New Business Propositions Enabled by Smart Meters

HP Executive Energy Conference
19 May 2010

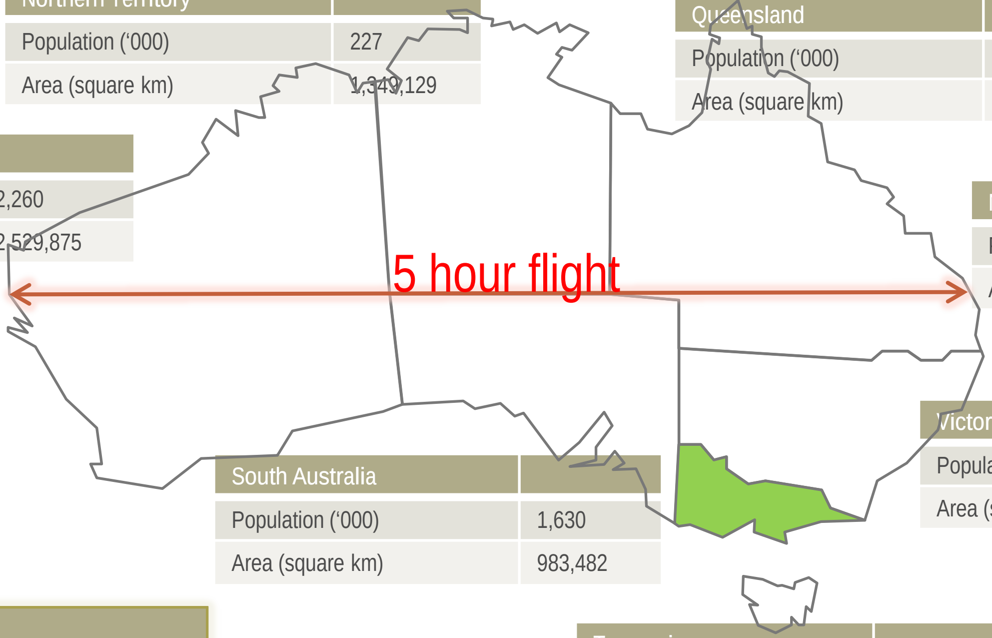
In area, Australia is the one of the largest nations in the world; with low population density

Northern Territory	
Population ('000)	227
Area (square km)	1,349,129

Queensland	
Population ('000)	4,450
Area (square km)	1,730,648

Western Australia	
Population ('000)	2,260
Area (square km)	2,529,875

New South Wales	
Population ('000)	7, 519
Area (square km)	805, 000



Victoria	
Population	5,473
Area (square km)	227,416

South Australia	
Population ('000)	1,630
Area (square km)	983,482

Tasmania	
Population ('000)	504
Area (square km)	68,401

Total	
Population ('000)	22,030
Area (square km)	7,692,024

Source: Australian Bureau of Statistics, "Population clock" as at 14th May 2010; Department of Foreign Affairs and Trade (DFAT), 'Land Area by States and Territories.'. Note: NSW includes Australian Capital Territory

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Background to Victorian Electricity Sector

Ownership	• Full privately owned
Physical network characteristics	• Dispersed, linear networks • Comparatively high rates of circuit availability
Wholesale Competition	• Moderate number of competing major generators
Retail Competition	• 3 dominant vertically integrated ‘gentailers’ (AGL, Origin Energy, TRUEnergy) • Market share is moderately concentrated in the hands of a few players • 11 smaller ‘2nd Tier’ independent retailers • Amongst the highest churn rates in the world at nearly 30%
Regulation	• Australian Energy Regulatory (National)

Distributors

Retailers

Government and Consumer Groups

Market Operator

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Background to Victorian AMI Program (1/2)

