



# RedFlow Technologies Ltd



Quarterly Report  
Period ending 30 September 2009

## Corporate Directory

### Board of Directors

Mr Chris Winter (CEO)  
Mr Phillip Hutchings (Chairman)

Dr Alex Winter (CTO)  
Mr Richard Aird (Executive Director)

### Company Secretary

Mr Iain Smith

### Auditors

Price Waterhouse Coopers

### Address

1 / 27 Counihan Road  
Seventeen Mile Rocks,  
Brisbane QLD 4073  
Australia

www.redflow.com.au  
info@redflow.com.au  
Phone: +61 7 3376 0008  
Fax: +61 7 3376 3751

### Bankers

Commonwealth Bank of Australia

### Solicitors

Hemming & Hart

### Group Companies

RedFlow Technologies Ltd	ACN 130 227 271
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RedFlow Pty Ltd	ACN 116 992 253
RedFlow International Pty Ltd	128 888 997

## Fast Facts - Company Overview

### General Information

- RedFlow is one of the world's leading developers and manufacturers of zinc-bromine (ZnBr) batteries.
- RedFlow's ZnBr battery modules have 5 kVA power rating, and store 10 kWh of energy in a 220 kg sealed unit.
- RedFlow packages its ZnBr batteries into Power+BOS® energy storage systems, certified for grid connection, with 10 kWh to 30 kWh capacity for daily cycling.
- RedFlow Power+BOS® systems are installed with solar PV for managing peak load on rural electricity grids.
- RedFlow is an unlisted public company, owned by management and external investors, located in Brisbane, Australia.
- With sophisticated control and communications systems, RedFlow's products include SCADA capability and are Smart-Grid ready.

### Production

- RedFlow's factory produces at an annualised rate of approximately 1 MWh of storage capacity per year.
- From early 2010, that will increase to 4 MWh per year.

### Employees

- 25 full time equivalents, plus external suppliers.

### Application Model

MW-scale community energy storage, deployed as kW-scale systems

**HIGHLIGHTS OF THE QUARTER**

- Deliveries of RedFlow Power+BOS® energy storage systems continued on track during the September 2009 quarter.
- RedFlow continues to lead the world in installations of zinc-bromine batteries for grid-connected applications.
- With all battery production from our current Phase One factory fully committed until the end of the 2009 year, we have cemented plans for our Phase Two factory expansion.
- We are now focussing on sales for 2010 production. Discussions are at early stages with several parties.
- Several international analyst reports were issued during the quarter, highlighting the strong demand growth expected for cost-effective battery storage.
- RedFlow's profile, both in Australian and internationally, is now growing rapidly.
- RedFlow's product development is continuing to significantly reduce our manufacturing costs. Our new design zinc bromine battery module is achieving approximately 20% more capacity than the current product being shipped for field installations.
- The 2009 audited accounts were completed, and the 2009 Annual Report has been issued and mailed to shareholders.
- RedFlow held its first Annual General Meeting under its new corporate structure, with all resolutions passed unanimously.



*A Power+BOS® energy storage system working at a rural Queensland location. This delivers electricity generated from solar PV in the daytime during evening peak demand times.*



*The Power+BOS® energy storage system is packaged in a utility-grade steel enclosure with a non-rusting base. Close inspection of this photo shows the 3G antenna mounted on the enclosure. This is used for data communications back to RedFlow's facility in Brisbane.*

## OVERVIEW

RedFlow's corporate transition from the product development phase to full commercial sales, while still in its initial stages, is progressing on track.

The performance of our zinc-bromine batteries in the field is proving most satisfactory. The units installed to date have highlighted a number of issues in the full system integration which are being taken into account as the product development progresses.

The underlying technology is performing as expected. What this means is that RedFlow's lightweight and compact zinc-bromine battery module has the equivalent performance of a stack of lead acid batteries weighing six times as much.

The growth path ahead is also clear. Our interim Phase Two factory expansion in 2010 will lift our production capacity by a factor of four.

Our manufacturing engineers are now scoping the much larger Phase Three factory. This will include much more automation and reduce unit production costs.

These engineering studies are confirming that production costs for zinc-bromine batteries at this larger scale will be a fraction of current costs. This will continue to drive the business case for energy storage to manage peak demand in place of traditional network solutions.

In the renewable energy market, RedFlow's cost reductions will be paralleling what is happening in the manufacturing of solar PV panels where unit costs have fallen by 50% in the past six months. This will provide opportunities for RedFlow's energy storage to enhance PV solar installations and allow delivery of clean electricity even without sun.

These changes point to very large markets for batteries in the near future.

### INSTALLATION OF STORAGE SYSTEMS

The delivery of Power+BOS® energy storage systems to Ergon Energy for installation in rural Queensland domestic and small commercial applications continued on schedule during the quarter. A further six units were delivered during the quarter, all based on zinc-bromine battery technology.

These systems have 20 kWh capacity in daily cycling. The units in the field are performing as planned and are providing valuable information for building the business case to justify further roll-outs into utility networks. They are also supporting the case for adding energy storage to solar PV to increase its value for utilities.

