JOHNSON ENERGY CONSULTING

Project: Sporting Association

February 2026

Supply address: NSW

Report prepared for Example Solar Company

Contents

ABOUT THIS REPORT

This report identifies solar investment options to maximise the rate of return based on current and projected requirements.

Key outputs:

Scenarios
3 scenarios have been modelled using sophisticated simulation software. From this, multiple solutions have been ranked according to the net present value of their cash flows over 10 years.

Solutions
Top ranking solutions are summarised with key metrics in this document, and a link to detailed analysis of cash flows, energy flows and emissions.

Downloads
Monthly cash flows, and energy flows in 30 minute intervals can be downloaded from the solution analysis for further modelling.

Financing
PPA, lease or rental finance options can be modelled if required.

SUMMARY OF FINDINGS

Based on my analysis, the solution with the highest ROi is a solar-only solution of a 320kW system with a 20.9% return.

But if the client is interested in maximising future cash flows, scenario 3 with solar and a battery exposed to the wholesale market for energy trading will deliver over $742k over 15 years.

Energy trading modelling has been done using very conservative spot market forecasting.

For each scenario, a link is provided showing full details of the analysis including downloads of energy and cash flows, along with links to all assumptions etc.

In the notes section I've listed a few things that may be worth considering as they will impact this analysis.

Thanks

Tim

REQUIREMENTS

Requirements for this report are confirmed below.

Scope	Deliverables	Feasibility report with 3 scenarios.
	Date due	Feb 2026
Scenarios	Scenario 1	Solar
	Scenario 2	Solar + Battery
	Scenario 3	Solar + Battery + Trading
Site	Number of sites	1
	Number of NMIs	1
	Existing solar	42.8kW
Analysis	Solar	Yes
	Battery BTM	Yes
	Battery FTM	Yes
	Tariff review	No
	Outage reduction	No
	EV chargers	No
	Other	No
Financing	Capex	Yes
	PPA	No
	Lease	No
Documents	Recent bill	Yes
	Meter data	Yes
	Available space for PV	Estimated using OpenSolar - see Appendix 1.
	Solar quote	No

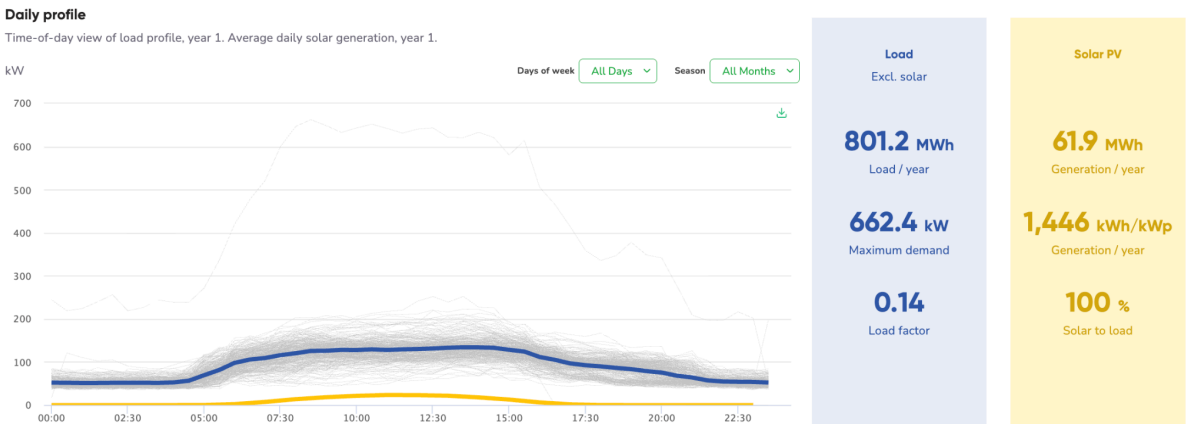
CURRENT STATE

Current consumption

Thank you for sharing meter data for 1 Nov 2024 to 1 Nov 2026.