- Early 2006 - Victorian Government formally endorsed the deployment of AMI to all Victorian electricity customers
- 2.6 million accumulation meters replaced with digital smart meters over 4 years across Victoria (2009 – 2013), which equates to 4,000 meter replacements per day. 200,000 meters installed by 19th May 2010.
- The program also includes the establishment of an entirely new two way communications network between the Distribution Business back end systems and the AMI Meter.
- Core AMI Services include:
  1. Half hourly interval data
  2. Remote Data Collection
  3. Remote Energisation
  4. Remote De-Energisation

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Background to Victorian AMI Program (2/2)

- Victoria is one of the first jurisdictions, worldwide, to mandate deployment of high functionality smart meters with two way communications in a fully contestability retail market – leading the way in the digital transformation of electricity utilities.
- Marchment Hill Consulting (MHC) has been leading the Program Office for the Victorian AMI Program since August 2007.

- *Strategic business responses are now emerging, especially amongst electricity distributors, energy retailers and new entrants.*

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What is a smart meter and what can it do?

Basic Meter	Smart Meter
• Records total accumulated energy use • Physically accessed and manually read several times a year • No other capability	• Records history of energy use in timed intervals • Remotely read, up to several times an hour • Remote de-energisation and re-energisation on demand • Reports faults in energy supply • Delivers communications to customer

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Smart meters are part of a more complex, intelligent grid

In addition to smart electricity meters, the "smart grid" also comprises:

- Network meters that can **measure** energy flows at a more granular level
- Network sensors that can **monitor** fluctuations and disturbances
- Wide area protection technologies that can **stabilise** the grid
- Automated processors that allow the network to **self-heal**
- Facility to make use of large scale energy **storage**
- Facility to handle embedded / distributed **generation**
- Data management that allows rapid network **analysis** and visualisation
- High-bandwidth **communications** capability
- Wide range of **customer interface** points

Almost all these technologies are available today – but have not seen unified commercial implementation

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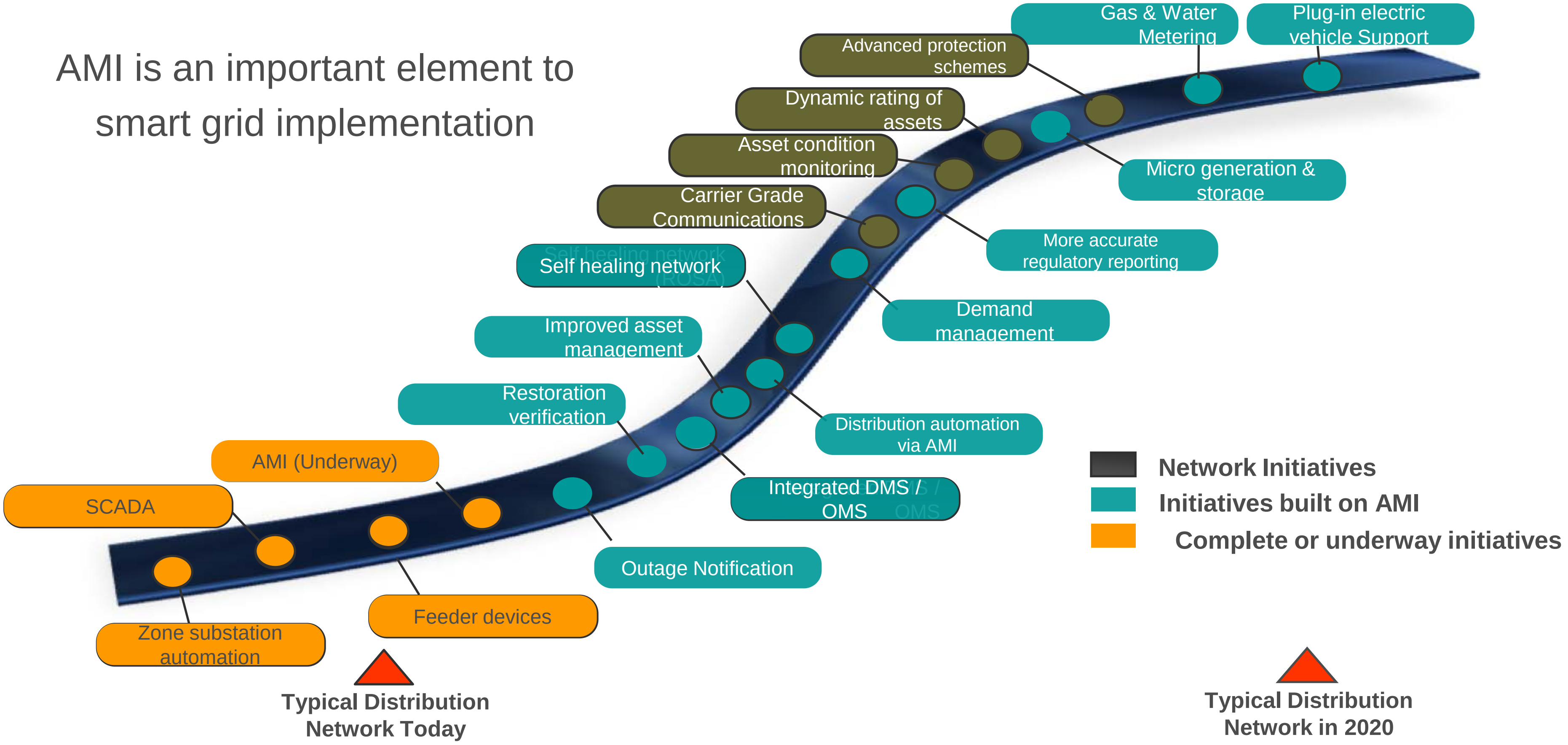
Smart meters and the journey to smart grids

