Redflow Ltd

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11 December 2023

Flexible, Smart Battery Solutions to Power the Energy Transition

NEED TO KNOW

- Flow batteries key to long duration energy storage
- Major contracts show strong pipeline conversion, RFX's move to large-scale product commercialisation
- Gov't clean energy policy adds to industry tailwinds

Redflow's flow battery technology supports renewables transition with long duration energy storage (LDES): Redflow's technology, developed over 15 years, provides LDES solutions which are key to enabling uninterrupted grid scale electricity generation from renewable sources, including wind and solar.

Substantial new project wins: Redflow has announced nearly 60 MWh of projects globally (largely in the US and Australia) since June 2023, which are expected to contribute A$55m in revenue. The latest 34.4 MWh project with the US Department of Energy will be Redflow's largest-ever project, 70% bigger than its previous largest 20 MWh project in California announced in June. The outlook is bright with a qualified order pipeline of more than 6 GWh of batteries.

Major policy support from Australia and the US driving demand: Redflow is at the forefront of Australia–US clean energy policy collaborations, as it is the only ASX-listed non-lithium, zinc-bromide battery manufacturer that has reached commercialisation stage, with ongoing interaction with industry and government stakeholders. Government programs are leading the way with demand for significant LDES solutions, contributing to a significant increase in project scale. Redflow raised $11.65m in September 2023 and is now proceeding to execute on its commercial opportunities.

Investment Thesis

Huge addressable market, starting in the US and Australia: The market continues to grow, as LDES is crucial for meeting demand and ensuring reliable, low cost, renewables-based energy grids. Redflow is well positioned to take advantage of the collaboration between the US and Australia in outlaying energy storage capability to support clean energy policy.

Industry leader in providing battery-powered LDES: Redflow is increasingly recognised as a global leader in alternatives to Li-ion energy storage tech. The group has developed significant IP over ~15 years through extensive R&D, offering a range of unique flow battery features well suited to grid requirements.

Major contracts and strong pipeline to support growth and returns: We expect increased scale, as Redflow aims to produce 500 MWh p.a. of storage, will drive significant revenue growth (current pricing is equivalent to ~A$0.9m rev per MWh) and margin improvements for the business. Recent project wins add significant market visibility and credibility to Redflow in the sector.

Valuation – A$0.32 / Share

Using a DCF valuation methodology with a WACC of 16.0% and a terminal growth rate of 2.5%, we generate a fair value for Redflow of A$0.32 per share. Key catalysts include additional major project wins and new strategic partnerships with potential funding partners, including government entities.

Risks

Key risks to our valuation include execution risk associated with production and delivery of battery storage projects and funding risks associated with access to capital to support growth longer term.

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redflow

Redflow Limited (ASX: RFX) is a designer and manufacturer of long-duration zinc-bromine flow batteries which are used in stationary, commercial, industrial and utility applications. Its energy storage solution has encompassed the growth of renewable energy by offering fully recyclable batteries made of low toxicity materials. The company has deployed its technology in over 9 countries as a leading, safe, clean and sustainable provider of energy storage.

Valuation	**A$0.32 per share**
Current price	**A$0.17**
Market cap	**A$40m**
Cash on hand	**A$12.7m** (30 Sept 2023)

Additional Resources

Video Link How do Redflow's flow batteries work?

Upcoming Catalysts and Newsflow

Period	
2H24	Half-year results
Ongoing	Additional project announcements

Share Price (A$)

Source: FactSet, MST Access.

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Redflow Ltd

Year end 30 June

MARKET DATA

Price	**$**	**0.17**
Valuation per share	**$**	**0.32**
52 week low / high	$	0.16/0.34
Market capitalisation	**$m**	**40.3**
Shares on issue (basic)	no.	237.1
Options / rights	no.	7.0
Other equity	no.	190.0
Shares on issue (diluted)	no.	434.1

12-MONTH SHARE PRICE PERFORMANCE

INVESTMENT FUNDAMENTALS		FY23A	FY24F	FY25F	FY26F	FY27F
Reported NPAT	$m	(13.6)	(10.4)	(15.6)	(9.1)	9.8
NPAT normalised	**$m**	**(13.6)**	**(10.4)**	**(15.6)**	**(9.1)**	**9.8**
Reported EPS (undiluted)	¢	(0.08)	(0.04)	(0.04)	(0.02)	0.02
EPS normalised (undiluted)	**¢**	**(0.08)**	**(0.04)**	**(0.04)**	**(0.02)**	**0.02**
....Growth	%	**n/m**	**n/m**	**n/m**	**n/m**	**n/m**
PER normalised	**x**	**n/m**	**n/m**	**n/m**	**n/m**	**7.4**
Operating cash flow per share	¢	(7.3)	(4.3)	(3.1)	(2.1)	0.4
Free cash flow per share	¢	(7.7)	(4.7)	(11.7)	(6.4)	(0.5)
Price to free cash flow per shar	**x**	**n/m**	**n/m**	**n/m**	**n/m**	**n/m**
FCF yield	%	n/m	n/m	n/m	n/m	n/m
Dividend	**¢**	**n/m**	**n/m**	**n/m**	**n/m**	**n/m**
Payout	%	n/m	n/m	n/m	n/m	n/m
Yield	**%**	**n/m**	**n/m**	**n/m**	**n/m**	**n/m**
Franking	%	n/m	n/m	n/m	n/m	n/m
Enterprise value	**$m**	**31.3**	**34.8**	**35.1**	**40.1**	**67.6**
EV/EBITDA	x	n/m	n/m	n/m	28.2	3.4
EV/EBIT	x	n/m	n/m	n/m	n/m	4.7
Price to book (NAV)	x	2.5	2.7	1.0	2.1	1.4
Price to NTA	x	1.8	1.9	0.5	0.8	0.5

KEY RATIOS		FY23A	FY24F	FY25F	FY26F	FY27F
EBITDA margin	%	n/m	n/m	n/m	1.8	10.6
EBIT margin	%	n/m	n/m	n/m	(5.6)	7.6
NPAT margin	%	n/m	n/m	n/m	(11.5)	5.2
ROE	%	n/m	n/m	n/m	(26.5)	19.4
Net debt /(cash)	$m	(9.0)	(5.5)	(5.2)	(0.2)	27.3
Interest cover (EBIT / net interes	x	n/m	n/m	n/m	n/m	n/m
Gearing (net debt / EBITDA)	x	n/m	n/m	n/m	n/m	n/m
Leverage (net debt / (net debt +	x	n/m	n/m	n/m	n/m	n/m

GROWTH PROFILE		FY23A	FY24F	FY25F	FY26F	FY27F
Operating revenue	%	n/m	n/m	417.5	174.0	141.3
EBITDA	%	n/m	n/m	n/m	n/m	1,314.3
EBIT	%	n/m	n/m	n/m	n/m	n/m
Operating NPAT	%	n/m	n/m	n/m	n/m	n/m
Normalised EPS	%	n/m	n/m	n/m	n/m	n/m

DUPONT ANALYSIS		FY23A	FY24F	FY25F	FY26F	FY27F
Net Profit Margin	%	n/m	n/m	(54.4)	(11.5)	5.2
Asset Turnover	x	n/m	n/m	0.3	0.8	1.3
Return on Assets	%	n/m	n/m	(17.9)	(9.6)	6.8
Financial Leverage	x	1.4	1.5	2.1	2.8	2.9
Return on Equity	%	n/m	n/m	(37.4)	(26.5)	19.4

Source: Company Presentations and MST

PROFIT AND LOSS		FY23A	FY24F	FY25F	FY26F	FY27F
Sales revenue	**$m**	**1.2**	**3.1**	**27.5**	**77.5**	**188.8**
Other income	$m	3.5	2.5	1.2	1.2	1.2
Total revenue	$m	4.7	5.6	28.7	78.7	190.0
EBITDA	**$m**	**(13.2)**	**(10.0)**	**(9.9)**	**1.4**	**20.1**
Depreciation & amortisation	$m	(0.6)	(0.6)	(4.3)	(5.9)	(5.7)
EBIT	$m	(13.8)	(10.6)	(14.2)	(4.4)	14.4
Net interest	$m	0.2	0.2	(1.4)	(4.6)	(4.6)
Non-operating income	$m	0.0	0.0	0.0	0.0	0.0
Pretax Profit	$m	(13.6)	(10.4)	(15.6)	(9.1)	9.8
Tax expense	$m	(0.0)	0.0	0.0	0.0	0.0
Operating NPAT	**$m**	**(13.6)**	**(10.4)**	**(15.6)**	**(9.1)**	**9.8**
Significant items	$m	0.0	0.0	0.0	0.0	0.0
Reported NPAT	$m	(13.6)	(10.4)	(15.6)	(9.1)	9.8

BALANCE SHEET		FY23A	FY24F	FY25F	FY26F	FY27F
Cash	$m	5.5	5.2	35.2	7.7	5.5
Receivables	$m	2.6	3.7	8.3	23.3	56.6
Inventory	$m	2.7	3.1	5.8	11.6	25.5
Other	$m	0.7	1.5	2.8	3.9	9.4
Current	**$m**	**11.5**	**13.6**	**52.0**	**46.5**	**97.0**
Prop, plant & equip	$m	1.6	2.1	34.9	47.9	46.4
Intangibles	$m	0.5	0.5	0.6	0.5	1.0
Other	$m	0.0	0.0	0.0	0.0	0.0
Non current	**$m**	**2.1**	**2.7**	**35.5**	**48.4**	**47.5**
Total assets	**$m**	**13.7**	**16.2**	**87.5**	**94.9**	**144.5**
Accounts Payable	$m	1.5	2.8	8.3	23.3	56.6
Borrowings	$m	0.0	0.0	35.0	35.0	35.0
Other	$m	2.4	2.4	2.4	2.4	2.4
Total liabilities	**$m**	**4.0**	**5.2**	**45.7**	**60.7**	**94.1**
Shareholder's equity	**$m**	**9.7**	**11.0**	**41.8**	**34.2**	**50.4**

CASH FLOW		FY23A	FY24F	FY25F	FY26F	FY27F
EBITDA	$m	(13.2)	(10.0)	(9.9)	1.4	20.1
Change in provisions	$m	0.0	0.0	0.0	0.0	1.0
Change in working capital	$m	(2.8)	(0.3)	(1.8)	(5.8)	(13.9)
Net interest	$m	0.2	0.2	(1.4)	(4.6)	(4.6)
Tax paid	$m	(0.0)	0.0	0.0	0.0	0.0
Other	$m	3.2	0.0	0.0	0.0	0.0
Operating cash flow	**$m**	**(12.7)**	**(10.1)**	**(13.1)**	**(9.0)**	**1.6**
Capex	$m	(0.7)	(1.0)	(36.7)	(18.3)	(3.7)
Acquisitions	$m	0.0	0.0	0.0	0.0	0.0
Disposals	$m	0.0	0.0	0.0	0.0	0.0
Investing cash flow	**$m**	**(0.7)**	**(1.0)**	**(36.7)**	**(18.3)**	**(3.7)**
Equity	$m	10.0	11.0	40.0	0.0	0.0
Increase / (decrease) in borrowing	$m	(0.2)	(0.2)	39.8	(0.2)	(0.2)
Dividend/other	$m	0.0	0.0	0.0	0.0	0.0
Financing cash flow	**$m**	**9.9**	**10.8**	**79.8**	**(0.2)**	**(0.2)**
Free cash flow	**$m**	**(13.4)**	**(11.1)**	**(49.8)**	**(27.3)**	**(2.1)**

Thesis: Flow Battery Solution Key to Energy Transition; Partnerships with Key Stakeholders

Company profile: flexible, scalable energy storage with global reach

Redflow is a central player in the long duration energy storage (LDES) market, which is a key enabler of the global transition to renewable energy solutions. The company provides safe, clean and sustainable long-duration zinc-bromine flow batteries with IP that has been continually developed since Redflow's inception in 2008. These batteries are used across a range of stationary, commercial, industrial, and utility applications worldwide.

The company is Australia's sole listed non-lithium battery manufacturer with over 270 active deployments of its LDES systems and is the only Australian project partner selected by the California Energy Commission and the US Department of Energy in their LDES programs.

Redflow operates globally, primarily in major markets including the US and Australia, where it has secured major project wins with large industry-leading customers and government entities. Since mid-CY23, Redflow has announced over 60 MWh of projects, which are expected to generate over $55m of revenues, adding significant scale to the business. The longer-term commercial outlook has also never been as strong as it is currently, with a qualified order pipeline of more than 6 GWh of batteries.