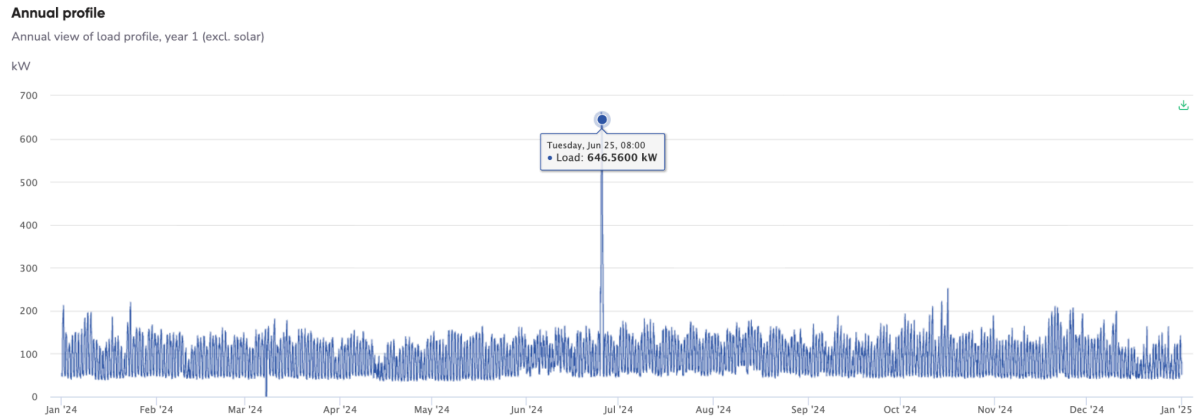
This has been used as the basis for forecasting future consumption with 0% growth assumed.

The existing solar system has been included in this assessment assuming 100% self consumption.



The usage, charted below in a calendar year, shows a large spike in demand on the 25th of June.

If this spike is unlikely to occur in future, please advise and I'll remove it and adjust the analysis.



Current rates

Shared electricity bills have been summarised in the table below.

All charges have been applied to volumes from the data above to create the estimated annual bill below.

Network demand charges make up 47% of the bill and a key opportunity to reduce costs on this site. A change to a tariff with different TOU timings may further reduce costs post-installation.

Expected bill (baseline)

(excl. GST)
$260,372.03

Retail Charges (ex.GST) — $111,638.83

Fixed Charges

Item	Time	Rate	Amount
Metering Charge	365 days	$8.699/day	$3,175.14
Daily Charge	365 days	$1.507/day	$550.08
AEMO Connection Point Fee	365 days	$0.032/day	$11.67
Fixed Charges total			**$3,736.89**

Volume Charges

Item	Quantity	Rate	MLF	DLF	Amount
Shoulder	373,259.4 kWh	$0.127/kWh	1.0	1.0509	$49,816.81
Peak	166,562.4 kWh	$0.127/kWh	1.0	1.0509	$22,230.12
Off Peak	198,387 kWh	$0.105/kWh	1.0	1.0509	$21,890.91
Volume Charges total					**$93,937.84**

Other Usage Charges

Item	Quantity	Rate	DLF	Amount
LRET	738,208.8 kWh	$0.009/kWh	1.0509	$6,982.05
SREC	738,208.8 kWh	$0.006/kWh	1.0509	$4,654.70
NSW ESS Charge	738,208.8 kWh	$0.002/kWh	1.0509	$1,551.56
AEMO pool fees	738,208.8 kWh	$0.001/kWh	1.0509	$775.79
Other Usage Charges total				**$13,964.10**

Network Charges (ex.GST) — $148,733.20

Fixed Charges

Item	Time	Rate	Amount
Network	365 days	2,276.2276c/day	$8,308.23
Fixed Charges total			**$8,308.23**

Volume Charges

Item	Quantity	Rate	MLF	DLF	Amount
Peak	104,112.6 kWh	7.3723c/kWh	1.0	1.0	$7,675.50
Off Peak	634,096.2 kWh	1.68c/kWh	1.0	1.0	$10,652.84
Volume Charges total					**$18,328.34**

Demand Charges

Item	Quantity	Time	Rate	Amount
Capacity	620.7 kVA	365 days	53.8935c/kVA/day	$122,096.63
Demand Charges total				**$122,096.63**

