



## Smart Energy Grid

**We have an opportunity to transform Australia's energy grids to: protect our electricity supply; empower consumers; and reduce our greenhouse emissions.**

### Why?

Australia's electrical grid was built for another age, when energy was cheap and climate change wasn't an issue. Using now outdated technologies, it was designed to be supplied by a few large, central power plants and to distribute power in one direction.

Today, Australia's government has committed to reduce our greenhouse emissions by as much as 15% by 2020. To achieve this, our grid will need to include renewable energy – which will come from small, local generators. We also need to allow consumers to sell energy back to the grid and empower them to improve energy efficiency.

Our current grid is struggling to support today's energy demand. It simply isn't capable of meeting its future challenges.

- Australia's energy demand is projected to grow by 36.8% by 2030
- Power generation creates 50% of our greenhouse gas emissions<sup>1</sup>
- In developed economies, up to 10% of energy is lost in transmission through grid inefficiencies
- 11% of energy is wasted because consumers lack information
- Over 90% of consumers want tools to help manage their energy use<sup>2</sup>

### What?

We can use new technologies, such as smart meters, network analytics and distributed generation, to create a 'smart grid' – a digital, automated, participatory network that shares responsibility between energy users and energy providers.

*"A smart grid will do for utilities, what the internet did for information."*

Craig Murray  
General Manager  
**Country Energy**

#### With a smart grid, we can achieve:

- 14% lower emissions by 2020<sup>3</sup>
- 15% reduction in peak loads

<sup>1</sup> National Greenhouse Gas Inventory 2006, Department of Climate Change, Australian Government, <http://www.climatechange.gov.au/inventory/2006/index.html>

<sup>2</sup> Global Utility Customer Survey 2008, IBM

<sup>3</sup> Smart 2020, The Climate Group June 2008, <http://www.smart2020.org/>

## How?

### Protect our electricity supply...

with an efficient, smart network that monitors its own health, remotely senses damage and predicts demand

With an analogue grid, energy providers often don't know there's an outage until a customer calls them -and most are reliant on manual restoration processes.

Whereas, a smart grid can be remotely controlled with in-built intelligence that detects problems and re-routes the flow of power. The result is fewer and shorter power outages, reduced maintenance costs, extended asset life and lower transmission and distribution costs.

**SMART IS** Knowing exactly where a power outage occurs and instantly dispatching a crew to fix the problem.

**SMART IS** Extending asset life by sensing and managing the stress placed on aging equipment.

**SMART IS** Detecting and minimising outages by sensing potential equipment failures.

**SMART IS** Reducing waste by using real-time data to match energy generation with energy needs.

#### **Easing peak load**

A US smart grid project, which offered customers the opportunity to save 10% on their electricity bills, decreased peak load by 15%.

#### **Scaling back infrastructure investments**

The US Galvin Electricity Initiative estimates that smart grid technologies would reduce power disturbance costs to the US economy by \$49 billion per year. Smart grids would also reduce the need for massive infrastructure investments by between \$46 billion and \$117 billion over the next 20 years.<sup>4</sup>

#### **Reducing outage times**

A Danish energy provider installed remote monitoring and control devices to gain an unprecedented level of information about the state of the grid, reducing outage times by a potential 25-50%.

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<sup>4</sup> *Smart Grid: Enabler of the New Energy Economy, A Report by The Electricity Advisory Committee December 2008 (to the US Department of Energy).*

## **Empower consumers...**

with real time information on their energy use, variable pricing and the opportunity to generate and sell their own energy back to the grid

Right now, consumers can't see how much energy is costing them until they get their bill. If they knew when energy cost less and which appliances were using the most electricity, they would make smarter choices about energy use.

A smart grid with smart metering gives customers the information they need to put off high-consumption activities until non-peak times of the day. It allows people to manage their energy use to reduce cost or environmental impact – or both. And it gives homes and schools running small renewable generators greater flexibility in buying, storing and selling energy.

**SMART IS** Meters that show consumers their energy use in real time.

**SMART IS** Variable pricing that allows consumers to choose off-peak energy.

**SMART IS** Analysing customer energy usage and providing customised energy services to meet their needs.

**SMART IS** Helping customers establish a "smart home" that turns appliances on and off to reduce energy costs.

### **Lowering household energy bills**

In Canada, a smart meter pilot generated energy bill savings of between 6-12%. When consumers were rewarded for using less power during times of shortage or peak demand, they shifted 25% of their usage away from peak hours.

### **Improving electricity supply**

The US Department of Energy research laboratory is providing customers with smart appliances, like water heaters, that can sense impending grid failure and cut back on power consumption.

### **Boosting the economy**

The Galvin Electricity Initiative estimates allowing consumers to control their power consumption could put \$5-7 billion per year back into the U.S. economy by 2015, and \$15-20 billion by 2020.

## Reduce greenhouse emissions...

by stopping energy wastage, connecting renewable generators to the grid and allowing consumers to choose clean power sources

Our outdated grids need to be more efficient, with up to 10% of energy lost in transmission and delivery. Nor are they geared up to deal with renewable energy sources, which require energy providers to adapt their capacity planning to the fluctuating and unpredictable nature of wind and solar energy collection.

Smart grids aren't just more efficient, they can connect with and manage a large number of small generators, allowing renewable energy to be shared and stored locally.

**SMART IS** Reducing transmission and delivery losses with an efficient grid

**SMART IS** Smoothing power demand to take advantage of off-peak supply such as wind.

**SMART IS** Maintaining a sufficient, cost-effective power supply while managing stringent greenhouse gas emissions targets.

**SMART IS** Making it easier for consumers to use renewable energy sources

### Monitoring wind power

A German power company deployed a proof-of-concept Wind Generation Monitoring Solution that will connect numerous power plants to a central monitoring application, enabling better collection and use of raw data.

### Improving grid efficiency

A Japanese power company implemented a software solution that allows the company to analyse and monitor the conditions of its plants to make continued improvements.

### Enabling renewable power

Country Energy's vision for an intelligent network by 2020 includes enabling small renewable generators to interact with the network.

## When?

NOW! There's no better time to start building smarter energy grids – focused on providing energy responsibly to empowered consumers.

**Let's work together to drive real progress in Australia.**