Market backdrop: renewable energy challenges provide sizeable opportunities for storage solutions

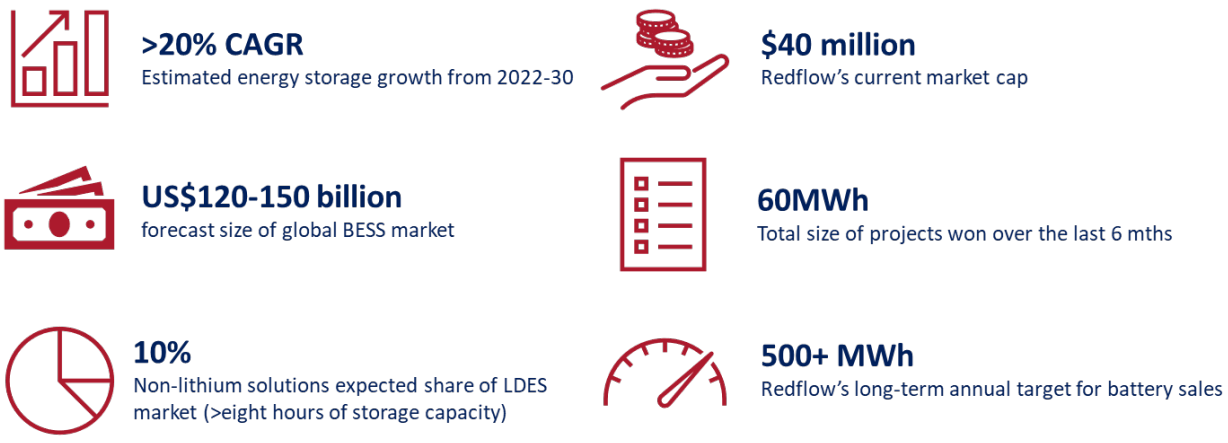
One of the biggest challenges facing the energy transition to include more renewables is the need for a constant and dependable energy supply, regardless of the time of day or weather conditions. This is the issue that LDES aims to solve. As the global energy transition gains momentum, the need for renewable energy storage is increasing, requiring substantial growth to help economies achieve global net-zero emissions targets. Multiple types of LDES methods exist, including batteries. However, many existing battery solutions, such as Li-ion batteries, are less suited to long duration applications, and have other drawbacks in grid applications related to fire risk, critical minerals supply chain, recyclability and degradation over time, as well as being more directed to other use cases, including the EV sector.

Redflow helps address this gap in the battery energy storage market, as its flow batteries can provide time-shifting energy and emergency power supplies in a wide range of climates. Redflow is well positioned to benefit from the increasing versatility and declining costs of flow battery technology, alongside a surge in demand as renewable energy sources and utilisation grow significantly.

Macro tailwinds helped by strong government support

Governments, including those in Australia and the US, have explicitly expressed their support for the development and production of a variety of LDES solutions to help meet longer-term renewable energy targets. Battery power and storage is a key part of the equation and Redflow's flow battery technology is well placed to benefit from both a market that is growing significantly and supportive government programs (particularly involving funding initiatives and project deployments).

Figure 1: Redflow market opportunity snapshot



Source: Bloomberg, McKinsey, Company data.

Financials

Redflow's revenue growth will be dictated by pipeline conversion and project delivery. We expect revenue growth to accelerate significantly to $27.5m in FY25 and $77.5m FY26 (from ~$3m in FY24) as Redflow delivers on recent project wins. Recently announced contract wins delivering a total of 60 MWh are expected to deliver $55m in revenue (equates to $0.9m per MHh) according to company estimates. We assume this will be received over two years on average, as contract payments are made gradually starting on commencement date and followed by subsequent progress stages. We assume half of this revenue estimate falls in FY25, while the other half falls in FY26. We expect the additional revenue achieved in FY26 (~$50m) will come from forthcoming project wins, leading to marginally positive EBITDA for the year as well.

Our base case longer term forecast assumes additional funding of $80m (split 50/50 between equity and debt) to be invested in additional manufacturing capacity (to meet the 500 MWh p.a. goal) and working capital requirements.

Valuation and risks

Our valuation of $0.32 per share for RFX is based on a discounted cash flow analysis (DCF) with a forecast period out to FY33, implying significant upside from the current share price. Given the early-stage nature of the company and industry overall, we attach a higher than market average discount rate (WACC) of 16%, which includes a risk-free rate of 4.5%, market premium of 8% and beta of 2.0.

While we highlight notable peers, the early stage of development for the industry overall also means it is difficult to apply meaningful market multiples at this stage, although this will evolve as the sector matures.

Key risks include possible delays with the ramp up of production to deliver recent contract wins and funding risks associated with the additional capital likely required to scale production to 500 MWh p.a.

Catalysts

We see the following as key catalysts for Redflow over the short to medium term:

1. Further updates on the strategic review which was announced post FY23 results to "accelerate market penetration, achieve scale and maximise shareholder value". According to management, engagement across multiple market participants and potential strategic partners has been ongoing
2. Potential for further policy support from stakeholders including government in key markets including Australia and US, which may lead to additional strategic partnerships or funding arrangements, including grants and/or debt arrangements
3. Further contract wins with major market participants similar in scale to recently announced projects. Successful delivery of the existing project pipeline is likely to add to strong underlying momentum.

Management team

Redflow's management team holds significant industry experience, particularly in the area of energy storage systems and zinc-bromine flow batteries (refer to page 28). The team is led by CEO Timothy Harris, who joined the company in that capacity in March 2018. Mr Harris was formerly the Chief Commercial Officer of New Zealand's largest telecommunications infrastructure company, Chorus, and also spent a decade in senior executive roles with BT, a British multinational telecommunications company. Mr Harris is supported by Non-Executive Chairman Brett Johnson, who has over 18 years of experience as a director of listed companies and over 25 years' experience as General Counsel of listed Australian companies.

Company Overview:
Energy Storage for a Clean Energy Economy

About Redflow

As Australia's sole listed non-lithium battery manufacturer, Redflow is a leading energy storage solution provider for the clean energy transition. Redflow delivers safe and sustainable energy storage systems, which are essential for harnessing the benefits of increased renewable energy production. The company's reliable and sustainable long duration energy storage (LDES) solutions for critical infrastructure are backed by over a decade of experience and product innovation.

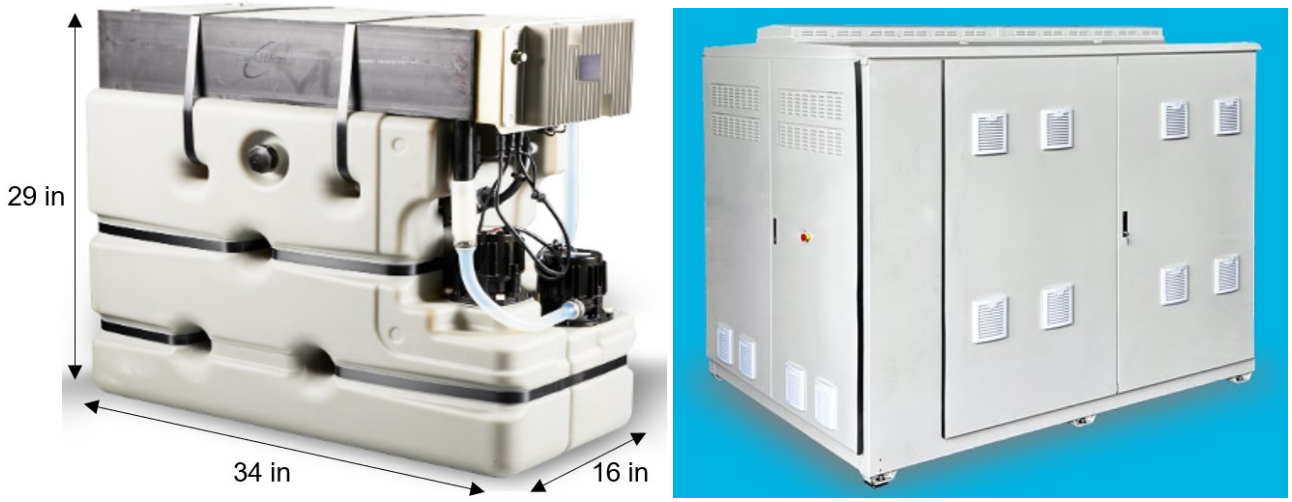
Recently, Redflow has undergone transformative change after securing significant large-scale project wins from major blue-chip customers, particularly in the US (the largest market currently for energy storage solutions) and Australia. The momentum from these major contract wins is boosting Redflow's profile and accelerating additional pipeline opportunities globally.

Benefits of Redflow's technology

Redflow's LDES is:

- **cost effective**
- **fire safe**
- **environmentally friendly**
- **adaptable** for a range of extended-duration energy storage applications, from small commercial installations to multi-megawatt-hour setups
- **efficient**, regardless of temperature: operates efficiently in extreme temperatures of 10–45°C, with no active cooling required
- **flexible and expandable:** the modular design can be used for medium to grid-scale energy storage needs, allowing for straightforward capacity expansion when necessary.

Figure 2: Redflow's ZBM3 – the world's smallest commercially available zinc-bromine flow battery (LHS); Redflow's Energy Pod200 (RHS) is a scalable LDES with each pod (2.93x2.26x2.2m) holding 20 x 10 kWh ZBM3 flow batteries



Source: Company data.

Company snapshot: started small but now servicing large-scale projects

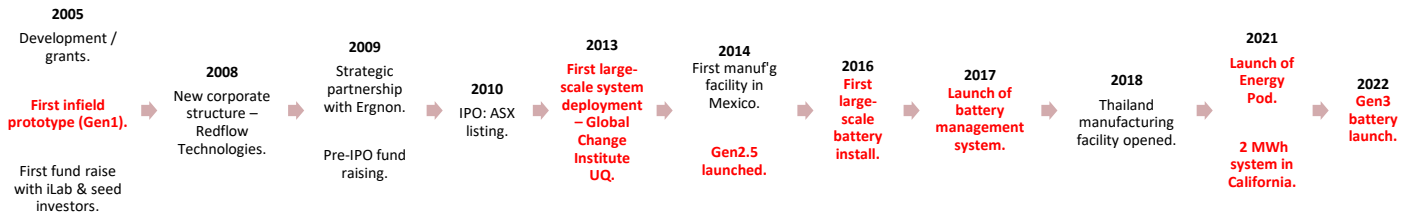
Small beginnings in 2008: Redflow was founded in 2008 and was listed in 2010. Its flow-based battery technology, which uses electrolyte liquid to store energy, has been developed and refined over more than a decade. Redflow started with a small, modular 10 KW system, the smallest flow battery in the world. Since then, Redflow has continually leveraged its innovation capabilities, driven by extensive research and development (R&D) efforts, to enhance its flow battery technology and associated product offerings.

A strategic pivot to larger systems, bigger customers and cost efficiencies: In 2020, Redflow pivoted its strategy, focusing on larger systems to drive substantial growth. The company harnessed its early operational experiences in smaller systems to support larger projects in the US and Australia, and to sell to larger customers.

As the market for LDESs has grown, Redflow has built a competitive cost edge by improving economies of scale and automating its manufacturing processes. These improvements can be attributed to its earlier modular approach, initially designed for smaller-scale systems but seamlessly adaptable to scale up and support larger projects. As part of the strategic pivot, Redflow opted to trade off short-term revenue wins in pursuit of establishing a strong foothold in the larger systems market, which the company expects to provide more scale benefits over the longer term.

2 MWh install for Anaergia a turning point: A pivotal breakthrough occurred with Redflow's partnership with Anaergia in California, in which Redflow deployed a 2 MWh system to support Anaergia's energy resilience. This system has been operational for close to 18 months and has provided a strong reference point for additional contract wins with larger systems in the US and Australia. All of the projects recently announced (5 key highlights provided below in the report) will use Redflow's modular Pod system first installed for Anaergia. Importantly, these recent project wins are significantly boosting the company's profile and building momentum, creating subsequent partnership leads and strengthening its outlook.

Figure 3: Historical timeline with notable milestones (technological developments highlighted in red)



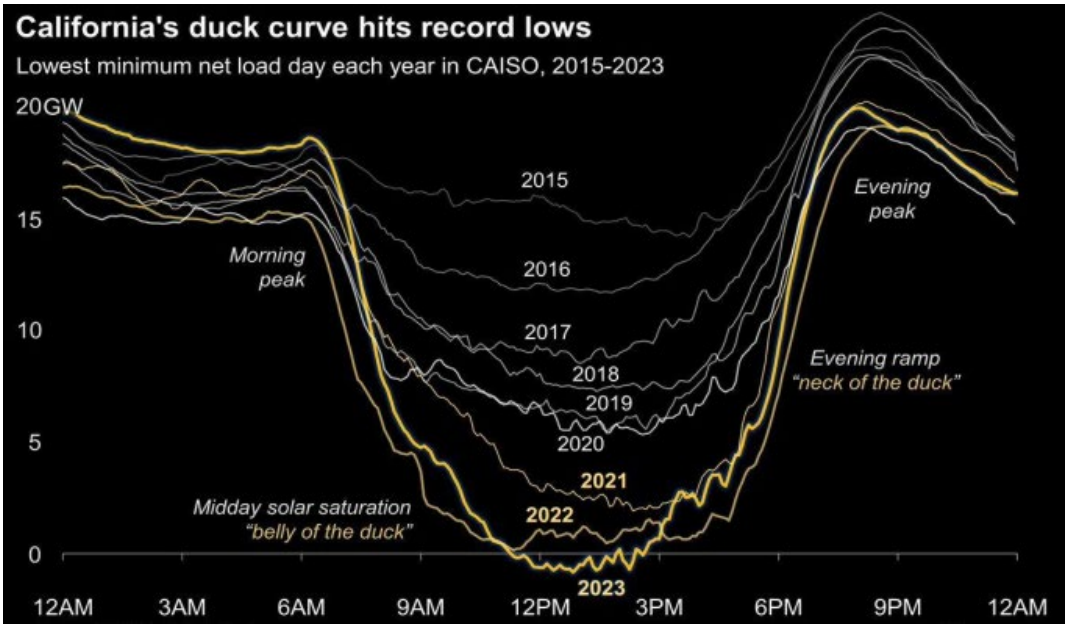
Source: Company data.

Flow battery technology – an optimal product for the transition to renewables, with significant advantages over Li-ion technology

The challenge – demand and supply are mismatched over the day

One of the biggest hurdles in the transition to renewable energy is ensuring a constant, dependable energy supply, regardless of the time of day or weather conditions. As is well documented, key sources of renewable energy (including wind and solar) can be highly affected not just by the time of day but also by day-to-day climatic conditions. For example, in places such as Australia and California, large amounts of energy can be generated in the middle of the day from wind and solar, surpassing demand at that time (see Figure 4). This surplus energy needs to be stored for later use, particularly in the evening when demand is highest. Industry estimates that up to 10% of energy generated will need to be transformed, which presents a huge market opportunity for players such as Redflow.