AMI is an important element to smart grid implementation



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So, what new business propositions can we expect to see?

The consumer perspective

Smart meters can fundamentally change the role of customers and industry

Customer features:

- "Uninformed"
- All customers the same
- Manual device control
- Protected from volatility
- Simply relationships with industry
- Volumetric simplicity

Customer features:

- Informed
- Mass segmentation – all are different
- Home energy managed using remote control
- Communications heavy
- Exposed to volatility
- Complex relationships; new definition of 'the industry'
- Service complexity

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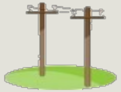
Stakeholders have different interests in smart meters

Stakeholder	Demands
Customers 	• Energy in the quantities they need, when they need it. • Information and tools to measure and manage own consumption • Wish to sell their own generated electricity into the network
Community 	• Accessibility and affordability of energy • Environmentally sustainable resource use • Minimise risk of disruption
Distributors 	• Optimise asset utilisation, and create opex/capex tradeoff options • Simplify and centralise decision making, minimise operating costs • Easier fault identification and quicker restoration • Optimise network flow, without taking on an insolubly complex problem
Generators and Retailers 	• Ability to develop & market new sources of supply and storage • Ability to offer innovative energy management products • Freedom to grow revenue, unconstrained by energy efficiency • Exploit increasing economies of flexible tariffs

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...and these will transform energy use in the home

