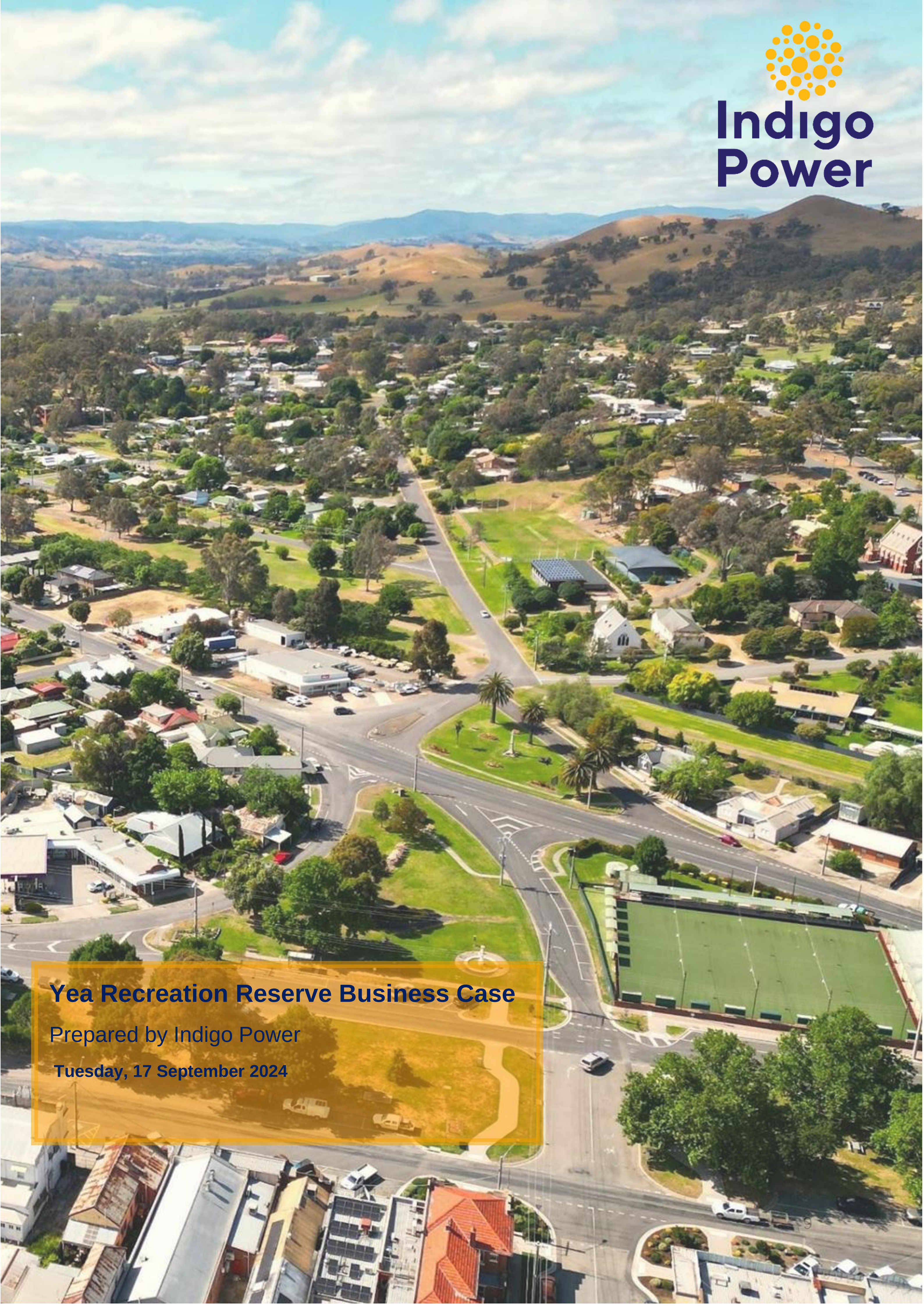

Yea Recreation Reserve Business Case

Prepared by Indigo Power

Tuesday, 17 September 2024

Version	Date	Author	Status
V0.1	14/03/2024	HS	Draft
V1.0	31/05/2024	HS	Draft
V1.1	31/07/2024	HS	Draft
V2.0	16/08/2024	HS	Draft
V3.0	26/08/2024	HS	Draft
V3.1	05/09/2024	HS	Draft
V3.2	17/09/2024	HS	Final

Table of contents

Disclaimer:

This business case has been prepared by Indigo Power Limited ACN 629865452 (IP).