Figure 4: Illustration of the duck curve, which illustrates daily electricity demand and supply patterns in California



Source: CAISO. Note: net load shown is demand minus utility-scale wind and solar

Li-ion batteries are tied up with EV production, not optimally sustainable

Lithium-ion (Li-ion) batteries, best known from their use in Tesla's home solution, the Powerwall, and utility scale system, the Tesla MegaPack, are the most well-known energy storage solution. However, Li-ion batteries are less suited for grid-level energy requirements particularly when considering their characteristics including supply chain factors. The growth in EVs, limited raw materials, concerns over sustainable use of highly toxic materials and fire safety, excessive waste, limited recyclability and output degradation are all factors making non-lithium LDES, including Redflow's solution, more appealing and competitive.

Better solutions are required – and flow batteries meet the moment

For renewables to truly compete with more traditional forms of energy, including fossil fuels, better solutions are needed for storing energy. Flow batteries, which are liquid batteries, are one potential solution to this problem. Flow batteries have a number of important benefits:

- significantly longer storage duration vs. Li-ion batteries; designed for medium to long storage time frames, beyond 4+ hours
- extended life span due to underlying chemistry, with no degradation in performance over time
- little to no fire risk
- discharge without damaging the battery, and can remain in discharge state indefinitely through a unique hibernation feature, which aids energy shifting over different time periods
- battery materials are recyclable, safe and non-flammable
- no significant cost or environmental concerns associated with disposal.

Competitive advantage: Redflow offers compelling, unique features

The continuous refinement of Redflow's batteries, coupled with increased scalability, has positioned the company well in markets with limited alternative solutions. The unique, non-substitutable features of its technology such as fire safety, hibernation mode, and the ability to operate in extreme heat has differentiated Redflow with customers in markets such as Australia and California.

Cross-border, cross-industry, in-the-field operational experience of 15+ years

Redflow's technology, researched and designed in Australia, has been optimised for the growing 4+ hour energy storage market. The company now has over 270 active deployments across the world that have delivered over 3.2 GWh of energy through Redflow battery systems, resulting in over 24 million hours of cumulative field operation. This operational experience separates Redflow from other offerings which have only been lab tested and are in the infancy of their commercial development.

Core battery design operates in a small footprint at multi-MWh scale with application in a wide range of use cases

The ZBM3 battery's compact, flexible design allows energy flow of 0–60 volts (through a bi-directional DC-DC converter). This is supported by a low-cost zinc-bromine–based chemistry with higher energy density. The ZBM3 battery has cost-of-storage advantages, can support scale, is environmentally friendly and recyclable and does not experience thermal runaway (a significant differentiating feature vs lithium). With up to 3x more energy density (34 kWh per sqm), Redflow can achieve the same energy output with a third of the physical footprint required by other LDES providers.

Redflow's EnergyPod200 provides a scalable storage solution

The EnergyPod200 is specifically designed to hold 20 x 10 kWh ZBM3 batteries in a custom enclosure. This design aids electrical protection and power conditioning through its integrated power conversion equipment (PCE), which provides higher range output voltages or direct AC output. These features make it well suited to a range of environments (including high temperatures). The pods have key applications across peak-shaving, bulk energy shifting, integration with renewables, microgrid creation, backup power and grid support.

Unique hibernation feature facilitates storage for long delay and duration

The hibernation feature allows the battery to be charged to 100% and 'parked' (left alone) for days and/or weeks with no loss of charge or degradation in performance, as is the case with other chemistry-based batteries. This is particularly useful for customers (e.g., the US Department of Defense) that need to maximise storage for resilience over very long periods. In Australia, this feature has been successfully operating at over 50 Optus mobile towers, to support their bushfire resilience program following the 2020 bushfire disaster.

Research and development: Redflow's IP developed over 15 years

R&D has been at the heart of the development of Redflow's LDES battery technology, and the company is now reaping the benefits, having turned R&D outcomes into practical application for its batteries and the projects they support.

R&D investments bearing fruit

Redflow has historically invested approximately $4–5m p.a. in research and development (R&D). The primary focus of its R&D has been to enhance the operational performance of its batteries while reducing costs. Each module currently generates 10 kWh of electricity; management expects this will increase materially over time, and is confident there is still significant opportunity to enhance performance and optimise the chemistry of the battery modules further. Importantly, Redflow's modular system allows easy deployment for a range of small to large projects, although emphasis more recently has been placed on larger opportunities to help achieve greater scale.

The company's R&D initiatives are continually evolving core engineering work, including a recent refinement to the ZMB3 design which introduced a new tank and new separator, which was delivered in the most recent September quarter (1QFY24). As part of its R&D initiatives, Redflow is proactively incorporating new design improvements to improve productivity, cost, quality and supplier diversification (for both the ZBM3 battery and EnergyPod), which will all aid profitability.

IP protection from portfolio of patents

As a global leader in LDES battery technology, Redflow protects its intellectual property through multiple patents, which provide a protective moat against replication. Redflow's technology portfolio, across both its core battery design and energy pods, is now supported by this portfolio of IP patents.

Government subsidies fund R&D

From a funding perspective, R&D efforts are well supported by Australian government subsidies, which provide ~43c back on every dollar invested. Government funding initiatives to support growth of LDES solutions as part of the renewables transition are becoming increasingly prevalent (see Financials chapter for more on funding).

How do Redflow's flow batteries work?

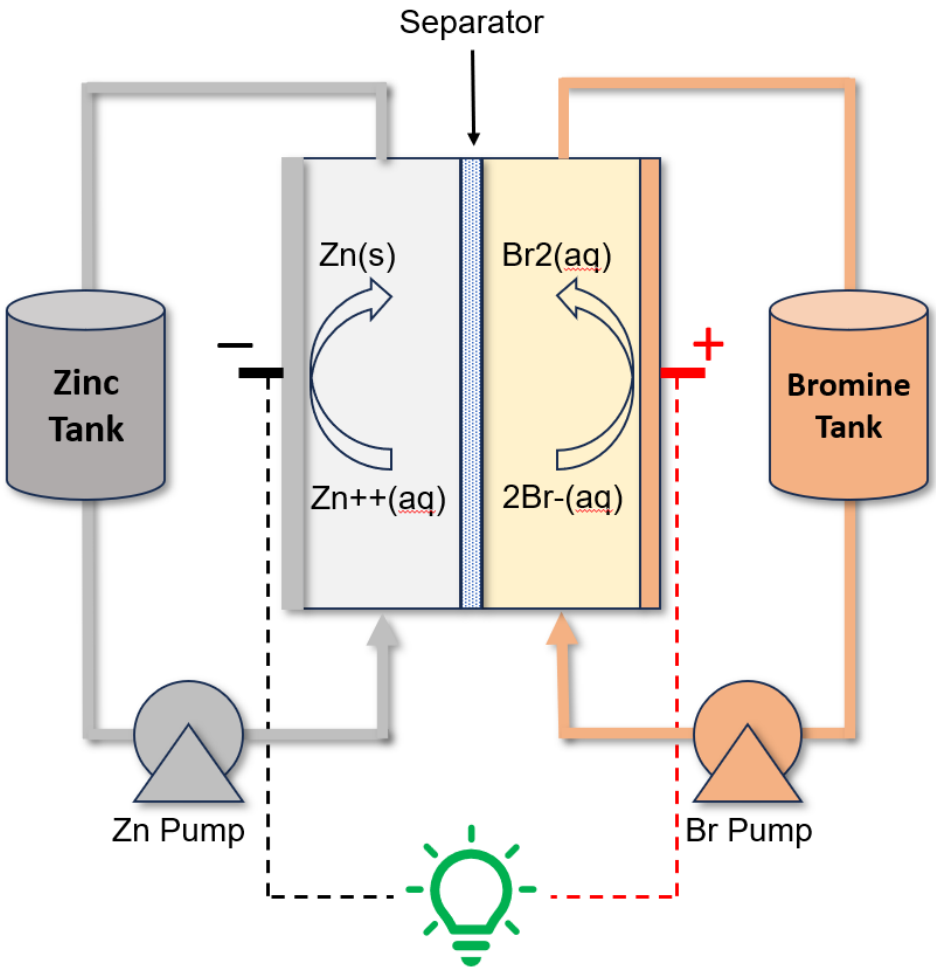
Flow batteries represent a form of electrochemical energy storage which uses chemical components dissolved in a liquid medium to store electrical energy.

Redflow's patented flow battery uses a liquid electrolyte stored in two individual tanks, received from renewable power sources (unlike Li-ion batteries, which store the electrolyte within the battery itself). In the **charging phase**, photovoltaic (PV) panels, wind turbines, or grid input supply electrons to pump electrolyte through the battery. This drives a chemical reaction within a cell stack and charges the zinc bromide electrolyte solution. Zinc is plated out as metallic zinc on one half cell electrode surface, while bromide is converted to complex bromine on the other half cell electrode. This plating and conversion process, which consumes electrons supplied by an electric charge, effectively stores energy.

During the **discharging phase**, the liquid electrolyte is circulated through the electrodes. This action reverses the charging process; zinc dissolves back into the solution and complex bromine is converted to bromide (both back to their original states). This reversal releases electrons to create an electrical current, thereby generating electricity.

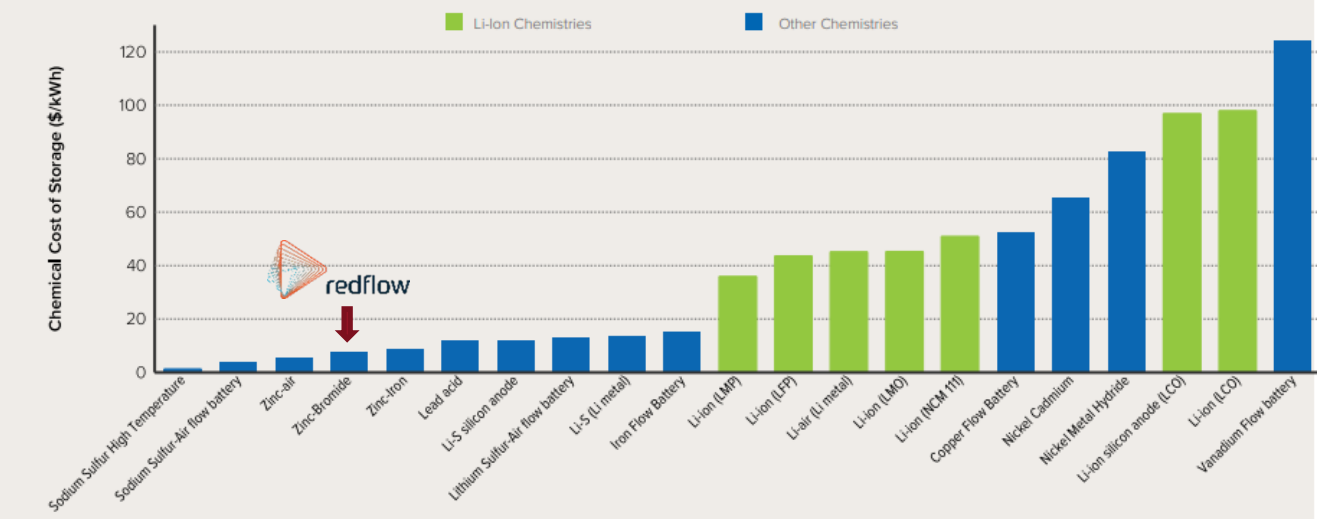
See the link on the cover of this report for a Redflow video on its battery technology.

Figure 5: Zinc-bromide flow battery – illustrative graphic



Production: Redflow's battery production currently in Thailand

Figure 6: Estimated cost of raw materials for different battery chemistries including zinc-bromide



Source: Rocky Mountain Institute.

Ramp up from 10 MWh pa to 80 MWh in the next 12 months

Redflow's ZBM3 batteries, which are contained in 200 kWh pod enclosures, are produced at the company's Thailand manufacturing facility. Annualised production is currently ~10 MWh per annum. The company expects to increase production to 40 MWh in early 2024 following key engineering and productivity projects (including commencement of a second operational shift that will aid ramp up of EnergyPod manufacturing and assembly capabilities), and then 80 MWh by late CY24, highlighting the upcoming step changes in production growth that will be required to align with Redflow's project delivery timetable.

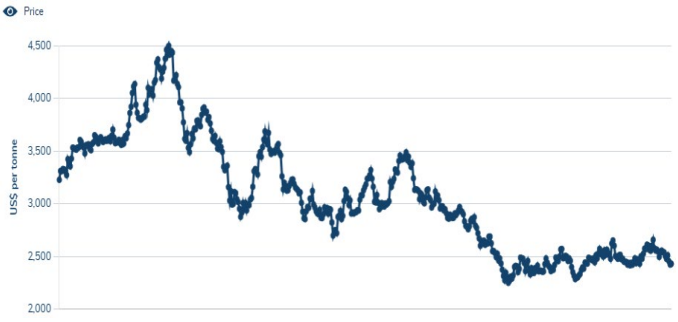
Secure and diversified supply chain

Government policies around national energy security, including energy storage (particularly in markets such as the US and Australia), have become increasingly sensitive to supply chain factors such as the geographical location of source materials and suppliers. Redflow's supply chain is a source of strength for the company with less dependency on particular countries or regions of concern, including China. The current supply chain includes items and materials from the US, Taiwan, Europe and Thailand. Redflow indicates that this could evolve over time, particularly as the company looks to expand production, with additional sourcing, manufacturing and assembly activities possible in end user markets including Australia and/or US, with active engagement taking place in both countries.