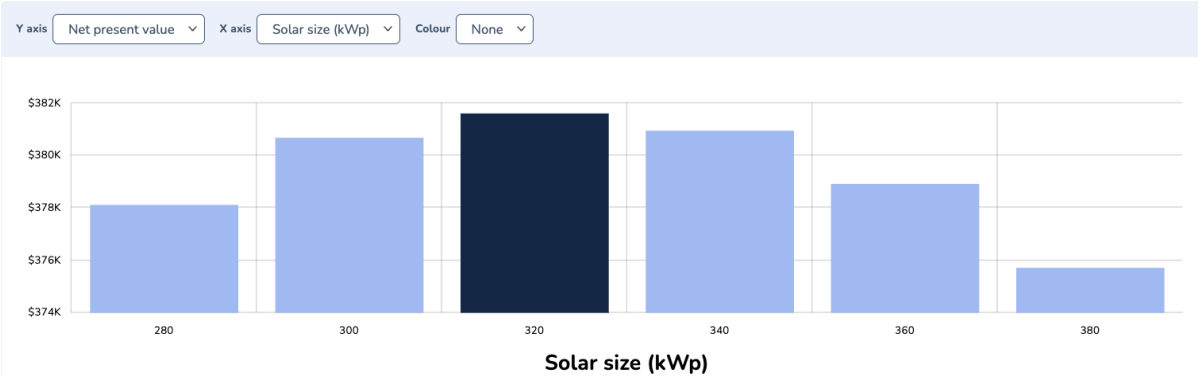
KEY ASSUMPTIONS

Below are the key assumptions used in modelling.

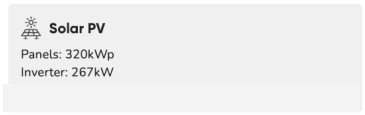
Scope	Analysis period	15 years
	Start date	1 March 2026
	Ranking metric	Net Present Value (NPV) with a discount rate of 5%
	Available space for new PV	Up to 420kW . See appendix 1
	Export limit	30kW
	Feed-in-tariff	None
	Inflation	2.5% applied to power bill charges, maintenance, replacement
	Rebates reviewed	LGCs, STCs
Solar	Array	Rooftop. Orientation: 17°. Tilt 2° System losses: 14%
	Generation	1,319 kWh per kW of solar per year
	Brand	Generic
	Upfront cost	$xxx/kW. Includes panels, inverter, labour, shipping, racking, BOS
	Ongoing cost	0.5% of upfront cost per year
	Degradation	0.45% per year
	Replacement	None modelled
	Inverter size	1.2 times the nameplate PV output (kW)
Battery	Brand	Generic Li-Ion
	Set up	AC Coupled
	Degradation	1.6% per year
	AC inverter efficiency	100%
	Max depth of discharge	90%
	Round trip efficiency	85.8%
	Standby losses	5%
	Speed / duration	2hr batteries were modelled
	Upfront cost	$xxx/kWh.
	Ongoing cost	0.5% of upfront cost per year
	Replacement	None modelled
Markets	Spot price data	NSW 2024 historical price per MWH - 30 minute intervals
	Spot price escalation	0% per year. This is conservative. See appendix 2

