assessing technology, comparing available bandwidth and the price of equipment, nor can following the herd be relied upon to deliver an AMI network for each utilities' potentially unique circumstances.

DiUS has the specialist expertise, experience and the supporting tools in place now to guide your utility through the communications landscape and the many challenges that exist in developing a practical and implementable AMI Strategy.



### *Who is DiUS?*

Founded in 2004, DiUS is an Australian-owned technology company with a passion for emerging technologies and its intelligent application to business.

In a world where technology continues to change rapidly and markets continue to demand ever-faster turnaround times, DiUS offers solutions that are pragmatic, responsive and innovative; solving problems and uncovering new business opportunities with speed and agility.

We work with clients at a strategic level – helping to define and shape their project using solutions and alternatives derived from existing and emerging technologies. Beyond consultation, we deliver real-world solutions that extend the boundaries of their traditional systems to revolutionise the way our clients do business.

### *AMI @ DiUS?*

DiUS' integral involvement in Advanced Metering Infrastructure (AMI) began in 2006 with the AMI initiative in Victoria.

Since then, we have helped Victorian electricity distribution businesses with technology strategy, planning, architecture, design, testing and procurement related activities for AMI technologies.

Today, AMI @ DiUS represents a leading consultancy capability in AMI Technologies and is well-positioned to assist utilities with their AMI strategies and deployment.

Our experience is your asset!