Cost advantage from zinc-bromide chemistry

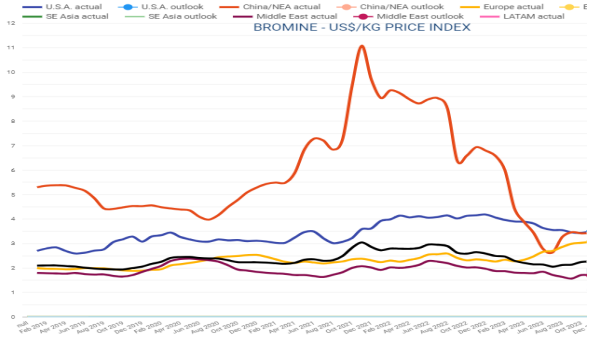
Key sources of battery input materials include bromine and zinc, both of which are mature markets. Figure 6 above highlights the strong cost advantage exhibited by zinc-bromide battery chemistries, particularly when compared to other Li-ion chemistries. Over the past 2 years, the cost of both inputs has been slightly declining or relatively steady, with the only exception being bromine produced from China (this does not affect Redflow's own supply chain).

Figure 7: LME zinc closing prices over the last 2 years (US$/tonne)



Source: LME.

Figure 8: Bromine price US$/kg since Feb 2019 mostly stable (China – in orange – does not affect Redflow)



Source: Business AnalytIQ

Overcoming recent production challenges

Management recently highlighted that daily production yield and planned manufacturing scale up has been impacted by ongoing variation in key materials from a specific supplier during October, particularly around glass-filled high-density polyethylene (HDPE). This is the same issue Redflow experienced previously, with the new batch from the company's supplier also assessed as being below required quality standards.

Ongoing testing and validation of various alternatives with current and new suppliers is being undertaken and is expected to provide a robust alternative. Furthermore, a new engineering approach has been in development over the last six months, involving injection of moulded parts, which would significantly reduce the need for this glass-filled HDPE. The company expects this new approach will be integrated into production by the end of December. Overall quality control is a key priority for management, and Redflow is confident the new solution will be robust and scalable and that it will not impact the delivery timetable for key projects.

Longer-term annual production goal of 500 MWh

The company remains focused on maximising the production capacity and cost efficiency of its Thailand plant. In January 2024, an additional capacity and second shift will commence. Redflow has added manufacturing and assembly capabilities to meet a planned ramp up of Energy Pods, aligned with delivery schedules for key projects.

The implementation of a new material requirements planning system and enterprise resource planning system next year will also aid the company's aim to grow production capacity meaningfully up to 500 MWh per annum over the medium term. The company is also considering various options to meet commercial demand, including a new manufacturing facility and/or contract manufacturing of non-core components.

Commercial Strategy: Recent Contracts, Growth Plans and a Promising Pipeline

Recent major project contract wins

Since June 2023, Redflow has announced over 60 MWh of projects for delivery for major blue-chip customers and partners with significant profiles. This is more than 10x the existing cumulative installed capacity already delivered by Redflow and the largest confirmed order book for the group, highlighting its significant step change in growth and profile that has occurred this year.

Redflow's achievement of securing multi-MWh projects in the US market not only enhances its profile, but also helps validate the investment in its US presence, including resourcing (staff) and capabilities. This follows a strategic decision to position the company to benefit from the significant stimulus for energy storage arising from the introduction of the US Inflation Reduction Act. The execution of past projects, coupled with recent contract wins, is also accelerating additional pipeline opportunities in the US, Australia and other select international markets.

Figure 9: Redflow's notable recent contract wins

Project	Description	Size (MWh)	Location	Partner	Timeframe
CHARGES Project	Flow-battery system for the Valley Children's Hospital in Madera	34.4	California	US Department of Energy	Late 2025
Ameresco Project	Solar energy microgrid at Stewart Air National Guard Base	1.2 to 1.4	New York	US Department of Defense	Second half of 2024
California Energy Commission (CEC) Project	Microgrid project in Paskenta	20	California	California Energy Commission	Q1 FY25
Energy Queensland Project	Energy storage system located in Ipswich	4	Queensland	Energy Queensland	Q2 2024
Acciona Energia Project	Integrate flow batteries at Acciona's clean energy innovation centre	200 (kWh)	Spain	Acciona	2024

Source: Company data.

CHARGES Project – US Department of Energy microgrid project in California

Redflow has been named as the battery provider of the 34.4 MWh long-duration energy storage (LDES) and solar microgrid project, funded by the US Department of Energy (DOE). Redflow is the only Australian company to be selected by the DOE, and the agreement followed a lengthy due diligence process of just over a year. To date, the DOE has awarded funding for 15 LDES projects across 17 states. This particular project will be part of the DOE's US$325m program that is aimed at advancing critical clean energy technologies, adopting renewable energy resources, and strengthening America's energy security.

As part of the project, the Children's Hospital Resilient Grid with Energy Storage (CHARGES) project will install Redflow's behind-the-meter (BTM), zinc-bromide flow battery system for the Valley Children's Hospital in Madera, California. This will occur in collaboration with Redflow's project development partner, Faraday Microgrids, who will purchase the batteries from Redflow. The project is sponsored and co-funded by the California Energy Commission (CEC).

Importantly, the project will allow the hospital to replace diesel generators with cleaner, more cost-effective energy sources to act as a resiliency microgrid, providing a roadmap for other US hospitals and infrastructure to adopt similar energy storage capabilities. During power outages, hospitals require reliable back-up power to continue to perform essential services. Redflow's systems provide a daily cycling application that charges during peak solar periods and discharges over the remainder of the day. By providing 100 hours of back-up power, the project will provide resiliency to this hospital, which is in a region that is often subject to significant power outages due to fires, storm surges, floods, extreme heat, and earthquakes. In the event of such shut-offs, the systems installed will allow the facilities to continue operating. Additionally, the microgrid will be combined with other renewable energy resources to support decarbonisation, deliver cost savings for the hospital, and provide overall grid benefits.

Under the current proposal, the project aims to supply the zinc-bromine flow batteries, enclosed in modular energy pods, by late 2025. This timetable is indicative only and subject to final approvals and legal documentation.

US Department of Defense contract

Redflow's contract with the US Department of Defense (DOD) will see the company renewing an existing microgrid at Stewart Air National Guard base in New York, and adding a long duration energy storage system, to ensure energy resilience for essential operations on the base. The project will be completed in partnership with Ameresco, a well-regarded energy services company with a strong relationship with the US Federal government. Redflow's resilient technology and hibernation feature played a pivotal role in establishing the strategic partnership. Additionally, this microgrid will offer a controllable solar plus storage system, which integrates the battery energy storage system with a solar PV power system. This system is capable of peak shaving (this involves actively controlling demand to minimise short-term spikes, thereby smoothing peak loads and reducing demand charge costs), aligning with the State of New York's objectives for clean energy.

This is the first project announced with Ameresco, one of the largest engineering, procurement and contracting firms in the US. Should this approach prove effective, management expects it has the potential to be implemented across various DOD facilities and critical infrastructure globally, which would provide significant opportunities for Redflow to undertake further similar rollouts. The DOD oversees 450 bases globally and is one of the world's largest procurement organisations. Redflow is the only Australian company to be selected by the DOD.

The initial US$2.83m contract with the DOD's Defense Innovation Unit will deliver a microgrid using 1.2–1.4 MWh of Redflow's LDES system. Deployment is planned for the second half of 2024.

California Energy Commission (CEC) Project

Redflow will deploy one of the largest flow battery systems in the US through its recent partnership with the California Energy Commission (CEC). The company will supply its 20 MWh battery system in Paskenta, a sovereign Native American nation located in Northern California. The microgrid project will benefit this under-served community while putting Redflow on a clear trajectory to help California's clean energy transition to commercialise long-duration energy storage. Redflow has signed a definitive supply agreement with Faraday Microgrids to purchase the required batteries and technical support for the project. Redflow expects to receive approximately US$12m for the system and to generate a positive return at the project level.

Redflow secured a substantial $18m in funding from the CEC for this program, distinguishing itself as one of the rare LDES companies with non-lithium energy storage technology approved for CEC funding (CEC has access or oversight of every LDES provider on the market). According to a June 2023 presentation delivered by the CEC's Mike Gravely, 'Initial system funding is in the 20-40 MWh scale per supplier, with the ultimate goal to increase this capacity to 200-400 MWh a year and help commercialise LDES solutions to be able to compete in the market.'

The CEC's LDES program is important across three key areas for Redflow:

- It helps Redflow to scale up the technology to become globally competitive.
- It accelerates investment, generating benefits of scale and better economies of scale.
- It supports California's energy transition goals, with energy storage a key part of the strategy.

Energy Queensland Project in Australia

Redflow has partnered with Energy Queensland to supply 4 MWh of zinc-bromine battery energy storage as part of a $12m battery project located in Ipswich. The program will support local Queensland companies to develop local industries in battery storage technologies. Following the memorandum of understanding signed between Redflow and Energy Queensland in February 2023, the project is expected to further validate Redflow's LDES technology and its role in energy transition strategies to renewable energy in Queensland and across Australia.

The system installed will manage the transmission power flows in particular regions. The batteries will be positioned near areas of high solar exposure, to store excess solar generated on a transmission circuit during a solar peak, and discharge over the remainder of the day. Final contract negotiations are currently in progress.

Management expects that the project will generate approximately $3.5m of revenue for Redflow and be delivered in 2Q24. The project opens the door to future projects for Redflow in the state, with energy storage demand rising and expected to potentially reach 14 GWh by 2030, according to the Queensland Government Battery Industry Opportunities for Queensland discussion paper.[1] The

[1] The Queensland Gov has also highlighted requirement for 22 GWh potential energy storage demand by 2035, as identified in the report *Battery Industry Opportunities for Queensland, 2022*.

Queensland Battery Industry Strategy is also expected to deliver the Federal Government's investment of up to $100m in an Australian-made battery precinct in Queensland.[2]

The project serves as a strong reference project for utility assets, and a successful implementation will help further develop Redflow's profile and demonstrate its ability to execute large-scale utility projects.

Acciona Energia Project in Spain

Redflow will integrate its zinc-bromine flow batteries into front-of-meter grid applications, with the project giving Redflow a key reference project in Europe. The project includes a 200 kWh pod supplied by Redflow and will integrate the company's technology with front-of-meter grid-participating applications. It will combine batteries with the solar assets at Acciona's clean energy innovation centre in Spain.

Acciona is a Spanish global conglomerate and the world's largest fossil fuel–free utility that exclusively uses renewable technologies. Successful execution has the potential to lead to future utility-scale deployments across Acciona's energy portfolio of renewable energy projects which covers 20 countries including Australia, North America and Europe. Acciona also plans to use Redflow's technology to demonstrate a hybrid solution that includes LDES solutions such as Redflow's and ultracapacitors integrated with solar and wind generation assets, which is aligned with Acciona's strategy of adding storage to existing renewables projects at sites globally and to incorporate storage into projects under development.

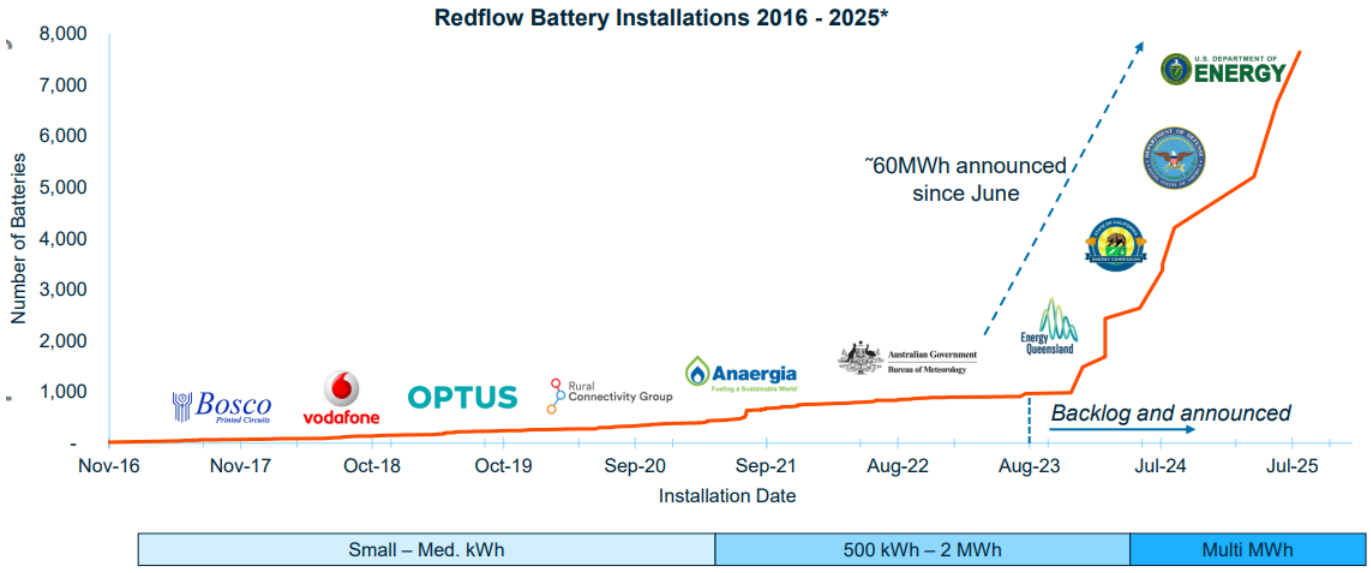
Customer and production growth strategy

Redflow's expects its recently announced projects will increase the company's installed base of battery deployments by more than 10x. All projects will be delivered using Redflow's 200 kWh pod enclosure, which is produced in Thailand. The company's immediate focus is on finalising contract negotiations for these key deals to secure notice to proceed.