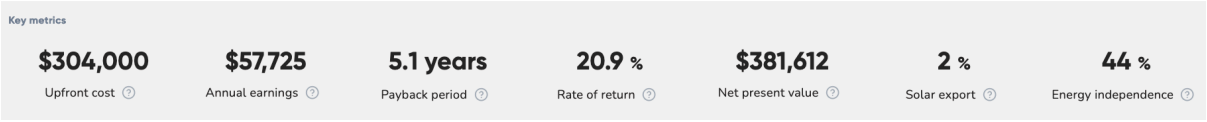
SCENARIO 1: Solar only

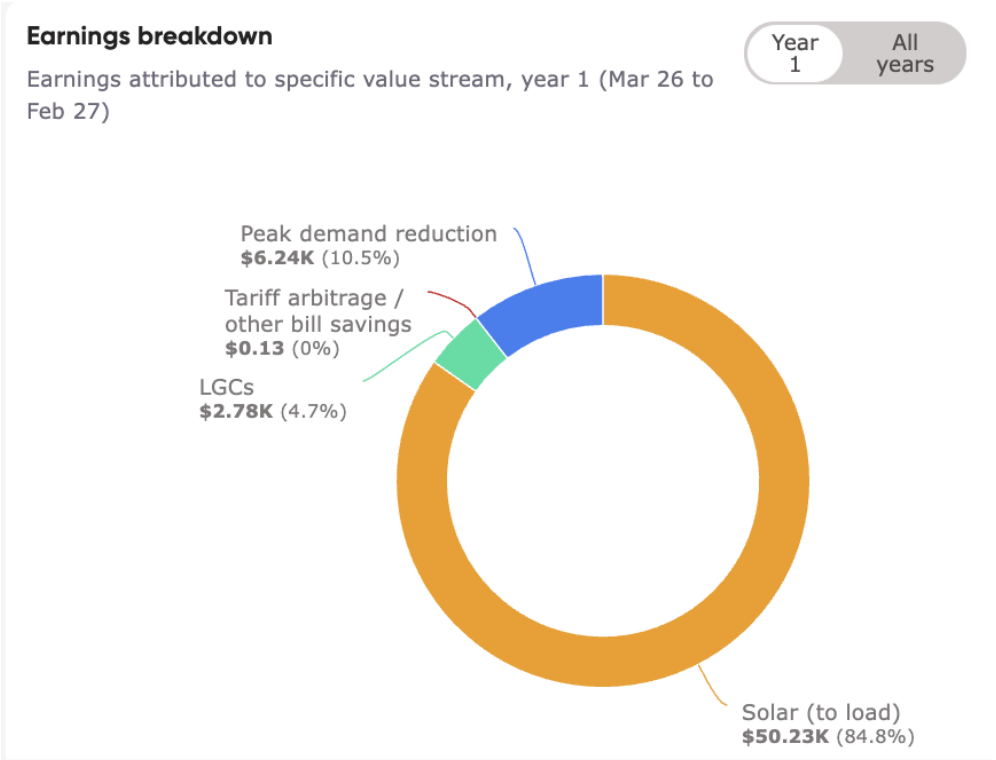
Multiple solar system sizes were compared based on the net present value of cash flows forecast over 15 years with a 5% discount rate. The top ranking was a 320kW system.



[Click here](#) to see full details of the analysis of this top ranking solution. Includes downloads.

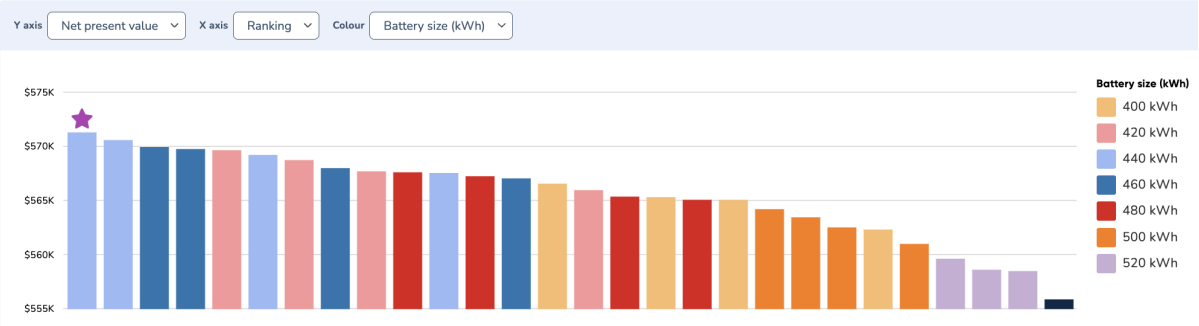






SCENARIO 2: Solar + Battery

Multiple solar + behind-the-meter battery system sizes were compared based on the net present value of cash flows forecast. The top ranking solution has 400kW of solar + 440kWh of storage.