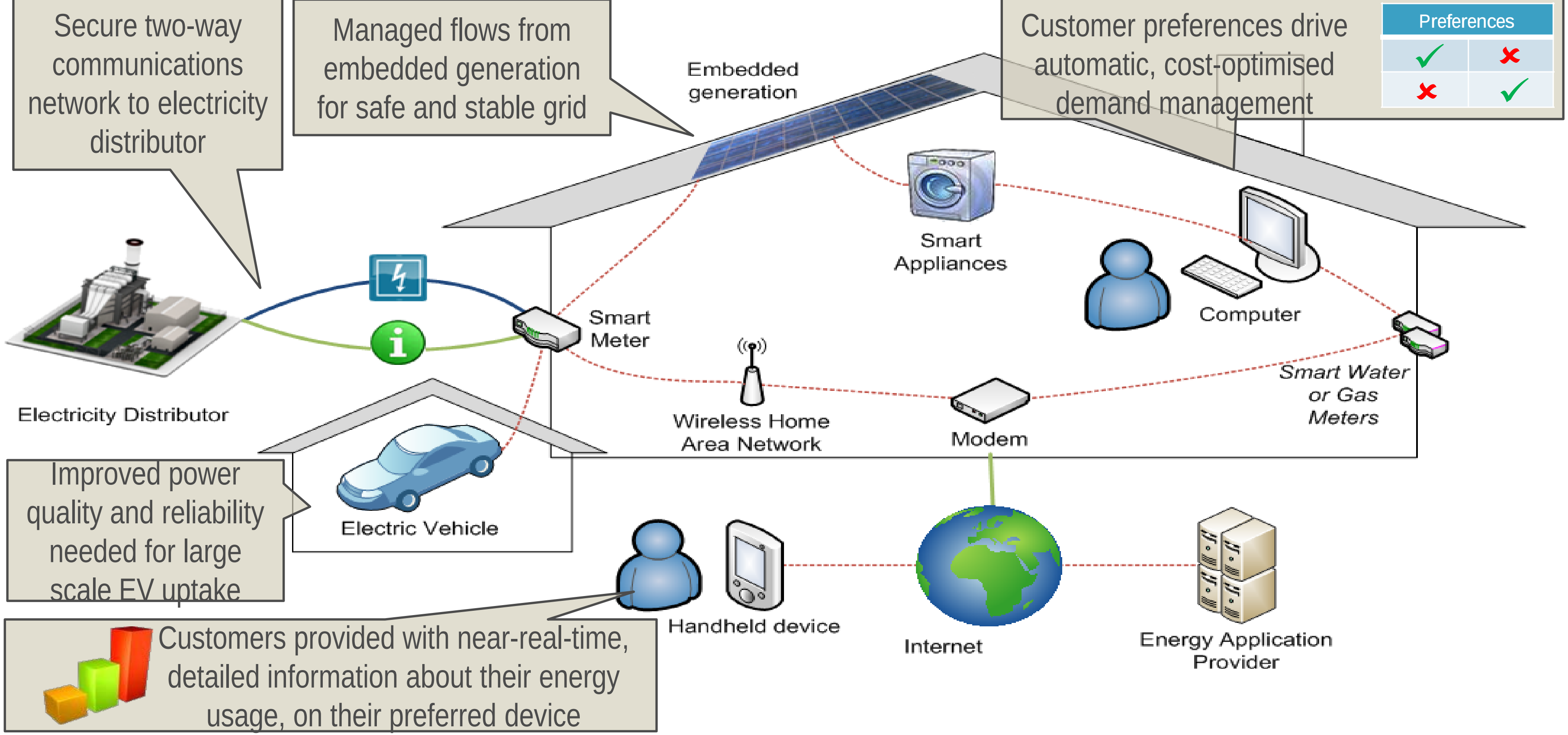
Secure two-way communications network to electricity distributor

Managed flows from embedded generation for safe and stable grid

Customer preferences drive automatic, cost-optimised demand management

Improved power quality and reliability needed for large scale EV uptake

Customers provided with near-real-time, detailed information about their energy usage, on their preferred device



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1. A new breed of energy retailer

- Smart meters allow for individual, rather than system-wide, load profiles to be calculated...
- Daily availability of metering data will allow customer churn to occur immediately.
- Unconstrained load-duration curve will grow and steepen
- Low-carbon energy supply will be less "agile”

- Energy costs for all retailers will be specific to their customers
- Opportunity for new or existing retailers to segment and target customers based on the profile of their load
- Increasing economic pressure for retail tariffs to pass on time-of-use price signal

Niche-focused energy retailers that offer innovative tariff structures will capture market share and provide a better deal for their customers

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2. Energy optimisation services

- Customers will be more informed and engaged users of energy
- Time-of-use pricing signals will emerge from generators and event networks, and be passed on through retailers
- Smart meters and associated infrastructure provide the "hardware" needed to respond
- Customers will need an intuitive way to manage them.

