Western Power’s Smart Grid Program

Presentation to W.A. Smart Grid Industry Forum

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**Many network challenges can be met through smart grid capabilities**

<table>
<thead>
<tr>
<th>Current grid</th>
<th>Smart grid features*</th>
<th>Future grid</th>
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<tbody>
<tr>
<td>Focus on protection of assets following system faults</td>
<td><strong>Self-heals</strong></td>
<td>Automatically responds to problems. Focus on prevention. Minimises consumer impact</td>
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<tr>
<td>Consumers have limited information and non-participative with the power system.</td>
<td><strong>Engages the consumer</strong></td>
<td>Informed, involved and active consumers. Broad penetration of Demand Response. Provides choice</td>
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<tr>
<td>Focused on outages rather than power quality problems. Slow in resolving PQ issues</td>
<td><strong>PQ for 21st century needs</strong></td>
<td>PQ meets industry standards and consumer needs. Proactive issues resolution</td>
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<tr>
<td>Relatively small number of large generating plants Numerous obstacles exist for connecting renewables</td>
<td><strong>Accommodates all generation and storage options</strong></td>
<td>Diverse distributed generation and storage devices complement the large generating plants. “Plug-and-play” convenience</td>
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<tr>
<td>Minimal integration of limited operational data with Asset Management processes and technologies. Siloed business processes. Time based maintenance</td>
<td><strong>Optimizes assets and operates efficiently</strong></td>
<td>Sensing of grid conditions. Grid technologies integrated with asset management processes effectively managing assets and costs. Condition based maintenance</td>
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* National Energy Technology Laboratory, 2007
# Our Smart Grid Vision for 2012

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Data Systems</th>
<th>Transmission</th>
<th>Distribution</th>
<th>Metering</th>
<th>Customer</th>
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<tbody>
<tr>
<td>Focused ES capability</td>
<td>Fully capable</td>
<td>Smart Grid</td>
<td>Smart Meters</td>
<td>Empowered with Choice</td>
<td></td>
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<tr>
<td>Capability taking us beyond poles and wires, new business structures</td>
<td>Scalable data management and storage</td>
<td>Large, multi-tier, two way communications network</td>
<td>New two-way distribution standards enabling wide spread distributed generation</td>
<td>Significantly progressed smart grid deployment</td>
<td>Empowered, engaged and educated customers</td>
</tr>
<tr>
<td>Energetic contributions by range of people who find meaning in new solutions</td>
<td>Integrated systems and data management</td>
<td>Demand management managing peak load</td>
<td>Commercial partnerships to deliver outcomes</td>
<td>Changing behaviour, supported with incentives, education programs</td>
<td></td>
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<tr>
<td>Regulatory engagement &amp; support</td>
<td>Greater reliability and performance of existing plant</td>
<td>Greater reliability and performance of existing plant</td>
<td>Distributed generation and energy conservation</td>
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This requires significant business change
The smart grid complements our current poles and wires capabilities.
Western Power’s Smart Grid drivers

**End Goal:** realise societal and environmental benefits

### Internal driver

**Improve reliability and energy management**
- Improve reliability & network efficiency
- Defer augmentation, optimise expenditure
- Enable demand management (direct load control)
- Facilitate distributed generation
- Increases safety

### External drivers

**Regulatory alignment**
- Demonstrate alignment with MCE recommendation for trials in WA
- Test if the investment is cost recoverable
- Prove deployment capability
- Address requirement to implement demand management solutions

**Customer empowerment**
- Provides transparency and enables choice
- Voluntary demand response resulting in load curtailment
- Enable renewable/distributed generation solutions to meet customer demand
Roadmap for getting there

Lay foundations 2008 – 2010
- Smart Grid vision
- Smart Grid trial
- Understand change requirements
- Understand costs, risks, benefits, technology
- Communicate goals and outcomes
- Collaborate with all stakeholders
- Understand the benefits for all participants
- Partnerships in R&D

Building a Smart Grid: 2010 – 2012
- Build the business case
- Expand and test capabilities
- Broaden demand response
- Active engagement of customers in innovative efficiency programs
- Partnerships and alliance with stakeholders
- Measure and manage benefits

Develop new capabilities: 2012+
- Rollout across SWIS
- Diverse range of distributed generation
- Effective integration of grid technologies with asset management processes
- Management of costs and assets
- Industry engagement and leadership
- Explore value adding benefits for stakeholders and build confidence in Smart Grid capabilities
Smart Grid trial objectives

Perform a Smart Grid trial to:

- test costs, understand risks and benefits
- explore both technical and organisational change requirements
- test our deployment capabilities
- test our ability to utilise and leverage new infrastructure and data
- identify changes to technical and planning standards
- build better relationships: retailers, other utilities, Regulator, Office of Energy, Solar City program
- bring innovation closer to home: links with universities, CSIRO and research institutions
- enable new business models and partnering opportunities to be explored
- provide opportunities to leverage smart meter multi-utility capabilities (work with water and gas utilities)
- recruit new skills and develop exciting opportunities for our current staff
- inform the Board, Executive, Regulator and staff of the appropriateness of future investments

The trial starts the journey and provides a platform for sustainable energy solutions
Procurement selection criteria

Enables customer applications
- Interface to home area network (HAN)
- Interface for multi utility metering (gas, water)
- Interoperable to enable in-home display communications

Smart meters
- Interval data
- Remote and local reading
- Tamper detection
- Load management
- Import/export metering
- Supply capacity control