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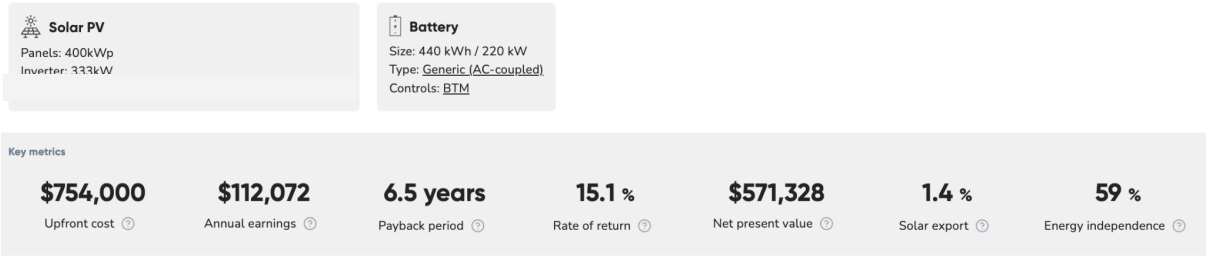
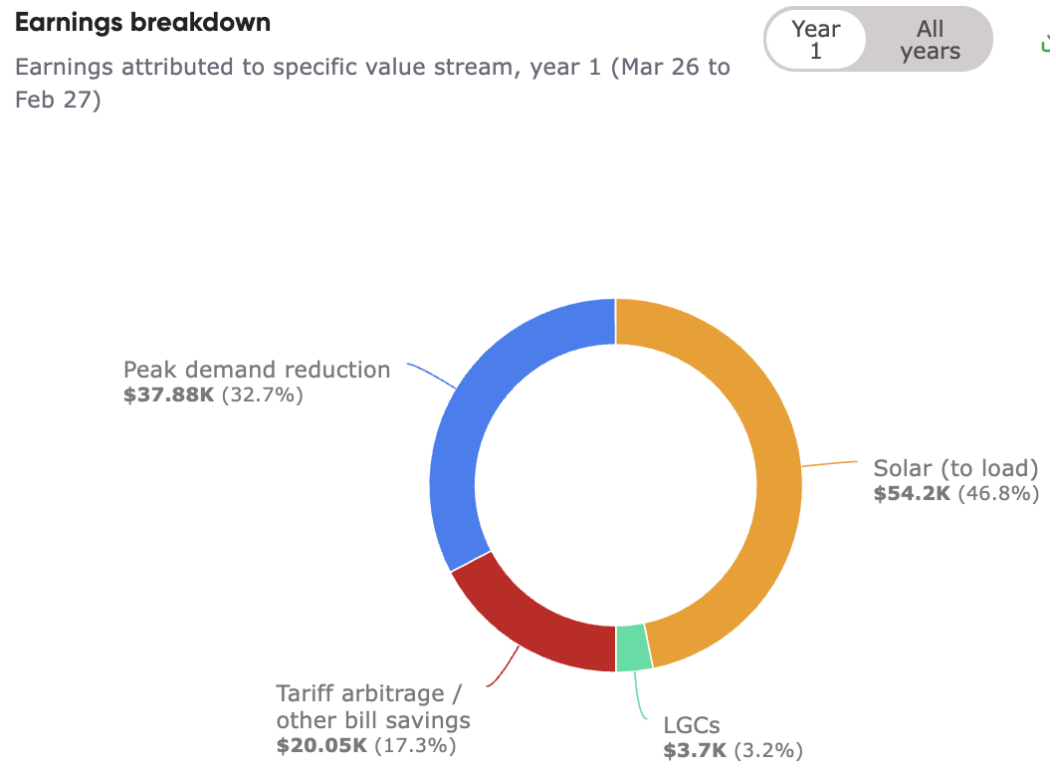
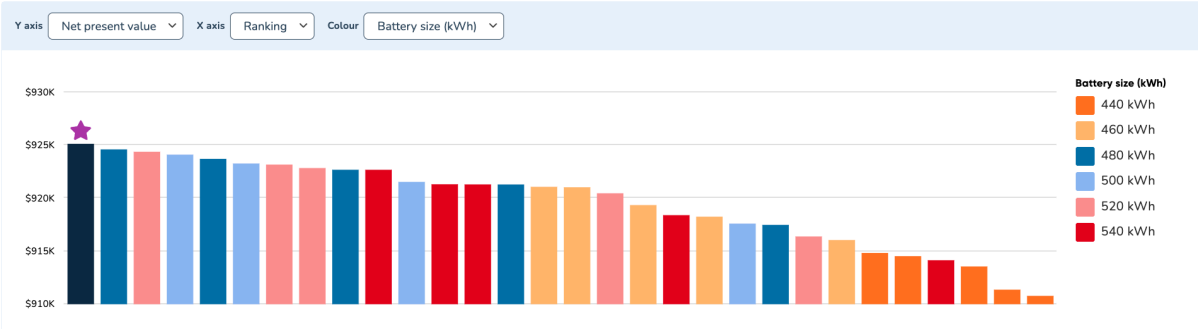




