About Ergon Energy

- $8 billion in assets
- 1 million poles
- 150,000 km of line
- 35 power stations
- 600,000 retail customers
- Highly radial & sparse network
  - 70% zone subs and 50% feeders are radial
  - 4.2 connections per line km (nat. avg 24)

**Vision:** World class, customer driven energy services business.

**Purpose:** To enhance the economic and lifestyle aspirations of our customers and community.

Where World-class is defined in the context of customer expectations including price, safety, quality, reliability and availability of supply.
Strategic Challenges

- **Increasing load** and increasing **peak demands** on the network leading to declining **asset capital efficiency**

- An **ageing network**, with significant **performance challenges** which is approaching tipping point of refurbishment, augmentation or replacement

- Increasing **customer expectations** and **regulatory requirements** for service quality, access and choice

- Demands for improving **cost of supply**

- Increasing **climate change** impacts and need for credible climate change response

- **Emerging technologies** will result in discontinuous change in the energy industry (including cultural change)

- Migration to **national regulatory framework**
United Kingdom
- Total Area 245,000 square kilometres
- England accounts for just over half of the total area of the UK, covering 130,410 square kilometres

France
- France Land: 545,630 square kilometres

Queensland
- Queensland is the second largest of Australia’s states and territories (after Western Australia), covering about 1,727,200 sq km (666,880 sq mi), or 22.5 percent of Australia.

Queensland – Land Area
- 12 x the land area England
- 7 x the land area UK
- 3 x the land area France
Meeting the challenge

A suite of solutions around ...

- Resilient network
- Network automation / Smart Grid
- Distributed energy resources esp demand management and energy storage
- Energy management systems
Townsville solar city project is a very exciting and innovative initiative that will use:
- renewable generation,
- demand management,
- energy efficiency,
- pricing,
- community based social marketing; and
- 2-way communication enabled smart metering.

To change the shape of Magnetic Island demand, reduce greenhouse gas emissions, save customers money and defer investment in the distribution network.
Key metrics

- 2550 kW peak demand reduction
- 900 kW solar PV capacity
- 50,400 tonnes GHG savings
- 11 GWh solar generation
- 2,200 Magnetic Island trial participants
- 150,000 people across Townsville area
- 2000 audits
- 2500 smart meters
Effect of Solar Cities Initiatives on Load (Demand) 
Showing Loss Reduction, Greenfield, Residential, Commercial and Photovoltaics Totals
RedFlow - Zn-Br Flow Battery

The Zinc-Bromine battery system

**Membrane**

**At Charge**
Neg. electrode side: Zn
Pos. electrode side: Br₂

Zn⁺⁺⁺ + 2e⁻ → Zn
Br₂ (aq) + 2e⁻ → 2Br⁻

**At Discharge**
Neg. electrode side:
Zn⁺⁺⁺ + 2e⁻ → Zn
Pos. electrode side:

(Zn is plated on neg. electrode)
(Br₂ is reduced to Br⁻)

(Zn ions dissolved in both electrolytes)
(Br ions dissolved in both electrolytes)
RedFlow’s Operational Prototypes

**GridBoss**
(5kW, 30kWh, utility apps)

**PowerBoss**
(5kW, 10kWh, customer apps)

everything in our power
Bending the Forward Demand Curve

Ergon Energy Forward Demand Curve

With NDM and Without NDM

Max Demand Without NDM (50% POE)
Max Demand With NDM

Demand (MW)

07/08 08/09 09/10 10/11 11/12 12/13 13/14 14/15

Financial Year
Residential Peak Load Control
What are we focussing on?

- **Air-conditioning trials**
  - reduce load with no customer detriment
  - anticipate average 0.7MW peak load reduction over 1,000 customers

- **Pool pump control**
  - generate industry backing for pool pumps on Tariff 33
  - shed an average of 1kW peak load per customer
What are we focussing on?

- **Building Developers**
  - learn from the past to improve for the future
  - no peak load reduction anticipated for 09/10 (a longer term goal)

- **Solar Cities**
  - testing new opportunities of load control through innovation
  - anticipate >1.2MW of load under control, and more
Large Customer & Embedded Generation
NDM C&I Pilot Project

- Target 20MVA demand reduction, 20kT CO₂e reduction PA
- Achieved to date 6MVA, 12kT of CO₂e abatement contracted and under construction
- Project running ahead of time and under budget
- Highlight JCU Thermal Storage Project plan won the Institute of Engineers Excellence Award for “Reports, Procedures and Systems” (the $6 billion Brisbane Airport Link and Northern Busway Environment Impact Statement and Concept Design and Impact Management Plan was placed second)
- 2009/10 – 20 MVA contracted by 30 June 2010 and under construction by 30 June 2011
Cloncurry Solar Thermal Project

- Successfully facilitated a deal whereby DME are paying $1.3 million to Lloyd Energy for them to build a test module at Cloncurry
- 2009/10 - Target to have the Cloncurry module up and running and the commercial viability of the Lloyd technology demonstrated (or proven to be not viable) by August 2010
Technology Innovation 2008-2009

Strategy
- Network Technology Roadmap
- Corporate R&D Strategy

Resilient Network - champion, support and facilitate network R&D

Distributed Energy Resources
- Storage – GUSS & RedFlow
- Demand Management
- Energy Conservation

Plug-in electric Vehicles
- Smart Charge / Garage Charge / Vehicle-to-Grid

Energy Management Systems
- EcoVision / GridPoint / OpenWay / Trillion …

Network Modernisation
- Smart Feeder … demonstration
GUSS

25kW / 200kWh
Lead acid battery
Ergon systems
Energy Storage

- Balance with other solutions
  - Demand management
  - LVR / Switched regulator
  - Network automation
- Schedulable load shifting … cost reduction
- Performance improvement …
  - Reliability (outage ride through)
  - Quality (voltage regulation)
- Customer choice … off-peak power et al
- Renewables penetration … buffer intermittent resources

Conceptually (in time) utilise customer owned PEVs in urban settings and network owned storage in remote rural settings for network support.
**High Level Plan**

- **H1**
  - Conduct trials and pilots
  - Seek funding and regulatory support from Qld Govt
  - Seek changes to National Elec. Rules

- **H2**
  - Ramp up projects & continue to develop capability & products

- **H3**
  - NDM is now business as usual
  - Continue to develop new products

**Demand Management**

- 2007: Demand Management not funded
- 2010: DM funded through National Electricity Rules & State Regulations

*everything in our power*