The US projects represent the majority of Redflow's global pipeline growth (and is also the largest energy storage market globally). The company has deliberately decided to target major projects in the US with the added incentive of stimulus from US Government policy, including the Inflation Reduction Act. Multi-MWh projects comprise more than 95% of Redflow's advanced pipeline. The US and Australia remain core markets, with both having large LDES energy storage needs. Redflow continues to look to grow its share of project works and is targeting projects with the following characteristics:

- a high dependence on solar shifting and energy arbitrage
- medium to long storage duration focus of 4+ hours
- service industries and applications where safety is paramount (e.g., mining)
- projects that can leverage Redflow battery's hibernation and energy density attributes.

Figure 10: Focus on MWh-scale projects has led to step change in Redflow's industry profile, scale and pipeline impact



*Source: Company data. *Installations based on deployed systems to 30 Aug 2023 currently active and currently expected deployment schedule of recently announced projects.*

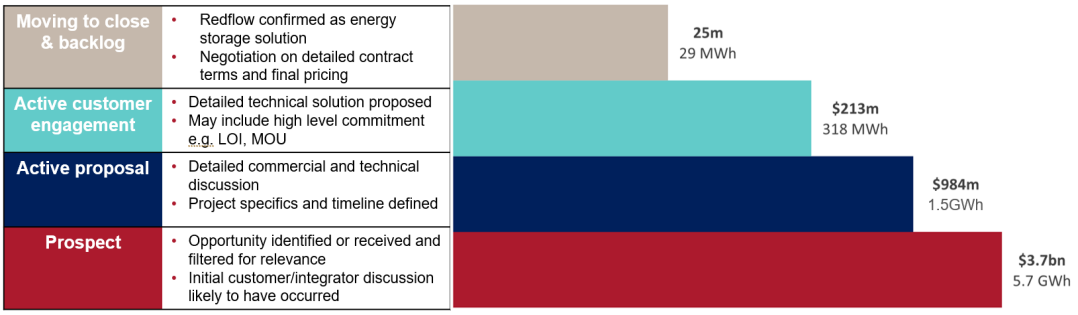
[2] Powering Queensland's battery industry | State Development, Infrastructure, Local Government and Planning

Pipeline

Redflow currently has a qualified sales pipeline of over 6 GWh in projects with a blend of corporate, government and regulated utility customers across various geographies. Broader demand for multi-MWh scale projects has increased significantly as the transition towards cleaner energy sources has accelerated.

Redflow has demonstrated a strong ability to execute on its pipeline, having announced multiple large-scale deals which had previously been flagged as prospects. Pipeline conversion continues to build momentum in the company and is accelerating other opportunities as well. Redflow's pipeline guidance over the past 12 months has been an intentional decision by management to highlight immediate growth priorities and its ability to execute on potential large-scale prospects, adding to the group's credibility. This is important given that earlier project wins are now leading to larger potential project partnerships which, while positive, can also lead to longer sales cycles, more due diligence and a greater degree of complexity for contract acquisition and deployment.

Figure 11: Recent pipeline with 10x increase in size since 2022



Source: Company data.

Figure 12: Notable pipeline highlights

Pipeline	Description	Size	Deployment
Fortune 500 US financial company	RFX named as preferred storage technology in RFI for bank branches and multiple campuses	500 MWh+	2024-26
Health care pipeline	Pipeline of California Health Care resilient microgrids supported by California and US Federal grants	53 MWh	Target 2024-25
Hawai'i large agricultural pipeline	Finalist for multiple multi-MWh agricultural project solar & storage microgrids	17.5 MWh+	2024
Utility remote grid	Initial installation for fringe-of-grid application, providing resilience & power system stability	400 kWh	Target early 2024
Global mining company	Large global mining and renewable company. Engagement since later 2021	100 MWh+	Target initial pilot 2024
Australia IPP	Large IPP sourcing multi-vendor battery solution to meet significant load needs	GWh scale	2024-28
Global IPP	200 kWh pilot likely deployed end of 2023 as demonstration of integration capability with range of renewable energy assets	1 GWh+	Target test system late 2023 1 GWh+ starting 2025
Israeli municipal utility	200kWh pilot deployment contracted as test phase for target full-scale rollout of 100 MWh LDES & solar system	100 MWh	Target 2025
US Federal Government	Storage for resilience applications for US Department of Defense & Department of State	10 MWh+	Second half of 2024

Source: Company data.

Market Context: Demand Provides Strong Macro Tailwinds and Room for Many Competitors

The macro picture: global energy storage is sorely lacking – and governments have noticed

Energy storage will need to grow by up to 400x from today's levels by 2040

The global energy transition continues to accelerate the demand for renewable energy storage, with significant growth needed to help achieve global net-zero emissions targets, including in Australia. Domestically, estimates are that energy storage needs to grow 10–14x to support the national electricity market, according to the CSIRO.[3] Separately, the LDES Council has estimated that LDES solutions need to have scaled up to ~400x present-day levels to 1.5–2.5 TW by 2040 and that approximately 10% of all electricity generated would need to be stored using LDES.[4]

Australian and US governments are taking action and collaborating

Governments, including the federal governments in Australia and the US, are recognising this increasing need with energy storage solutions receiving support through various policies. We note that Redflow is at the forefront of Australia–US clean energy policy collaboration. Redflow was recently a key guest at the signing of the California–Australia Clean Energy MOU in August this year (attended by California's Secretary for Natural Resources, Wade Crowfoot, and Australian Ambassador to the US, Kevin Rudd), where Redflow was highlighted as a key example of a successful Australian clean energy technology that is part of the Australia–US collaboration.

Major initiatives in Australia and the US

Government schemes, including various subsidies, are supporting the development of energy storage technologies and helping accelerate their adoption by industry and users. For example:

- In 2021, the Australian Federal Government released a 'Technology Investment Roadmap: Low Emissions Technology Statement' to guide the accelerated deployment of priority low-emissions technologies in order to help meet long-term emissions targets. The statement covers a number of key technologies including clean hydrogen, ultra low-cost solar, energy storage, low emissions materials, carbon capture and storage as well as soil carbon. Within the technology of energy storage, the statement specifically features Redflow as a leading technology provider of flow batteries.

- The US Department of Energy's (DOE) $325m LDES program is a core part of President Biden's Investing in America agenda, funded by the president's Bipartisan Infrastructure Law. This DOE announcement validates the strong focus by the US government on accelerating the commercial development of key LDES technologies, which is recognised as critical to enabling the transition to a clean, resilient, and cost-effective electricity system. Additionally, the US Inflation Reduction Act, passed in August 2022, includes an investment tax credit for stand-alone storage, which is expected to boost the competitiveness of new grid-scale storage projects.

The solution: long duration energy storage (LDES) steps into the spotlight

Within the energy storage sector, LDES is now firmly on the agenda of governments, utilities and enterprises seeking reliable and clean purchase power agreements to mitigate climate change.

LDES benefits

Increased system flexibility: LDES increases the flexibility of the power system, offering competitive cost and scalability. LDES covers a spectrum of technologies capable of storing electrical energy in various forms for extended periods. These technologies can release electrical energy as needed, covering timeframes ranging from hours to weeks, and providing system flexibility beyond what short-duration solutions such as Li-ion batteries can offer (lithium is typically more suitable for other use cases, including the EV sector).

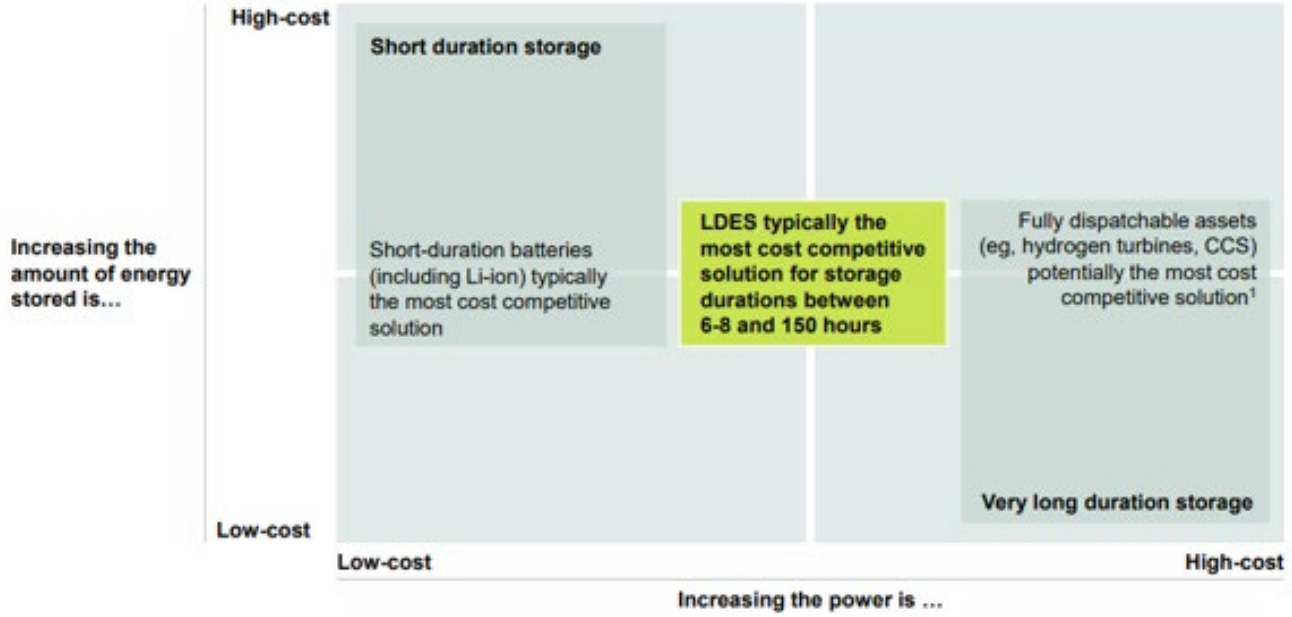
Low marginal costs: One of the key advantages of LDES is low marginal costs for storing electricity. This feature enables a decoupling between the quantity of electricity stored and the rate at which it is

[3] https://arena.gov.au/blog/csiro-roadmap-points-to-big-energy-storage-gap/#:~:text=A%20new%20report%2C%20supported%20by,pioneered%20retrofitting%20renewable%20energy%20storage.
[4] https://www.ldescouncil.com/assets/pdf/LDES-brochure-F3-HighRes.pdf. LDES council has provided additional estimates that up to 8TW of long duration storage is anticipated by 2040 to facilitate the transition to renewables and limit the impacts of climate change (https://www.energy-storage.news/world-needs-collaborative-competition-to-capture-us4-trillion-long-duration-opportunity).

absorbed or discharged. The competitiveness of LDES is driven largely by energy storage capacity costs, which are expected to decline significantly.

Quick to deploy and scale: LDES technologies are widely deployable, scalable, and generally have shorter lead times compared to the upgrading of transmission and distribution (T&D) grids.

Figure 13: The cost advantage of LDES technology – sits in the sweet spot for storage durations of 6–150 hours



Source: McKinsey Energy Storage Insights.

LDES growth trajectory – LDES could store 10% of all required electricity by 2040

Current modelling indicates that by 2040, LDES has the potential to deploy an energy capacity of 85–140 terawatt-hours (TWh), which could account for storing up to 10% of all consumed electricity. This projection aligns with a cumulative investment estimated at US$1.5–3 trillion and a potential value creation of approximately US$1.3 trillion (by 2040), highlighting the significant impact and financial opportunity that LDES presents in the energy sector.

The supply picture: snapshot of LDES technologies

Key types of utility-scale LDES technologies (see Figure 14) include:

- **Clean hydrogen** may become a viable option for seasonal storage to balance renewable generation. Hydrogen can be used in fuel cells, or in turbines to generate electricity
- **Solar thermal energy** is another storage technology that can provide deep storage or be used for high-temperature industrial process heat applications
- **Pumped-storage hydropower** is the most widely used storage technology and it has significant additional potential in several regions. The total installed capacity of pumped-storage hydropower stood at around 160 GW in 2021. Global capability was around 8,500 GWh in 2020, accounting for over 90% of total global electricity storage
- **Flow batteries** are the most scalable type of grid-scale storage, and the market has seen strong growth in recent years. Batteries are projected to account for the majority of storage growth worldwide (see Figure 14). Total installed grid-scale battery storage capacity stood at close to 28 GW at the end of 2022. Installations rose by more than 75% yoy in 2022.