SCENARIO 2: Solar + Battery + Trading

Multiple solar + battery systems were compared based on the net present value of cash flows forecast - with the addition of wholesale energy trading via a market exposed child meter. The top ranking solution has 260kW of solar + 500kWh of storage.



[Click here](#) to see full details of the analysis of this top ranking solution. Includes downloads.

Note that this scenario includes a $15k upfront battery setup fee paid to a battery aggregator and a 30% revenue share on all wholesale energy trading revenues.

Solar PV
Panels: 260kWp
Inverter: 217kW

Battery
Size: 500 kWh / 250 kW
Type: Generic (AC-coupled)
Controls: FTM

Tariffs
Child (battery): added: Wholesale Passthrough

Aggregator
Customer share of energy trading revenue: 70%

Key metrics

-$687,000	$124,393	$1.36M	6 years	$744,899	19.3 %
Upfront cashflow Year 0	Net cashflow Year 1	Accumulated cash All years	Simple payback	Net present value	Rate of return

Aggregator - commercial terms

Customer share of energy trading revenue	70%

Child meter electricity bills: For the project duration, Battery Aggregator pays/receives

All other electricity bills: For the project duration, Customer pays/receives

All upfront costs: Customer pays 100%

All ongoing costs (O&M & replacement capex): For the project duration, Customer pays 100%

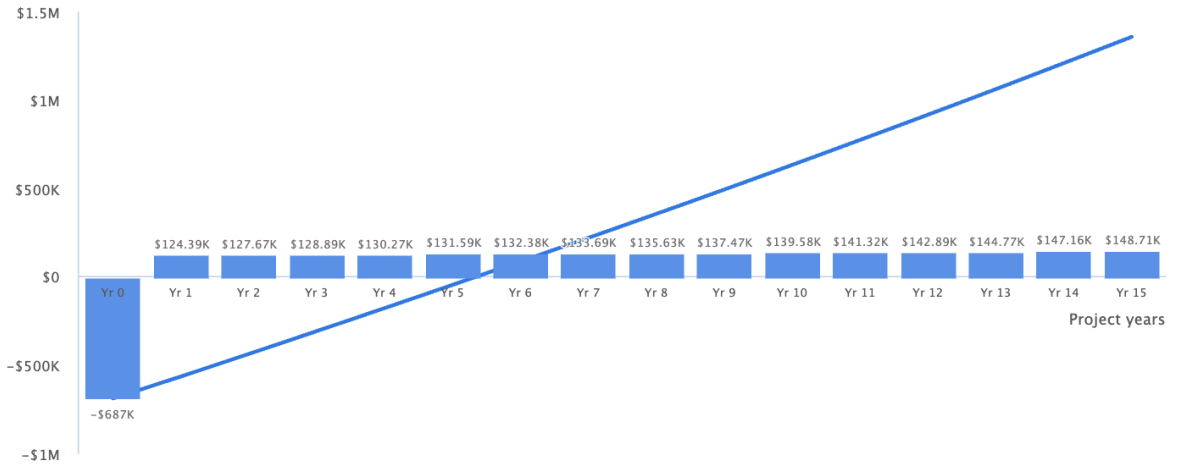
All earnings: For the project duration, Customer receives 100%

For Energy trading revenue For the project duration, Battery Aggregator pays Customer 70% of energy arbitrage earnings (wholesale) each month, with no escalator

For Set up fee Prior to commissioning (month 0), Customer pays Battery Aggregator $15,0/month, with no escalator

Cash flows forecast for the customer including aggregator costs and revenue sharing.

