

On-Grid Electricity Storage

MW-Scale Solutions Deployed as kW-Scale Systems



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*“Cost effective electricity storage will be a disruptive technology.
It will produce a complete paradigm shift in the entire electricity industry.”*

RedFlow’s current products, now in the field are the foundation for this.
And I will tell you about this in next ten minutes.....

Introducing RedFlow

Developer and manufacturer of zinc-bromine battery storage systems



2001 Began developing zinc-bromine batteries.

2008 a) Second generation zinc bromine battery design settled.

b) Fully packaged Power+BOS system, with inverter, control & communications developed.

2009 a) Began selling battery systems to Ergon Energy (shipping 4/month).

b) 1 MWh/yr capacity manufacturing capacity today – all committed until the end of this year.

2010 a) Increasing manufacturing capacity to 4MWh/year.

b) Entering US market.

- Privately owned.
- Located in Brisbane, Australia.
- 22 staff (11 engineers).
- Substantial IP generated.



RedFlow's Zn-Br battery technology

⇒ Cost effective and efficient, and in the field now



Zn-Br battery systems are not new:

- Pioneered 100 years ago.
- Further developed by Exxon and Gould in the 1970's & 80s.
- Currently 3 other zinc-bromine battery developers globally.

RedFlow's IP is based around:

- Optimisation for utility application (complex fluid environment);
- Design for manufacturing (white goods manufacturing processes); and
- Reliability (completely sealed system – minimise potential for leaks).

RedFlow's design uses:

- All plastic construction for cells and tanks; and
- Integrated pumps and control systems.

Advantages of Zn-Br:

- High energy density (volume and weight);
- Low cost due to simple and cheap materials; and
- High performance and capacity for 100% cycling.



With large scale manufacturing, RedFlow has:

- ✓ A cost target of one-third, and
- ✓ A performance target of 6 times compared to best available lead-acid batteries.

Our Power+BOS[®] system

⇒ Certified for grid feeding via remote command



The RedFlow Power+BOS system comprises:

- A packaged energy storage solution certified for grid feeding.
- Comprises one to three zinc-bromine modules .
- Capacity of 10 kWh to 30 kWh in daily cycling.
- SMA inverter (5kW).
- RedFlow proprietary remote terminal unit (RTU).
- Full communications via 3G phone network.
- Steel enclosure and non-rusting plastic base.
- Supplied as a factory assembled and ready-to-run unit.



RedFlow systems assembly

⇒ Our current factory at work



RedFlow's Solution

⇒ Large-scale energy storage deployed as kW-scale systems

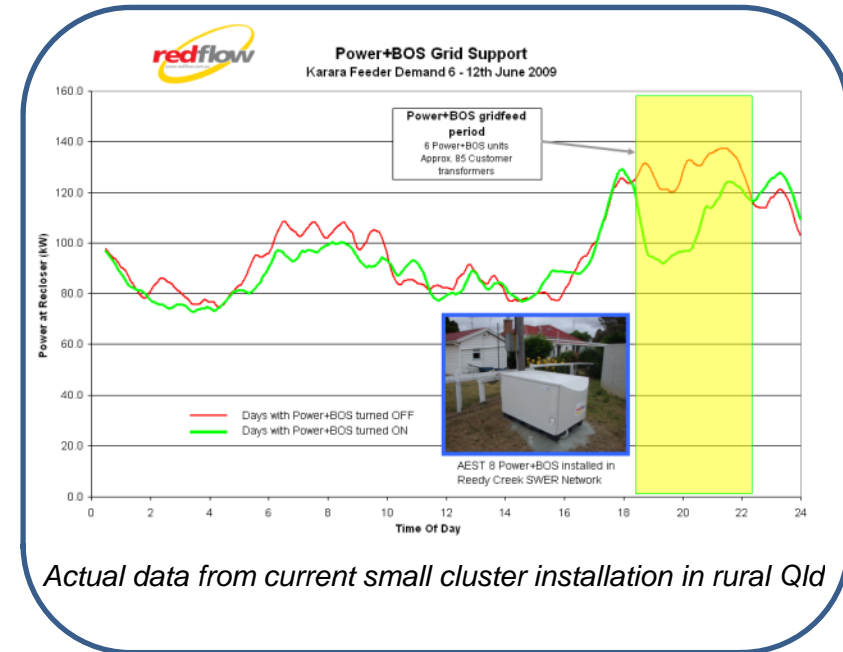


1. Suppressing peak loads in existing networks:

- Installed as a cluster of 20 kWh units within a SWER rural distribution grid.
- 1 unit per 10 residential customers.
- Reduces peak demand on stressed assets (lines & transformers).
- More cost effective than traditional “poles and wires” upgrade

2. Enhancing the value of intermittent renewable generation:

- Solar PV



And use your imagination for our next application:

- *RedFlow's systems can provide MWh-scale storage which can be easily remotely monitored and controlled.....*

Elegant remote monitoring & control

Actual screen from our in-house control systems



The screenshot displays a Windows desktop environment with a blue background. The taskbar at the bottom shows the time as 20h and a date of 10/11/12. Several application windows are open:

- Live Chart:** A window showing a table of monitoring data for various sites.
- Control Panel (RPB-A2-BC10 | Karara Hotel | AEST10):** A window with a green "Data Feed Ok" status bar. It contains several control buttons: "Inv - Run", "Inv Comms - Ok", "Grid Feed - Off", and "Fan - On". It also displays gauges for "External" (Temp °C) and "Solar" (Amps).
- Control Panel (RPB-A1-BB08 | Berridale | AEST6):** A window with a green "Data Feed Ok" status bar. It contains control buttons: "Inv - Run", "Inv Comms - Ok", "Grid Feed - Off", and "Fan - Off". It displays gauges for "External" (Temp °C) and "Solar" (Amps).
- Control Panel (RPB-A2-BC02 | Karara Hotel | AEST10):** A window displaying a "Line / External Power Source" section with four gauges: Volts (242.3), Amps (1.8), KWatts (6.1), and KVars (-6.4). Below this is an "Inverter" section with four gauges: Volts (243.6), Amps (6.9), KWatts (6.0), and KVars (6.1). At the bottom is a "Load" section with four gauges: Volts (243.6), Amps (6.9), KWatts (6.1), and KVars (-6.3).

The desktop also features standard Windows icons on the left sidebar, including "My Computer", "CW", "Host", "DataViewer", "LiveChart", "Shortcuts", "QuickBooks Premier Edition", "Internet Explorer", "Mozilla Firefox", "My Bluetooth Places", "ThinkVantage Productivity Center", "Marsden", "Norton Antivirus", "BigPond Wireless Broadband", "Windows Explorer", "Skype", and "Google Desktop".

Summary

RedFlow is an Australian company with a world-leading electricity storage product.

www.redflow.com.au