### PRODUCTION DEVELOPMENT

RedFlow's engineering team continued to work on techniques to improve the performance of our proprietary zinc-bromine battery module. Higher electrical performance is also an important component of reducing the cost on a per kilowatt-hour basis.

Elements of the design are continually being optimised and tested before being introduced into the field.

Tests at the company's Seventeen Mile Rocks facility in Brisbane during August 2009 showed our new generation zinc-bromine

stack is capable of delivering over 13 kWh of energy in repeated cycling tests. This compares with the nominal 10.5 kWh rating of the current generation RedFlow battery. As a result, the new generation battery has increased energy storage capacity by approximately 20% compared with the prior product. RedFlow will progressively introduce the new design into production operations.

RedFlow is also reducing the cost of components by moving from in-house manufacturing to sourcing from specialist external suppliers as soon as the size of the order justifies the initial setup cost for the supplier.

This latest round of lower cost sourcing and RedFlow's product improvements show that the ongoing development path is delivering excellent results.

As a result, RedFlow has achieved more than a 20% reduction in its cost per kWh this quarter.

RedFlow's advanced zinc-bromine battery is packaged in a module of approximately 220 kg. An equivalent set of lead-acid batteries would weigh 1,200 kg (when operated in an equivalent daily cycling mode, and limited to 20% depth of discharge to ensure an acceptable operating life as required by warranty terms).



*Zinc-bromine batteries undergoing test at RedFlow plant, August 2009.*

## NEW PRODUCT

In late September 2009, RedFlow introduced its stand-alone Zn-Br battery module designed for OEM applications. This product is based on one standard battery module. It is designed to allow Original Equipment Manufacturers (OEMs) to incorporate our high performance batteries into their products.

The initial markets for this product are:

- Augmenting existing off-grid power systems that use lead-acid batteries; and
- Upgrading existing solar PV systems that have been installed without batteries.

## MANUFACTURING OPERATIONS

The current Phase One RedFlow factory continues to operate at full capacity. It is providing three functions:

1. Manufacture of zinc-bromine battery modules;
2. Assembly and integration of battery modules into Power+BOS® energy storage systems (complete with SMA inverter, communications and control equipment and packaging in a steel enclosure); and
3. Ongoing product development. This ranges across fundamental zinc-bromine battery design through to improved battery control electronics and communications.

RedFlow also operates several zinc-bromine battery test stations, to ensure products meet specification before shipment.

## SALES & BUSINESS DEVELOPMENT

The awareness of RedFlow's products is growing, both in Australia and internationally.

RedFlow is now in early discussion with several prospective customers for our 2010 production.

During the quarter, RedFlow participated in several conferences, including:

- The EESA National Conference and Exhibition at the Gold Coast ("Smart Grid, Smart Energy, Smart People");
- The Energy Networks Association Energy 21C conference in Melbourne; and
- The Australian and NZ Solar Energy Society conference in Townsville.

At the latter function, our partner Ergon Energy hosted an evening function powered by RedFlow energy storage systems.

There is increasing interest in our products from USA and New Zealand. Visits are planned for the next quarter.



*Work experience student Courtney Soo with Electronics Technician Venessa Au*

## SOCIAL RESPONSIBILITY

RedFlow proudly participates in the Queensland community. During the quarter, we hosted a work experience student Courtney Soo from Helensvale State High School.

**CORPORATE NEWS**

During the quarter, the accounts for the year to 30 June 2009 were finalised and audited. RedFlow's auditors are PricewaterhouseCoopers.

RedFlow issued its 2009 Annual Report (the first for the new corporate structure) in late August 2009.

RedFlow held its Annual General Meeting on 18 September 2009. All resolutions were passed unanimously. After the meeting, we hosted a visit by shareholders and guests to our Seventeen Mile Rocks factory and manufacturing operations.

Our new website is drawing increasing attention. It is resulting in several requests for information from international market analysts.

**FINANCE & ADMINISTRATION**

During the quarter, RedFlow made two small share issues.

We received several expressions of interest from parties wishing to invest in RedFlow during the quarter.

At present, we are working on the path to a larger equity issue to fund the Phase Two factory expansion. The factory expansion is planned for early 2010.

These funds will be used for:

- The capital cost of the new machines and tools for the Phase two factory expansion. This will include the first round of semi automated machinery;
- Additional working capital for inventories of materials and components for the increased levels of production, as well as higher levels of finished stock and receivables; and
- Expansion of our staff to meet the higher production and sales levels.



*CEO Chris Winter addressing the RedFlow AGM*

Overall, the company is making pleasing progress in a market which is receiving more and more attention globally.

If you have any questions, I would be pleased to assist.

**Chris Winter**  
**CEO**

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**INTERESTING WEBSITES**

**RedFlow Technologies Limited**  
[www.redflow.com.au](http://www.redflow.com.au)

**Electricity Storage Association**  
[www.electricitystorage.org](http://www.electricitystorage.org)

**First Solar**  
[www.firstsolar.com](http://www.firstsolar.com)

**Electric Power Research Institute**  
[www.epri.com](http://www.epri.com)



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