-$687,000	$124,393	$1,359,411	6 years	$744,899	19.3%
Upfront cashflow Year 0	Net cashflow Year 1	Accumulated cash All years	Simple payback	Net present value	Rate of return (IRR)



Summary | Detailed

		Year 0	Year 1	Year 2	Year 3	Year 4
LGC revenue	Non-bill earnings	$0	$2,547	$2,434	$2,177	$1,925
Retailer other usage	Bill savings	$0	$5,029	$5,152	$5,261	$5,381
Retailer volume import	Bill savings	$0	$35,339	$36,207	$36,971	$37,816
Network volume import	Bill savings	$0	$8,491	$8,751	$8,957	$9,114
Network demand	Bill savings	$0	$38,844	$41,060	$41,784	$42,632
Energy trading revenue (70.0%)	Payments	$0	$37,502	$37,509	$37,275	$37,025
Battery (BESS) upfront costs	Upfront costs	($425,000)	$0	$0	$0	$0
Solar panels upfront costs	Upfront costs	($247,000)	$0	$0	$0	$0
Battery O&M costs	Ongoing costs	$0	($2,125)	($2,179)	($2,235)	($2,292)
Solar PV O&M costs	Ongoing costs	$0	($1,235)	($1,267)	($1,299)	($1,332)
Set up fee (15000 $/m)	Payments	($15,000)	$0	$0	$0	$0
Net cashflow	**Total**	**($687,000)**	**$124,393**	**$127,667**	**$128,892**	**$130,268**
Accumulated cash	**Total**	**($687,000)**	**($562,607)**	**($434,940)**	**($306,048)**	**($175,780)**

Forecast cash flows and savings including aggregator costs and revenue sharing.

NOTES

- **Replacement**
  - Would you like to model the replacement of the battery after 10 years?
    Or adjust the analysis window down to 10 years to match the battery warranty?

- **Export limit**
  - 30kW assumed. Energy trading revenue may be increased if this is larger.
  - Modelling of the cost and benefit of installation of a transformer is available.

- **Load outlier**
  - The annual load has a single big spike. Remove it?

- **Ausgrid EA305**
  - Newer Ausgrid business tariffs have shifted the Peak window to **3:00 pm – 9:00 pm**, I've assumed this TOU timing here. May be worth confirming with Momentum.

- **Existing Solar**
  - There is an existing 42.8kW with a 50kW Inverter but there is no export in the meter data - zero negative import and zero kWh values kWh in column B. I'm assuming the meter data is net of energy consumption including solar generated locally.

- **Backup**
  - None currently modelled. Please advise if required (maybe 5% of battery).
  - Savings from outage mitigation can be modelled improving the project ROI.

Disclaimer

- Johnson Energy Consulting will use best efforts to ensure all data, calculations, and analysis are accurate and complete; but accepts no liability for any errors or omissions. It remains your responsibility to review and verify all deliverables for accuracy before relying on them in any capacity.

METHODOLOGY

Orkestra is a sophisticated financial modeling platform designed to assess, compare, and rank the financial viability of commercial solar and battery projects. See more here.

Financial outcomes are modeled by creating a detailed "digital twin" of the site and running a multivariate analysis across the project's lifespan.

1. Project Setup & Data Inputs

- Baseline: Utility bills and meter data are uploaded to establish the baseline energy consumption and cost upon which scenarios can be simulated.
- Rich Data:
    - Tariff Structures (retail and network, including Time-of-Use and demand charges).
    - Solar and Battery Profiles (generation and technology specifications).
    - Historical Market Data (e.g., wholesale electricity prices, FCAS market data).
- Scenario Builder: Users define key variables like solar size, battery capacity, technology costs, and financing structures (e.g., loans, leases, PPAs via the Business Model Builder).