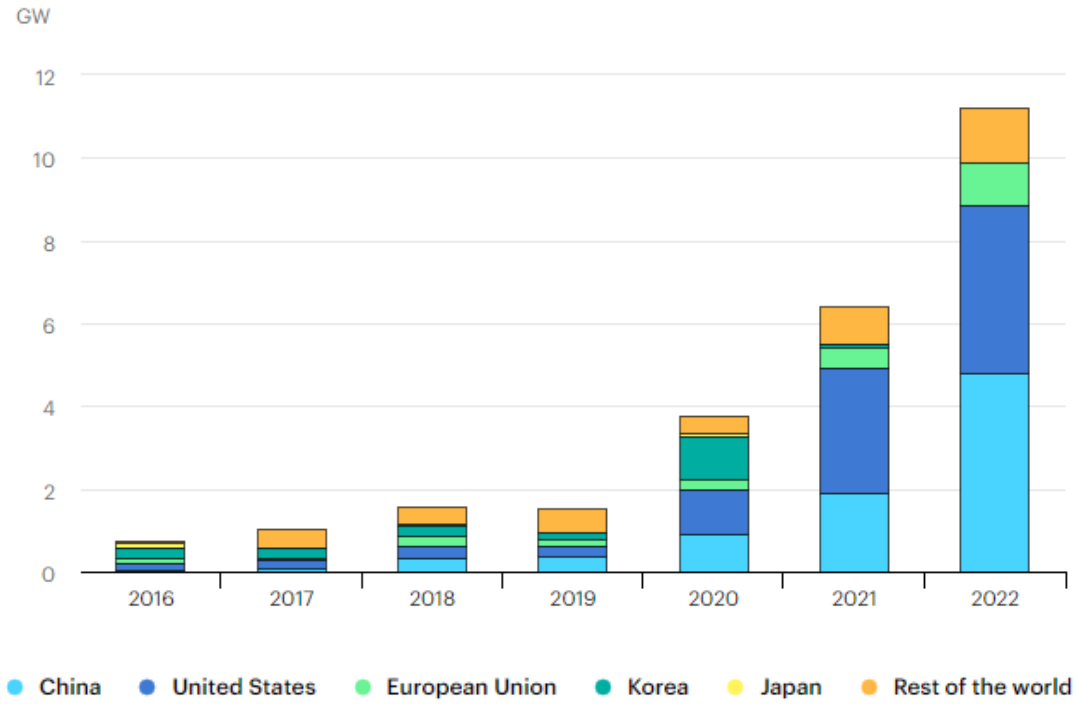
Note that the LDES category does not include important but significantly shorter-duration storage solutions such as Li-ion batteries.

Figure 14: LDES technological categories

	Electrochemical (Redflow)	Mechanical	Thermal
Description	Energy storage sytems generating electrical energy from chemical reactions	Solutions that store energy as kinetic, gravitational potential or compression/pressure medium	Solutions stocking thermal energy by heating or cooling a storage medium
Typical technologies	• Flow batteries (vanadium, zinc-bromide) • Sodium-sulfur • Iron-air • Hydrogen	• Adiabatic and cryogenic compressed liquids (change in internal energy) • Geo-mechanical pumped hydro • Gravitational	• Latent heat (phase change) • Sensible heat (molten salt) • Solar themal energy
Key advantages	• No degradation • Cycling throughout the day • Modular options available	• Considered safe • Attractive economics • Proven technologies (e.g. pumped hydro)	• Able to leverage mature industrial cryogenic technology base • Inexpensive materials • Power/energy independent • Scalable
Key disadvantages	• Membrane materials costly • Difficult to mass produce	• Large volumetric storage sites • Difficult to modularize • Cycling typically limited to once per day	• Reduced energy density • Cryogenic safety concerns • Cannot modularise after install
Key challenges	• Expensive ion-exchange membranes required due to voltage and electricity stress • Less compact (lower energy density)	• Geographical limitations of some sub-technolgoies • Low efficiency of diabatic systems	• Visibility into peak and off-peak • Climate impact on effectiveness • Scale of application (e.g. best for district heating)

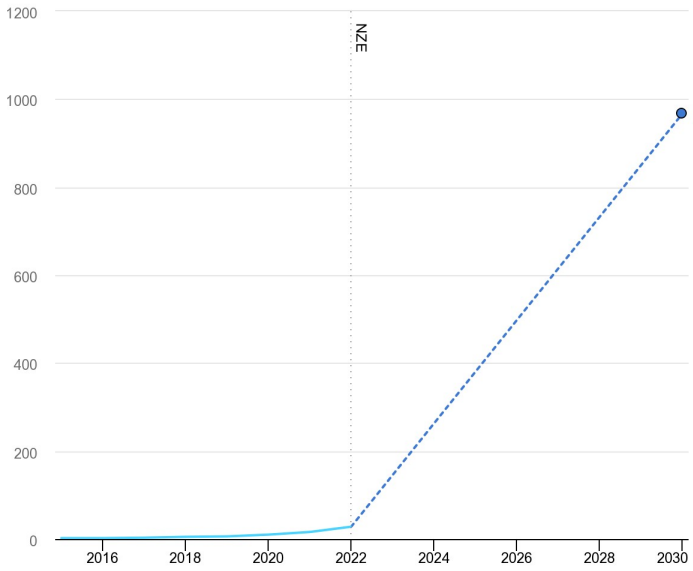
Source: Lazard Research Insights, Department of Industry, Science and Resources.

Figure 15: Annual grid-scale battery storage additions (2017–2022) – a drop in the ocean compared to what is to come



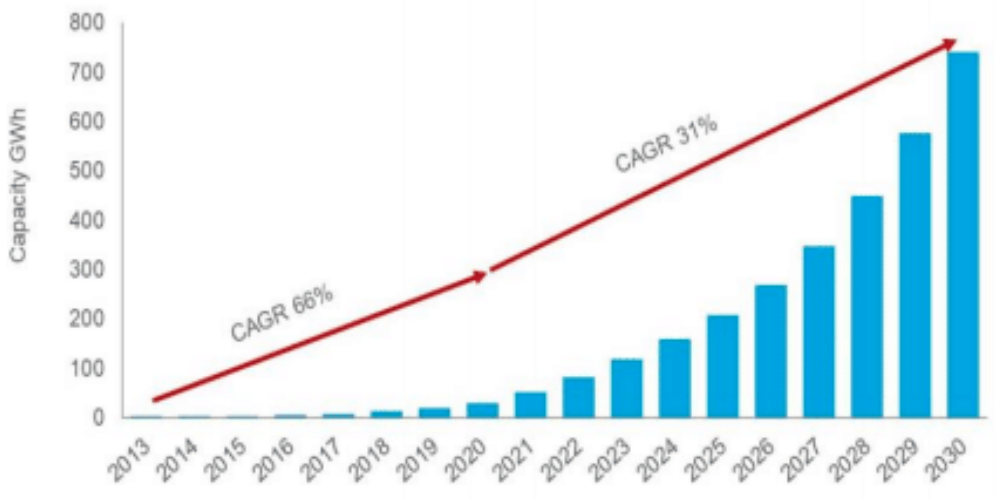
Source: International Energy Agency.

Figure 16: Global installed grid-scale battery storage capacity in the Net Zero Scenario, 2015-2030 (GW)



Source: International Energy Agency.

Figure 17: Cumulative global energy storage deployments (2013–2030) – a drop in the ocean compared to what is to come



Source: Wood Mackenzie.

Figure 18: Summary of existing and emerging flexiblity solutions for flexible duration needs (shorter to longer duration)

Solution Partial solution

Flexibility duration	Power system challenge	Dispatchable generation	Grid rein-forcement	Curtailment or feed-in management	Li-ion batteries	LDES	Demand-side response
Intraday	Intermittent daily generation	✓		✓	✓	✓	✓
	Reduced grid stability	✓			✓	✓	○
Multiday, multiweek	Multi-day imbalances	✓	○	○	○	✓	
	Grid congestion	○	✓	✓	○	✓	
Seasonal duration	Seasonal unbalances	✓	✓			✓	
	Extreme weather events	✓				✓	

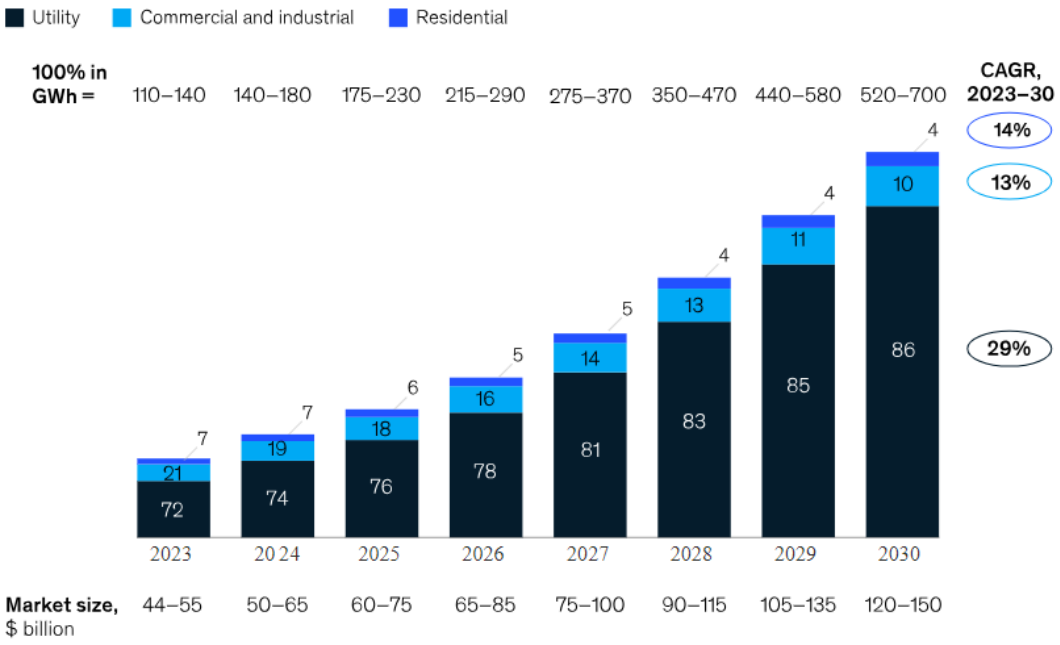
Source: McKinsey Energy Storage Insights.

Battery energy storage systems (BESS): a closer look

Within the LDES sector, the global battery energy storage systems (BESS) market is a growing market, estimated to reach $120–150 bn by 2030, according to McKinsey. The market's infancy means that it is still highly fragmented. The size of the potential market and the scale of the energy storage challenge suggests that multiple competitors will be required to help meet the growing demand.

The BESS market includes battery storage solutions across all durations, from the shorter-duration Li-ion solutions to longer-duration flow battery technologies.

Figure 19: Annual added battery energy capacity forecast to come online (%)



Source: McKinsey Energy Storage Insights. Note: Figures may not sum to 100% because of rounding.

Battery storage is flexible and appropriate for all use cases

Due to the technology's versatility and falling costs, batteries are expected to be increasingly used for renewable energy over the coming years. Batteries provide intraday, multiday and seasonal flexibility.

Intraday flexibility (<12 hours):

Flexibility that provides balancing services in electricity supply and demand (such as peak energy demand in the evening).

- Balancing services < 4 hours: Li-ion batteries are typically a cost-effective zero-emission solution
- Balancing services for 4–8 hours: LDES is one of several options
- Balancing services for 8–12 hours: LDES is the best option

Multiday and multiweek flexibility (12 hours–weeks):

Flexibility that allows day to week long fluctuations in supply and demand to be balanced (such as taking into account weather anomalies).

- Traditional solutions: conventional power plants, electricity supply curtailment, and gradual expansion of the transmission grid
- LDES technologies emerge as a promising zero-carbon solution for these longer-duration needs, especially for several days

Seasonal flexibility and extreme weather events:

Seasonal flexibility needs are driven by the natural variability in solar irradiation, wind speed, temperature, and rainfall, as well as exposure to extreme weather events. To attain global net-zero power by 2040, seasonal flexibility solutions are crucial, particularly in regions with limited potential for a balanced renewable energy portfolio and with restricted regional transmission lines.

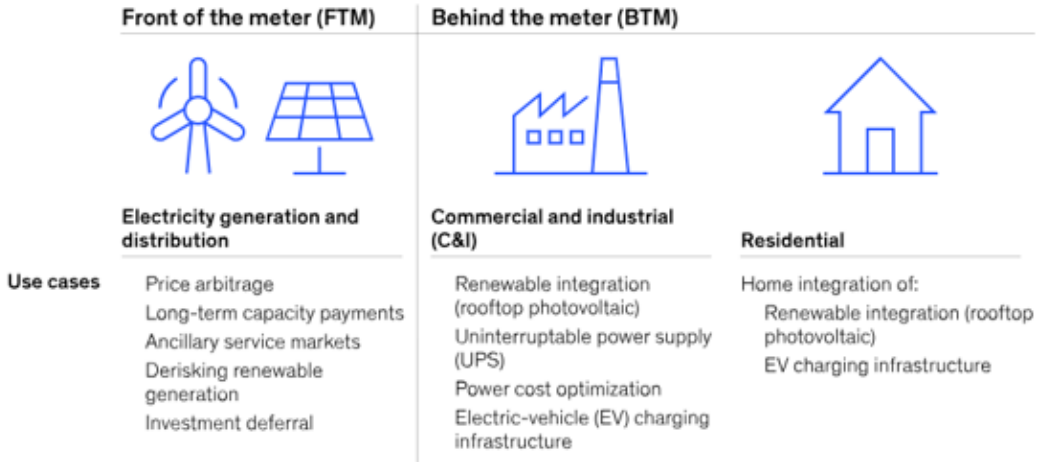
- Other solutions are possible, but LDES has the bonus of enhancing resilience against extreme weather
- Modelling suggests that the adoption of these longer-duration solutions will accelerate when renewable energy penetration reaches 60–70% – to likely be reached in many regions within 10 years

BESS usage markets

BESS are used across the entire energy market, including the electricity generation and distribution, commercial and industrial, and residential segments (see Figure 20). Redflow primarily operates in the behind-the-meter (BTM) segment of the market, specifically the commercial and industry segment. This is the second-largest segment, with a forecasted CAGR of 13% by 2030, and is predicted to reach 52–70 GWh in annual additions by 2030, according to a McKinsey Energy Storage Insights report.

Subsegments of the commercial and industry market include critical infrastructure such as telecommunication towers, data centres and hospitals, which provide temporary backups for power supply during outages and reduce the reliance on traditional sources of back-up energy such as diesel generators. Another subsegment includes public infrastructure, commercial buildings and factories, with BESS systems helping with peak shaving (in key markets like North America, this can be significant given the demand charges that can be applied), integration with other on-site renewables, consumption optimisation, back-up energy supply and the provision of grid services.