Grid applications
- Power factor measurement
- Quality of supply
- Outage detection

Data management and backhaul network
- Upgrade and interfaces to interval data engine
- Network management system procurement

Interoperability and security
Scope of Smart Grid deployment

Trial scope:

Implement:
- Network Management System (NMS) Mesh Communication (Last Mile)
- 8,700 MCE Compliant Smart Meters
- Build interface between NMS and SCADA, metering business system and other corporate systems
- Functional and technical design
- Provide foundation for in-home displays, home area network, tariff and direct load control trials to be rolled out in 2010
Program timelines

**July 2008**  
Business strategy confirms commencement of smart grid program

**September 2008**  
Smart Grid strategy signed off  
Funding application submitted to Regulator

**December 2008**  
Preliminary vendor engagement and workshops

**August 2009**  
RFP to market

**December 2009**  
Order placed, technical and functional designs completed

**April 2010**  
Field deployment

**June 2010**  
Finalise deployment

**June 2010 - 2011**  
Test grid capabilities (progressive)  
Build business case for network-wide deployment
This is a significant organisational change

Understanding customer behaviour to enable improved engagement, targeted provision of information and services
Regulatory reform to recognise and incentivise new investments

Need to develop a shared understanding the vision and benefits. Only aligned efforts can make this vision a reality

New standards and policies must be developed. Existing standards will require changes

Various processes to support new services eg. remote connect

New metrics to provide the milestones for measuring progress and performance

Convergence of physical assets and business systems, across multiple areas of the business, necessitates greater collaboration and integration across silos

New structures to pull together disparate capabilities currently scattered across Divisions

New skills to manage systems and explore innovation

The integration of current and new systems, meters and communications, will generate unprecedented data: we need to know how to use this data
Increased requirement for security
A view of Victoria’s experience

Not so smart: savings wasted, says auditor

Matthew Dunckley

Mismanagement, flimsy analysis and an almost tripling in cost to $2.25 billion of Victoria’s smart energy meter program could wipe out any benefit to consumers and businesses from the project, an investigation by the state’s Auditor-General has found.

In a report released yesterday Auditor-General Des Pearson detailed a litany of shortcomings in the government’s rollout of smart meters and called for an immediate review of the project’s merits.

Although other states have agreed to install smart meters, the Victorian government is the first state to roll them out, and plans to install the devices in 2.4 million households and small businesses by 2023.

The meters allow electricity companies to charge customers more for using power during peak periods and less during off-peak periods. The meters are paid for by the electricity companies, which then recover the costs from consumers.

Mr Pearson savaged the project’s economic modelling, particularly by the Department of Primary Industries, and said that because of these “significant inadequacies” there was a risk that consumers could end up paying for meters without gaining any benefit. He found the installation cost of the meters had increased from an original price of about $500 million to a recent industry estimate of $2.25 billion.

“It appeared, he said, that the state’s modelling overstated the likely behavioural change by consumers, meaning the benefits to households and companies were overblown. “There has been insufficient analysis to fully understand potential perverse outcomes, risks and unintended consequences for consumers,” he said.

“It is therefore possible that there will be an inequitable, albeit unintended, transfer of economic benefits from consumers to industry,” Victorian Premier John Brumby defended the scheme, saying governments worldwide were installing smart meters to reduce energy consumption and tackle climate change.

Energy Minister Peter Batchelor said the Australian Energy Regulator had recently indicated it would be “vigilant” in ensuring any benefits to electricity companies were passed on to consumers through lower tariffs.

Opposition energy spokesman Michael O’Brien said Victorian consumers could end up paying more than $200 extra each year for little benefit.

Victoria’s four privately owned generators – Hazelwood, Yallourn and Loy Yang A and Loy Yang B – have told the government the proposed $3 billion in transitional arrangements under the electricity sector adjustment scheme provide only one-quarter of the help needed to maintain asset values.

The four generators account for more than 80 per cent of electricity in Victoria.

The six-page Clayton Utz advice was commissioned to outline some of the consequences of an “adverse reassessment” of the enterprise value of a power generator.

It warns the $8 billion to $10 billion estimated impact on private generators’ balance sheets would activate an auditing and banking “trigger point”, or review, that could lead to debt-equity ratios, or bank loan covenants, being breached, with loans becoming immediately payable.

“Whilst not causing the power station borrower to become immediately insolvent, [it] could nevertheless be considered quite likely to give rise to a credit rating downgrade trigger, financial ratio trigger, or market capitalisation trigger,” the advice warns.
What a Smart Grid means to Western Power

- This is a major business transformation. All major change brings both challenges and opportunities.
- We see this as an opportunity to:
  - Manage risk through a “bite size” smart grid trial
  - Provide exciting new careers: re-skill, retain and develop our people
  - Explore innovative alternatives to traditional poles & wires solutions
  - Provide more choice and meet increasing customer expectations
  - Grow our build experience, skills and knowledge in new technologies
  - Demonstrate that the business is doing what the Regulator expects us to do: alleviate network capacity constraints and reduce the overall long-term cost of electricity supply by exploring alternatives
- Creates a clear path to improved energy efficiency throughout the grid
- Builds a platform for persistent and continued carbon reduction
- Foundation program enables incremental changes to the network and business, reducing financial risks, simplifying technology and business evolution
- Establishes a flexible and adaptable platform on which to build the 21st century “low carbon” WA State economy