2. Value Stream and Cash Flow Calculation

Orkestra simulates the project hour-by-hour (or at interval granularity) to calculate the total value generated, which forms the basis of the cash flow:

Energy bill reduction
: Calculated by accurately shifting energy consumption from expensive grid power to self-generated solar/battery power, optimizing savings against the site's specific Time-of-Use (TOU) and demand charges.

Solar export revenue
: Revenue generated by selling excess solar power back to the grid (Feed-in Tariffs or Wholesale Market).

Demand charge reduction
: Value created by the battery system strategically discharging to "shave" the site's highest power peaks, avoiding high demand charges from the network.

Market revenue stacking
: For battery projects, the software models advanced revenue streams like Wholesale Arbitrage (buying low/selling high) and participation in Frequency Control Ancillary Services (FCAS) markets.

Rebates and subsidies
: Includes the financial value of incentives like STCs, LGCs and VEECs (in Australia).

3. Ranking

This detailed energy model is then translated into a cash flow analysis that forecasts annual and monthly cash movements, incorporating capital expenditure (CapEx), operating expenses (OpEx), and project financing terms.

APPENDIX 1

Available space

A rough desktop PV array design suggests there is room for approximately 424kW of solar.

To be conservative, a maximum PV array of 420kW has been assumed.

That's 944 x 450kW panels.

If it is possible to fit more solar on the roof, this analysis indicates it would improve ROI.

(image replaced here)

APPENDIX 2

Spot market price forecasting

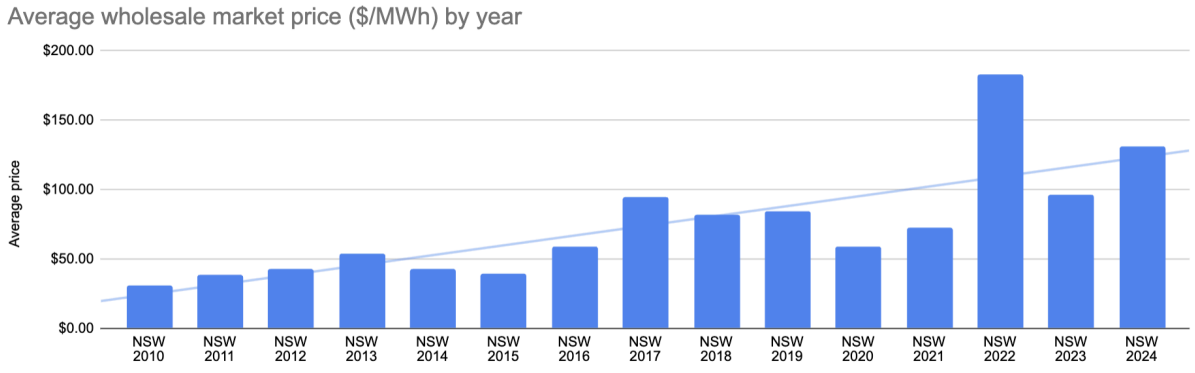
Forecasting revenue generation from wholesale energy trading is heavily impacted by spot prices.

For best results, broker price forecasts can be purchased and modelled, but in the absence of this, I have used 2024 NSW actual prices, with a 0% escalator over the 15 years of this analysis.

This may be considered a low or worst case scenario given that the actual average spot price growth since 2010 has been 19% for NSW.

NEM wholesale prices

Data set	Average price $/MWh	YOY change	
NSW 2010	$30.89	-	
NSW 2011	$38.91	26%	
NSW 2012	$43.05	11%	
NSW 2013	$53.90	25%	
NSW 2014	$42.78	-21%	
NSW 2015	$39.16	-8%	
NSW 2016	$58.98	51%	
NSW 2017	$94.79	61%	
NSW 2018	$81.75	-14%	
NSW 2019	$84.33	3%	
NSW 2020	$58.97	-30%	
NSW 2021	$72.61	23%	
NSW 2022	$182.71	152%	
NSW 2023	$95.95	-47%	
NSW 2024	$131.01	37%	
	$77.06	**19%**	< Average



Source: AEMO