Figure 20: Battery energy storage systems (BESS) usage across the energy landscape



Source: McKinsey Energy Storage Insights.

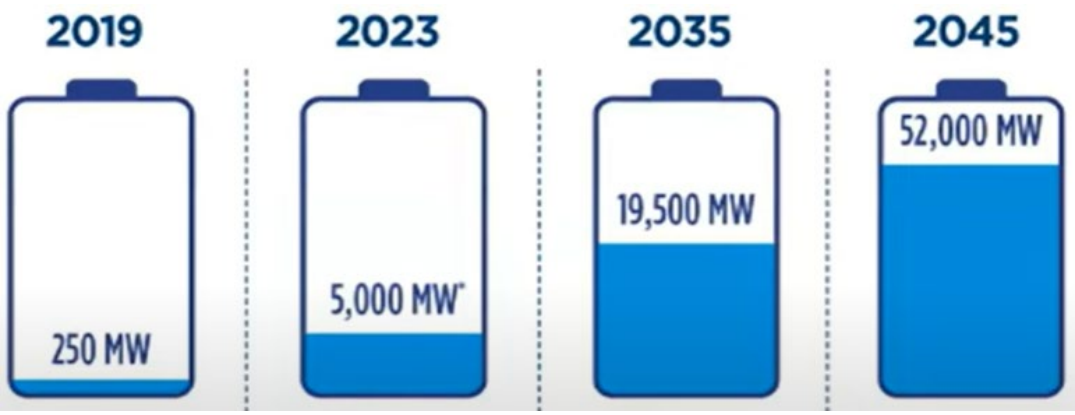
Where Redflow's zinc bromide batteries fit in the BESS landscape

Besides lithium-ion batteries, flow batteries could emerge as a breakthrough technology for stationary storage. Redflow's zinc bromide batteries offer several advantages over other BESS technologies:

- performance: flow batteries can be discharged completely, are long-lasting and are fireproof
- input costs: unlike some other battery materials, zinc and bromine are cheap and readily available throughout the world
- endurance: flow batteries do not show performance degradation for 25-30 years
- flow batteries are capable of being sized, through multiple battery units, according to energy storage needs with limited upfront capex.

Geographic case study: energy storage in California

Figure 21: California's growing battery storage capacity expectations – reflects the state's renewable resource base



Source: California Energy Commission.

California's 5,000 MW capacity of storage currently involves Li-ion storage only. To reach longer-term targets, solutions involving non-Li-ion storage technologies will be required. Current estimates are that about 10% of the LDES (defined as 8+ hours) storage capacity will be provided by non-Li-ion solutions. The Californian state government currently has $190m programmed for the 2023-24 State Budget, to support non-Li-ion long-duration energy storage projects. This followed $140m in investment in 2022–23.

See the Commercial Strategy chapter earlier in this report for details on Redflow's involvement with the 20 MWh Paskenta Microgrid Project, an important step in California's clean energy transition, which demonstrates the California Energy Commission's (CEC) determination to commercialise proven long-duration energy storage. Redflow is one of only four non-lithium manufacturers selected for large-scale LDES projects approved for CEC funding, and is also the only Australian energy storage company in the CEC's high-profile LDES program.

Industry peers: no direct comparables, and plenty of demand to go around

While other non-lithium battery companies exist in Australia, they are yet to commercialise on a national scale. Graphite Group from Western Australia and Li-S Energy remain in the experimental phase, and Gelion, the only other non-lithium battery company in Australia, is listed in the UK and has not yet entered production.

The fact remains that the addressable market for LDES and battery storage solutions remains very large, providing ample scope for multiple providers to succeed in winning project contracts and generating meaningful returns. Whilst Redflow is continually gaining market share and offers unique features to address market demand, it's worth noting that some of its competitors are larger in size and can also offer distinct features of their own.

Figure 22: Notable industry peers

Peer	Market Cap (A$m)	Headquarters	Description	Battery product features according to manufacturers
Eos Energy Enterprises	293	US	Founded in 2008, focusing on developing zinc-powered battery energy storage solutions.	Eos Z3: US-designed and manufactured alternative to traditional rechargeable batteries. They have minimal delivered energy loss, a flat degradation curve that retains 88% of the rated capacity over a 20-year life span and 100% depth of discharge.
Invinity Energy Systems	107	England	Created through the 2020 merger of two flow battery providers, redT energy and Avalon Battery. The company focuses on developing vanadium flow batteries.	VS3-022: Uses vanadium redox flow technology to store energy in an aqueous solution. It has a lower risk profile than other battery storage technology and a lifespan of over 25 years. Large throughput and no marginal cycling costs give the battery the lowest price per MWh stored and discharged over the lifetime of the battery.
Form Energy	*Private*	US	Founded in 2017, the company is developing and commercialising iron-air battery solutions.	The pre-commercial stage iron-air battery product has a 100-hour duration at system costs competitive with legacy power plants. Each individual battery module is the size of a side-by-side washer/dryer set and contains a stack of approximately 50 one-meter-tall cells.
Li-S Energy	122	Australia	Created through two nanomaterial teams from Deakin University Institute of Frontier Materials and BNNT Technology Limited (BNNTTL). The company is developing ways to improve lithium sulfur batteries by integrating nanomaterials.	Improvements were made on the traditional lithium sulfur batteries by integrating nanomaterials, boron nitride nanotubes (BNNTs) and a new nano-composite invention called Li-nanomesh, into cells to enhance strength, life cycle and performance. BNNTs are a revolutionary material due to their physical strength, thermal conductivity, and electrical resistance. The partnership with BNNTTL has allowed Li-S to overcome barriers to purity and cost, although the technology remains at pre-commercialisation stage.

Source: MST Access.

Financials – Forecasts and Key Assumptions

Key assumptions – P&L

Revenues

As shown in Figure 24, we expect delivery of Redflow's project pipeline and full order book to have a significant positive impact on revenues, growing to $27.5m in FY25 and $77.5m in FY26. The recent contract wins are estimated to contribute ~$55m, roughly half of which we expect will fall in FY25. We expect the other half to be received later in FY26 (based on the assumption contract payment and delivery typically occurs over two years), with further contribution from additional project wins as the pipeline continues to be converted. Beyond that, we believe Redflow can continue to grow revenues aggressively as production capacity increases significantly (up to 500 MWh p.a.) and the industry overall grows exponentially to help meet broader emissions targets. We conservatively assume average pricing in FY28 of ~$0.6m per MWh (vs ~$0.9m currently).

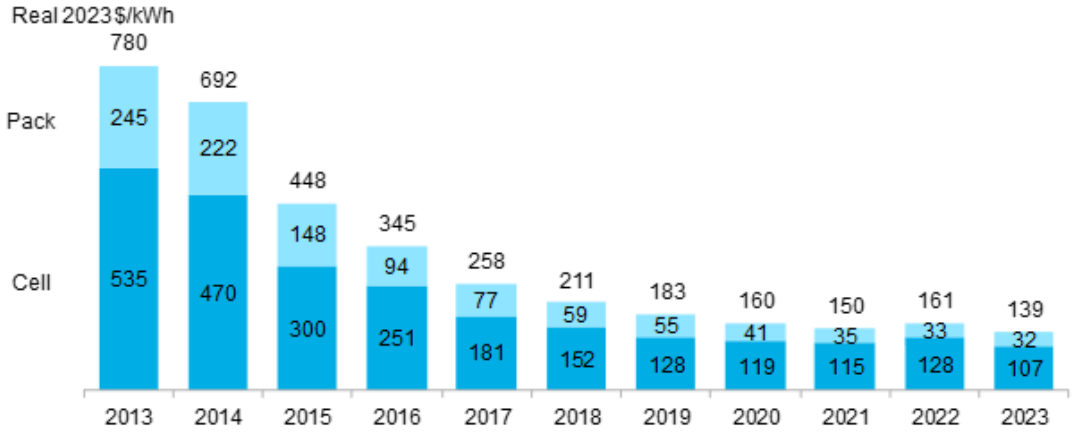
Gross margins

Increased production capacity from added scale will give Redflow a strong basis to achieve meaningful improvements in gross margins, partly from better bulk supplier pricing. We expect scale growth to drive gross margin from mid to high single figures in FY24 (we specifically assume 5%) up to 10% in FY25 and 20% in FY26.

Currently, Redflow's manufacturing facility in Thailand is capable of ~80 MWh of production p.a., with the company planning to bring additional new production online from the start of CY26 (targeting 500 MWh p.a.). Added scale is expected alongside productivity improvements, further process automation, reduced materials wastage and lower labour unit costs. For the industry overall, battery LDES production is still early in its development and on the cost curve, but this is expected to improve as the sector matures, leading to further improvements in battery design and energy yields.

It is also instructive to compare industry gross margins being achieved by existing Li-ion battery producers. Current industry average gross margins are typically in the low double digits, which have matured as the cost and pricing of lithium-ion battery packs and cells have declined over time. We believe that unique characteristics around flow batteries, including their ability to be recycled, lower degradation in discharge output over time, intellectual property protection and longer-duration energy storage, are all drivers of Redflow's better levelised cost of storage (LCOS) advantage, which make its higher upfront pricing competitive and should aid higher gross margins over time.

Figure 23: Volume-weighted average lithium-ion battery pack and cell price split, 2013-23, which is instructive for how flow batteries might evolve



Source: Bloomberg. Historical prices have been updated to reflect real 2023 dollars. Weighted average survey includes 303 data points from passenger cars, buses, commercial vehicles and stationary storage.

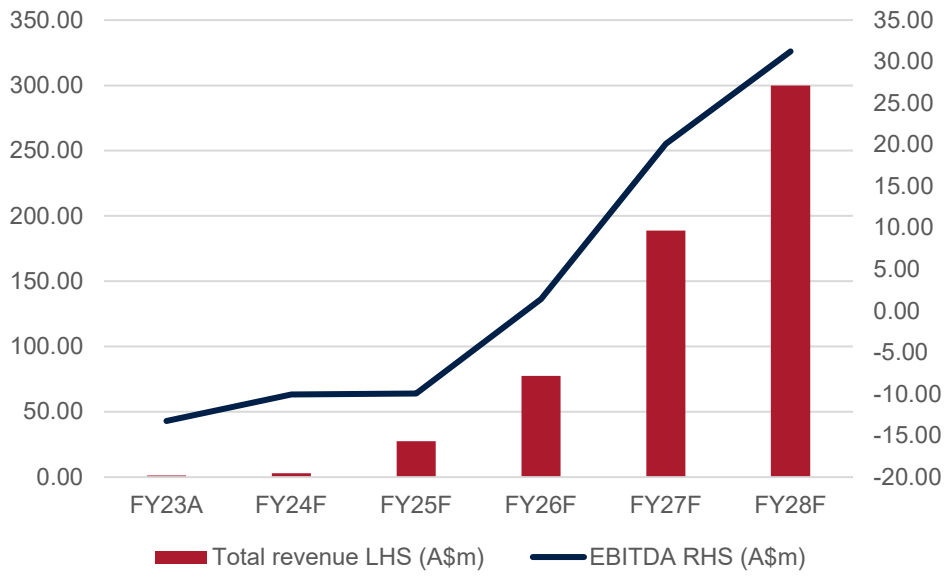
Opex (SG&A)

We expect Redflow's opex to grow by 10% p.a. between FY24-FY26 (from $11.5m in FY23), and to reach 10% of sales (not including cost of goods sold) beyond that initially in FY27-FY28 (as added production capacity comes online), which is broadly in line with industry standards. We expect the business to continue investing in commercial capabilities to position the group to continue acquiring major project deals, which should aid momentum in the company as the market more broadly grows significantly.

EBITDA

Our forecasts translate to Redflow achieving positive EBITDA in FY26F of $1.4m (FY23A was -$13.2m) and $20.1m in FY27F. This translates to positive NPAT by FY27F of $9.8m.

Figure 24: Revenues and EBITDA outlook (A$m)



Source: Company data, MST Access.

Figure 25: Key P&L items (A$m)

	FY23A	FY24F	FY25F	FY26F	FY27F	FY28F
Total revenue	4.7	5.6	28.7	78.7	190.0	301.2
Gross margin	NA	5%	10%	20%	20%	20%
EBITDA	(13.2)	(10.0)	(9.9)	1.4	20.1	31.2
EBIT	(13.8)	(10.6)	(14.2)	(4.4)	14.4	25.7
NPAT	(13.6)	(10.4)	(15.6)	(9.1)	9.8	21.1

Source: Company data, MST Access.

Key assumptions – balance sheet

Cash position

During 1QFY24, Redflow received additional support from new and existing shareholders, raising $11.65m, which will be primarily used to support the customer project pipeline. The receipt of progress payments for existing project deliveries and R&D tax rebates near term will further support cash on hand, providing additional runway.

Funding

As Redflow grows its manufacturing and commercial operations, we assume the business will continue to need additional sources of capital. We assume an additional $80m in capital, split equally between debt and equity, will be raised in FY25 to support the company's aim to increase production capacity. We understand Redflow is still considering a variety of options to increase production, including the construction of a new manufacturing plant and/or partnering with additional parties who could provide outsourced battery production. However, our base case currently assumes Redflow invests in manufacturing capacity and have full ownership of future production.

Furthermore, management has been open that the company continues to seek a cornerstone investor. The FY23 annual results noted that the Board has commenced a strategic review to "accelerate market penetration, achieve scale and maximise shareholder value". According to management, the review is ongoing with engagement across multiple market participants and potential strategic partners.