- New "software" will allow customers to express preferences for the trade-off between energy cost and lifestyle, through simple interfaces
- Preferences drive an algorithm which handles aggregation, dispatch and real-time device management
- Makes use of embedded storage and generation to draw from *or* feed into the grid, depending on price

Utilities may be able to assume control of customer devices to optimise the grid – customers will be able to optimise it for themselves

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3. Consumer infrastructure provision

- Consumer-grade storage, embedded generation, and energy-aware appliances are rapidly appearing
- Smart meters and other technologies will enable more of these sources to be integrated with the grid efficiently
- Retailers, optimisation providers and favourable policy will make them economically compelling.

- Embedded generation may move from being an expensive expression of conscience, to the mainstream
- Improvements in battery technology will make distributed storage economical, beginning in the form of EVs
- Manufacturers of energy-intensive consumer goods will need a provider of technology that communicates with smart meters

Smart meter uptake will lead to a significantly expanded market for embedded generation, storage and smart appliances

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4. Data management services

- There will be an enormous increase in the volume of meter data that retailers receive daily (by a factor of around 4,500)
- Existing retailers and networks may not have the organisational capability to store, manage and analyse this data

- Much of future retailers' competitive advantage will be driven by how effectively they can derive insight from this data...
- ...and networks will need to demonstrate more efficient and effective operation from its use

Third parties will compete to manage data and communication services on behalf of retailers and networks

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What business models might emerge in the very long term?

Evolution of the Residential Electricity Customer Experience

In time, the customer base becomes heavily segmented, energy is a means to an end (i.e. a life style & service), dependence on – and the control of – 'traditional' industry structures and models diminishes, new entrants capture incumbent value, and engaged consumers are clear winners:

- Industry control diminishes
- Information symmetry (asymmetry !) shifts
- Market structures change
- New entrants emerge offering service based propositions
- Mass segmentation of the market - customer engagement heightened

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Caveats and Threats

- Existing industry players may not be the most efficient, or may not even have an incentive, to offer new energy and network support services.
- ‘Smart’ devices that sit downstream of the meter must be able to speak to each other or to a central hub. A single standard messaging protocol will hugely simplify the task for vendors of smart devices to bring them to market.
- Customers must have the ability to examine their own data and to direct it to parties offering products and services, or innovation will be stifled.
- Participation mechanisms must be meaningful to customers. Just as in any other market, the onus will be on businesses to offer value propositions that customers willingly take up. Coerced participation will not create value.

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Thank you

About the speaker

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Previously:

PA Consulting Group	Global Energy Practice Leader CEO, Australia Member of PA's Global Management Committee Chair, Asia Pacific Regional Development Committee
AT Kearney	Vice President South Asian Energy Practice Leader

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About MHC

Who we are

Marchment Hill Consulting is a management consulting firm dedicated to serving the needs of the utilities, infrastructure and resources industries worldwide.

Our senior consultants built their expertise both in the industries we serve, and through their extensive experience on engagements undertaken around the world.

With a wealth of combined experience and an enviable track-record, we deliver demonstrable value through the quality of our insight, the internal support we generate for change, and the way we work with our clients to implement solutions that deliver measurable value.

Marchment Hill consultants have worked for clients around the globe, including in the United States, Canada, Europe, the Middle East, and across the Asia Pacific region.

Our philosophy

The Marchment Hill philosophy, validated and reinforced by our work for clients around the world, holds that the value (V) of a consulting intervention rests on three cornerstones:

Without all three cornerstones, no consulting intervention can deliver its full value. Each engagement is planned with these cornerstones in mind.

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Contact details

Marchment Hill Consulting has offices in five locations which serve Australia and New Zealand, Asia and the Pacific Rim, the United Kingdom and the Middle East. We are continually developing our geographic footprint.

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