

# The Battery Company That Wants to Keep Tesla Out of Australia

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We're very big on batteries, in *Exponential Investor*. That's because the world is rapidly moving towards renewables being the dominant electricity generation technology. This will give us rock-bottom prices for power – but it also means we'll have to put up with getting electricity when it's available, not necessarily when we want it. Batteries give us the freedom to store this energy, until it's actually needed. That way, we don't end up with an electricity grid that's flooded with power at lunchtime, and browning out by dinnertime.

Of course, you can play the batteries revolution by investing in Tesla. It's not just heavy hitters in electric vehicles – but it's also rolling out stationary batteries for home and utility use. One such deployment is currently slated for delivery in 100 days from order, in Australia. But, even in Oz, Tesla's not the only game in town – as we'll see today. Going after a pure-play battery firm gives a more focused investment strategy, for those who want to bet on storage – and that's the niche today's Australian firm fits in.

However, trading battery manufacturers isn't the only way to take advantage of this revolution. You need to be aware of the commodities angle. These materials plays can give you tremendous profit opportunities – and you can find out how you to invest in "white diesel" [here](#). I'm really not sure how much longer we can make that information available for – so please do [check it out today](#).

Now I'll let Simon Hackett tell you all about Redflow – a pure-play battery firm that's well placed to "defend" Australia, against Tesla's onslaught.

**AL: What do you think is behind this explosion of interest in energy storage during the past couple of years?**

SH: I think a key factor is broad recognition that energy storage is the missing link in the renewable energy revolution. In Australia and elsewhere, we've seen an enormous uptake in the production of solar and wind-powered energy. But the problem with these energy sources is their intermittency. The sun does not always shine and the wind doesn't always blow. Indeed, when these sources are feeding into existing fossil-fuelled energy grids, those systems can experience significant challenges. When clouds suddenly cover the sun or the wind drops off, it causes a collapse in energy supply.

Energy storage systems such as batteries are one way to solve this problem of intermittency. Batteries charged up by excess sun and wind energy can almost instantly supply power if generation drops off. Several Australian states are already making major investments in grid-scale storage to address problems arising during transition from fossils to renewables.

**AL: So battery technology has wider usage than single-household or single-property systems?**

SH: Absolutely. Batteries have the potential to change the entire structure of energy distribution systems. Currently, the grid is a tree-like structure. Energy emerges from distant generators, then flows through the trunk and along the branches to the "leaves" of each house. That hierarchical system can run into many problems. While the obvious one is a major power outage, the most common issue in grids is maintaining frequency and voltage *stability*, especially at extreme endpoints. The proliferation of residential solar panels *without* batteries makes it harder for utilities to maintain grid stability.

Everything changes when residential batteries are added. These batteries can be aggregated as a distributed "virtual generator", embedded throughout the grid's customer base. In future, a grid operator could call upon this virtual generator to dynamically balance frequency and voltage – precisely where and when that balancing is most needed. Contributing to this sort of grid stabilisation is the sort of service that customers can expect to receive payment for.

It's not hard to envisage that in a few years' time, energy companies will pay their customers for providing on-demand energy for a lower cost than the current solution – gas generators which are turned on only to meet peak demand periods. As well as helping individual premises – whether they are homes or businesses – batteries will help drive down energy costs for the entire network.

**AL: Which applications are going to be game changers?**

SH: It's all about the cost of energy. As we see a continued migration to renewables, they have the benefit of very low operating costs once their capital cost is recovered. Batteries are the missing link in this revolution, so as they become more widely deployed, they will contribute to driving down the cost of energy without generating more carbon. Households will deploy batteries so they can self-consume solar. Businesses will deploy batteries to guarantee supply, and reduce input costs. Utilities will deploy batteries to stabilise the grid, and to leverage renewables 24/7 – effectively replacing fossils for baseload. Redflow is in an enormous new market, offering storage unhindered by the limitations of legacy battery chemistries. We feel very optimistic about our prospects.

**AL: How did you get involved with Redflow?**

SH: I invested in the company in 2014, became executive chairman in 2015 and CEO in 2016. Before that, I established an internet company called Internode in 1991, which grew to become Australia's largest privately-owned internet service provider before I sold it in 2012. I've had a long-standing interest in renewable energy, installing solar panels and lead-acid batteries at my own home in 2010. I saw Redflow as an attractive investment opportunity, with patent-protected technology that offers unique benefits for its customers. I've become actively involved with the company to make sure it has the best chance of success, and remain convinced it is well placed to make its mark in the energy storage market.

**AL: That's very useful background. Can you tell me a bit more about the firm?**

SH: Redflow is a publicly-listed Australian company, which has developed the world's smallest zinc-bromine flow battery. Redflow's patented 10 kilowatt hour (kWh) ZBM2 batteries deliver unique advantages over legacy batteries.

**AL: Can you tell me more about these legacy technologies, and the problems you're solving?**

SH: Our batteries have advantages over lead-acid and lithium-based chemistries. These include 100% daily discharge without damage; sustained energy storage for its ten-year warranted life; and the ability to operate at ambient temperatures up to 50C without cooling.