The company is committed to pursuing all available sources of non-dilutive capital, including government support, to facilitate scaling of manufacturing in target markets, particularly the US and Australia. On 15 November 2023, the US Department of Energy announced up to $3.5b from the

Infrastructure Law would go towards boosting domestic production of advanced batteries and battery materials nationally, prioritising innovative technologies and battery chemistries, in addition to lithium-based technologies.[5] Various other arrangements are also being put in place by state and federal governments in Australia to encourage domestic manufacturing.

Below is a snapshot of recent funding arrangements, including loans and grants, received by various LDES projects and initiatives, demonstrating the increasing support being received particularly from stakeholders, including governmental organisations. Redflow expects to target various initiatives going forward to support its production plant, capex and project needs, particularly those which are non-dilutive to existing shareholders.

Figure 26: Funding

Date	Company	Funding (US$m)	Description
Pending approval	Nostromo Energy	189	Nostromo provides ice-based energy storage solutions and has submitted a Part II application for a $189m loan from the US DOE to deploy 275 MWh of Distributed Energy Storage Systems.
August 2023	Eos Energy Enterprises	398.6	The US DOE has given a conditional commitment to Eos for a loan guarantee of up to $398.6m for the construction of up to four production lines to produce Eos's battery energy storage systems in Turtle Creek, Pennsylvania.
August 2023	Form Energy	12	Form Energy was awarded a $12m grant from the New York State Energy Research and Development Authority to accelerate the development of a 1000 MWh iron-air battery system in New York State.
July 2023	VoltStorage	32	Munich-based VoltStorage has been financed €30m by the European Investment Bank to develop and commercialise vanadium redox flow batteries as well as scale up iron-salt battery technology.
June 2023	ZincFive	80	ZincFive, a nickel-zinc battery–based solutions provider, has partnered with Orion Infrastructure Capital. The capital investment will provide ZincFive up to $80m via a term loan to fuel the company's developments.
January 2023	Energy Dome	18.5	Milan-based Energy Dome won $18.5m in grant and equity financing from the European Innovation Council, the maximum amount available. This will help to scale the company and deployment of CO_2 batteries around the world.
November 2023	Quidnet Energy	10	Quidnet Energy was selected to receive $10m in funding from the US DOE Advanced Research Projects Agency – Energy. The funding will support Quidnet's project to create long-duration energy storage that does not require the mountainous terrain often associated with other LDES solutions, including hydro.
October 2022	e-Zinc	7	e-Zinc closed a $7m venture debt facility with Silicon Valley Bank. The funding will help further the company's commercialisation efforts and execution on high-value pilot projects such as the Toyota Tsusho Canada Inc. project as well as its partnership with California Energy Commission.
January 2022	LAVO	3.2	LAVO secured A$5m in NSW Government funding to expand prototyping, testing and pilot manufacturing for the LAVO Hydrogen Energy Storage System in Tomago in the Hunter Region of NSW.

Source: MST Access.

[5] Biden-Harris Administration Announces $3.5 Billion to Strengthen Domestic Battery Manufacturing | Department of Energy

Valuation Methodology

We have used a discounted cash flow (DCF) analysis and peer multiple valuation to derive a fair value of $0.32/share for Redflow.

DCF implies $0.32/share

Our DCF valuation is based on conservative assumptions, including:

- WACC of 16.0%
- a terminal growth rate of 2.5%
- an equity risk premium of 8.0%
- beta of 2.0.

Figure 27: Discounted cash flow valuation

DCF Valuation (A$m)		FY24F	FY25F	FY26F	FY27F	FY28F	FY29F	FY30F	FY31F	FY32F	FY33F	FY34F
Total EBITDA		**-10.0**	**-9.9**	**1.4**	**20.1**	**31.2**	**34.4**	**37.8**	**41.6**	**45.7**	**50.3**	**55.3**
Corporate Tax Paid		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-15.1	-16.6
Change in working capital		-0.3	-1.8	-5.8	-13.9	-15.0	-1.8	-1.8	-1.9	-1.9	-2.0	-2.0
Total Capital expenditure		-1.0	-36.7	-18.3	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7
Free cash flow		**-11.3**	**-48.4**	**-22.7**	**2.6**	**12.5**	**28.9**	**32.3**	**36.0**	**40.1**	**29.6**	**33.0**
PV of perpetual free cash flow	68	Risk free rate				4.5%		Cost of debt (before tax)				8.0%
Enterprise Value	**132**	Equity market risk premium				8.0%		Tax rate				30.0%
Net Debt	-5	Net debt/net debt + equity ratio				30%		Cost of debt (after tax)				5.6%
Equity Value	**137**	Equity beta				2.00		**WACC**				**16.0%**
Number of shares on issue (Fully Diluted)	427.1	Cost of equity				20.5%		**Terminal growth rate**				**2.5%**
Value per share	**0.32**											

Source: MST estimates.

In addition, we have made the following financial assumptions for the period covering FY29F–33F, for which we do not have explicit forecasts:

- EBITDA growth of 10% p.a. due to continued strong growth from FY29 onwards as economies continue to prioritise emission reductions and need LDES solutions to enable this
- the company does not pay any cash tax until towards the end of our forecast period (FY33). Redflow currently has ~$150m in retained losses which will provide ongoing tax benefit for some time
- capex of $36.7m in FY25 and $18.3m in early FY26 to support additional production capacity development (total $55m)
- working capital grows significantly over the next 10 years to support additional production capacity
- fully diluted share count of 427m shares which assumes additional issuance from further equity injections (we conservatively assume $40m equity capital raised in FY25 at $0.20 per share, slightly above the current share price).

These assumptions generate a fair value for Redflow of A$0.32 per share, which implies upside to the current share price. While we believe our DCF valuation methodology is sound, we recognise that its very sensitive to certain assumptions, hence our conservative approach.

Peer comparison

While we highlight notable peers, the early stage of development for the industry overall also means it is difficult to apply meaningful market multiples at this stage, although this will evolve as the sector matures. Of the peers we highlight above in Figure 22, we see the most comparable provider as Invinity Energy Systems (market cap of A$107m), which has been developing its own flow battery storage solution (using vanadium) over a similar timeframe for the past 17 years. The group has deployed or contracted 75 MWh with customers across 70 projects in 14 countries.

Positive catalysts for share price and valuation: ramp-up to full production and execution of existing projects key

We believe that Redflow has significant potential for further share price and valuation upside.

Ramp up to full production: Redflow's near-term focus is to fully ramp up production to successfully execute on recently won contracts – this would be a key share price catalyst. The company now has a clear line of sight to full production with the introduction of a new engineering approach of injection-moulded parts which significantly reduces the need for glass-filled HDPE. This new approach has been in development over the past six months.

Strategic partnerships and contract wins: Strategic partnerships with potential funding partners and additional major contract wins would provide more certainty on Redflow's medium- and long-term future, which would improve the stock's valuation.

Capital and operating cost optimisation: Operating cost savings would have a positive impact on margins and cash flows and would reflect well on the company's management team, likely boosting the valuation. As projects advance, there is an opportunity to optimise and improve on our current estimates, which could lead to an increase in the project valuation, particularly in power cost savings.

Key risks to share price and valuation: offset by significant contract pipeline, strong projected returns

We believe that the risks to our valuation and share price, detailed below, are offset by:

- battery IP created through extensive R&D efforts over the last 15 years
- significant contract pipeline and prospects in tier-1 markets (US and Australia)
- expertise of management and relationships with key industry stakeholders.

Funding shortfall risks: A shortfall in capital would force Redflow to reduce the scope of its activities, which could adversely affect its business, prospects, financial condition, and operating results.

Ramp-up delay: Redflow has begun production at the Thailand factory and is focused on ramping up production. Issues with this could delay projects and ultimately revenues/cash flows and reflect negatively on management.

Operating cost increases: Operating cost increases would negatively impact margins and cash flows, reflect poorly on the company, and hurt the valuation.

Poor product and performance: High-complexity products have an inherent risk of containing defects or underperforming. Redflow has not tested its battery over its operating life, either in the field or in simulated conditions.

Competitive risks: Redflow operates in a highly dynamic market with strong domestic and global competition, such as other LDES companies. Some competitors are larger, with greater financial, technical and human resources. Redflow has little control over its competitors' actions, which may hurt its own market share and performance. This risk is mitigated by Redflow's strategic partnerships and continual research and development into high-quality products, technologies, and ways to improve operating costs.

Personnel risks: The growth of Redflow and the development/quality of its product offerings is highly dependent on leadership within the group. However, the group has taken significant steps to help the business mature and reduce its dependency on key personnel.

Currency risk: Redflow receives most of its revenue and incurs most of its costs in US and Australian dollars. Any changes in the AUD/USD exchange rate would have a direct and immediate effect on Redflow's financial and operational performance.

Government policy changes: The industry in which Redflow operates is constantly subject to government action and changes in government policy. In particular, changes in relation to intellectual property protection, taxation and trade restrictions could negatively impact Redflow.

Legal risk: Redflow provides its products to customers globally, and thus is governed by the applicable laws and regulations in the countries in which it operates, including property or environmental regulations, and must cater its operations to such legal frameworks to ensure compliance. Breaches or non-compliance with these frameworks could result in penalties and other liabilities.

Board of Directors and Management Team

Board of Directors

Brett Johnson – Non-Executive Chairman: Mr Johnson has over 18 years' experience as a director of listed companies, including Scott Corporation, Helloworld and Cashrewards. At Scott, Mr Johnson was the only Independent Non-Executive Director representing minority shareholders and chaired the Audit Committee. At Helloworld, he was the Chairman from August 2014 to December 2015. At Cashrewards, Mr Johnson was the Chairman from August 2020 to December 2021, when it was acquired by ANZ Bank. He has over 25 years' experience as General Counsel of listed Australian companies, including Qantas Airways (1995–2012). He is also currently the Chair of Allotrac Limited's Advisory Board. He is Chairman of Redflow's Board and a member of the Audit & Risk Committee.

John Lindsay – Non-Executive Director: Mr Lindsay has an extensive background in senior leadership positions. Previously, he held roles as CTO at iiNet Limited, CTO at Internode and General Manager of Chariot Internet. He was a Director of the Telecommunications Industry Ombudsman until February 2023, and was a Non-Executive Director of Uniti Group until it was acquired by the Morrison Brookfield Group in 2022. Mr Lindsay is a Graduate of the Australian Institute of Company Directors (GAICD) and a director at Ultra Commerce Ltd and Clevertar Pty Ltd. He is a member of Redflow's Audit & Risk Committee.

David Brant – Non-Executive Director: Mr Brant has more than 20 years of Managing Director experience running a number of businesses in Asia for IMI plc, a UK-based FTSE 200 company. He spent 13 years at the executive board level for the Norgren Group of companies focused on manufacturing automation, including establishing a China-based global manufacturing and technology design centre. Mr Brant worked for Redflow as VP Strategy and Corporate Development (2010–2012) and ran his own start-up energy storage business, Energy 365 (2014–2017). He is on the board of Loddon Mallee Housing Services and is a Fellow of the Australian Institute of Company Directors.

Adele Fraser – Non-Executive Director: Ms Fraser is the Chief Financial Officer at Australian Naval Infrastructure, before which she held management positions at PwC in South Africa and Australia. She has an honours degree in Financial Reporting, Auditing, Taxation and Management Accounting, and a Graduate Diploma of Chartered Accounting. She is a Fellow of Chartered Accountants Australia and New Zealand (FCA) and a GAICD. Ms Fraser is currently the Chair of Redflow's Audit & Risk Committee.

Management Team

Timothy Harris – Managing Director & CEO: Mr Harris has an extensive background with international companies. He was previously Chief Commercial Officer at New Zealand's largest telecommunications infrastructure company, Chorus. He spent a decade in senior executive roles with BT, the UK's largest provider of fixed-line, mobile broadband and media services with operations in 180 countries.

Tim MacTaggart – COO: With expertise in clean technology and a background in technology commercialisation, Mr MacTaggart came to Redflow from Queensland University of Technology where he was the Chief Entrepreneur in Residence at QUT bluebox, collaborating with startups, entrepreneurs, and investors to commercialise innovative research and technologies. In 2019, Mr MacTaggart returned to Redflow as Chief Deployment Officer, later assuming the position of Chief Operating Officer.

Steve Hickey – CTO: Mr Hickey is a seasoned electrical engineer with deep expertise in Redflow's battery technology and skills spanning product development, testing, measurement, and modelling. He co-founded Blastronics (later renamed Texcel) in 1988 and joined Redflow in 2008 as a Test Engineer, working on the initial zinc-bromine flow batteries. From 2012 to 2014, he was on secondment with Ktech-Raytheon in the US, focusing on system development. After a stint as an MRI engineer with Magnetica, Mr Hickey returned to Redflow, taking up the role of Chief Technology Officer in 2020.

Mark Higgins – CCO: Mr Higgins is a globally recognised figure in energy storage strategy and a seasoned executive with extensive connections across North America's energy sector. He previously chaired the US Department of Commerce's Renewable Energy & Energy Efficiency Advisory Committee and co-founded Resilient Earth Ventures, where he also serves as a venture partner. He was the COO and a board member of Strategen, overseeing its global consulting business and managing company operations. Past leadership roles include positions at PG&E, SunEdison, Fotowatio Renewable Ventures (FRV), and MMA Renewable Ventures, and involvement with California Energy Storage Alliance and the Vehicle-Grid Integration Council.

Eric Chainet – GM Redflow Thailand: Mr Chainet is an experienced Materials Engineer and Manufacturing Manager. He has a Masters in Materials Engineering from California State University, Northridge and experience leading manufacturing processes in the metals, packaging and automotive industries. Mr Chainet's primary focus is to drive volumes, efficiencies and quality control in the fabrication of Redflow batteries and pods.

Methodology & Disclosures

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This report has been prepared and issued by Michael Youlden of MST Access.

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