**AL: How do your batteries work?**

SH: Our zinc-bromine flow battery is essentially an electroplating machine that holds a zinc-bromide solution in two tanks. The battery is charged or discharged by pumping that electrolyte solution through an electrode stack and back into the tanks. Energy is stored by extracting zinc from the solution and "plating" it on to the stack. Energy is discharged by reversing this process, releasing the zinc back into the solution. Because this is a sealed system, there is no loss of storage capacity during the warranted life.

**AL: Who do you sell to?**

SH: Our ZBM2 batteries are ideally suited for telecommunications, commercial and industrial and off-grid residential deployments – especially in warm climates. They thrive on heat and hard work – conditions that will typically degrade or destroy lead-acid or lithium batteries. To date, our largest single deal is a US\$600,000 sale to a telecoms systems integrator, which is building an off-grid comms network on a Pacific island. We've also sold multiple ZCell residential batteries to people whose homes are off-grid.

**AL: Batteries have a bad reputation for pollution unless carefully managed. How do yours stack up?**

SH: Zinc-bromine flow batteries have an excellent environmental story. Most of our components are made from plastic, steel or aluminium, which are readily recycled. At the end of the battery's life, the 100 litres of zinc bromide solution can be "cleaned" and reused in a new battery.

**AL: How do customers justify the cost?**

SH: Most customers have a clear business case for buying. In one instance, a customer spent about A\$40,000 to deploy a two-ZCell energy storage system at his off-grid property.

**AL: You could buy a lot of Tesla Powerwalls, for that money!**

SH: You'd need a lot – when working hard during a bunch of 40-degree summer days – because lithium batteries don't like the heat. His other option was to spend more than \$100,000 to connect to the grid – after which he would still need to pay for electricity. Today, his two batteries and 24 250-watt solar panels provide him with all the energy he requires – and no bills! In the case of telcos, there is a long-established practice of buying and replacing lead-acid batteries for remotely-located towers every 18-36 months. As our ZBM2 batteries are warranted for ten years at full performance, we have a major cost advantage. The bottom line is that it makes business sense for customers to choose ZBM2 or ZCell batteries.

**AL: What's the difference between these two products?**

SH: ZBM2 is our core industrial-strength battery, while ZCell is our residential product. This provides a ZBM2 battery within an attractive, weather-proof enclosure.

**AL: How can you compete with huge corporations, like Tesla, LG and Panasonic?**

SH: Actually, Tesla did Redflow quite a favour by announcing its entry into the energy storage market back into 2015. What they

did was make energy storage “sexy”. This had the benefit of legitimising a previously immature market (apart from distinct segments, like telco towers). Redflow is not really a -to- competitor with Tesla. They are competing ferociously for the on-grid residential market, where batteries are a useful addition to solar panels. Here, the performance demand is not particularly heavy, so lithium batteries can work. Our ZBM2 batteries thrive on heat and hard work, so they meet the needs of different market segments. If you look at rapidly industrialising countries in the tropics – South-East Asia, India, southern Africa and South America – that’s a very dynamic, growing geography for us.

**AL: How do you look after batteries, in such remote locations?**

SH: We’ve an internet-enabled battery management system (BMS), which allows us to remotely monitor and manage every battery – essentially making each battery part of the “Internet of Things” (IoT). This lets us diagnose problems and apply solutions anywhere. It also gives us a fleet-wide view, so we can identify whether a problem is isolated or shared. We can often apply a software-based solution to any problems discovered. This BMS is a key element of our battery’s success.

**AL: Where do you manufacture?**

SH: For the past few years, we had manufactured our batteries at a factory in North America, but, as the battery market has evolved, we’ve received the strongest demand from countries between Oceania and southern Africa, so we’re currently relocating outsourced production to South-East Asia. Once that’s complete, we’ll scale up production – driving down costs to become more competitive.

**AL: What’s limiting your expansion to other countries?**

SH: Our batteries are already installed at customer sites in Australia, Africa, New Zealand, South-East Asia, America and Europe. However, at present, we are in the unique position of having more demand than batteries, so we are making sure we bite off only what we can chew. Our challenge for the next 12-18 months is scaling production at our new factory to meet demand. The good news is that we have an experienced installer channel in Australia for ZCell residential batteries, and an international network of system integrators for our ZBM2 battery, which is at the heart of the ZCell system. We have decided to focus first on meeting demand from Australia, New Zealand, South-East Asia, India and South Africa. We will build out from there.

**AL: Are your best prospects in developed nations where there is a mature energy distribution network, and a demand for grid services – or is the firm more focused on off-grid uses?**

SH: While developed world markets are definitely attractive (especially in countries like Australia with soaring electricity cost), we have great off-grid opportunities in developing nations. Bundled with renewable generation, our hard-working temperature-tolerant ZBM2 batteries lend themselves towards these applications.

I believe the market really leads to all forms of energy generation and storage ultimately being controlled online. Off-grid home solar + battery systems will provide millions with electricity, in rural areas. As efficiencies improve, costs will fall. Redflow is in a unique position to supply those emerging markets.

**AL: How do people invest in Redflow?**

SH: Redflow is a public company listed on the Australian Securities Exchange, so it’s easy to buy our shares (RFX), through a broker.

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Best,

Andrew Lockley  
*Exponential Investor*