The business case and the information in it is provided in good faith and all care has been taken to ensure its accuracy at the date of preparation. The business case is based on information available to IP including data provided by or collected from third parties and public sources (Available Information).

The business case contains forward-looking statements, projections, forecasts, assumptions, opinions or estimates (forward-looking statements).

Any forward-looking statements and or other representations contained in this business case are not guarantees or predictions of future events or performance and involve known and unknown risks and uncertainties and other factors, many of which are beyond the control of IP. The business case may involve significant elements of subjective judgement, assumptions and contingencies as to future events which may or may not be correct and which are subject to change without notice.

In addition, any forward-looking statements reflect the views of IP only as at the date of this business case. Electricity markets are inherently volatile, and change regularly on account of external events. With this in mind, actual events and results may differ materially from the anticipated events and results projected or implied by the forward-looking statements.

While IP believes the forward-looking statements in the business case are reasonable having regard to the Available Information, neither IP nor any other person gives any assurance or guarantee that the occurrence of the events expressed or implied in the business case will occur and you are cautioned not to place undue reliance on this business case. IP accepts no obligation or liability to provide any ongoing, additional or updated information whether because of new information, future events, results or otherwise.

Importantly, IP does not have an Australian Financial Services Licence, and this advice should not be construed or relied upon as tax, legal, financial, investment or accounting advice. Additionally, the business case does not consider the objectives, situation or needs of any person(s) or organisation(s).

The business case does not include, without limitation, all information that a participant, potential participant or investor in Australia’s national electricity market may require before making any decision and should not be solely relied on as the basis for making any such decision.

1. Introduction

1.1 Project Background

Indigo Power (IP) in consultation with ***2030Yea, RMIT and Indigo Power Foundation***, are funded by the ***Victorian Government's Neighbourhood Battery Initiative Round Three*** to work in the Yea township to develop an investment-ready business case and site-specific project plan for one community battery at a site that support energy resilience in participating local area.

The intention of the Victorian Government's Neighbourhood Battery Initiative (NBI) is to develop a pipeline of projects that are ready to commence implementation by July 2025. The Victorian Government is funding 100 community batteries over a two-year period through the 100 Neighbourhood Batteries (100NB) Program.

Applications for 100NB Round 2 are expected to open in August 2024, with up to $300,000 project funding available per battery. The objective of this project is to develop a community battery business case and site-specific project plan that can support applications to this fund.

Neighbourhood battery technologies and business models are in the early stages of development and community battery projects are not financially viable without the support of grant funding. Grant funding provides an opportunity to cover most of the costs associated with the installation of a community battery, thereby mitigating financial risk.

This business case outlines the commercial options for the delivery of a community battery facility at the Yea Recreation Reserve. Financial analysis is presented for each commercial option. The business case forms a part of a suite of supporting documents which includes:

1. Site inspection report: provides the outcomes of IP's detailed inspection of the site.
2. Preliminary modelling report: provides detailed analysis to identify system specifications that maximise net present value.
3. Design Brief: provides detail on system design, layout, costing and delivery.
4. Business case: provides financial analysis and commercial models.

1.2 Site Summary

Yea Recreation has an existing 18kW solar PV and a 39kWh battery storage system at the pavilion. On a separate electricity meter, on the same site, there is a 5kW solar PV system installed on the tennis court shed.

The roof area on the pavilion is already at capacity. No additional solar PV can be installed at the site as there is no suitable roof space available.

The site connects to a shared 500kVA transformer. The Main Switchboard (MSB) is presently capable of 80 Amps. This is located on the east wall of the pavilion along with the recreation reserve's metering.

It is expected that the battery system will be sized to 50kW/200kW. The existing 18kW solar PV system has been included in the battery modelling to assist in charging the battery with onsite renewable energy generated. There will be no new or additional solar will be installed as part of the modelled neighbourhood battery.

The total cost to install the proposed new system is $297,300 (excluding GST). Details of the breakdown of capital costs are included in Table One below.

Table One. Capital cost breakdown.

Solar capital cost	$0
Battery capital costs	$297,300
Total	$297,300
Grant breakdown	
Grant Request	$267,570
Battery owner contribution	$29,730

1.3 Neighbourhood batteries are in an early stage of commercial development

Neighbourhood batteries are in their early stages of commercial development, and any neighbourhood batteries installed under the NB100 grant program should be considered as pilot projects. Neighbourhood batteries will be capable of delivering environmental, resilience, community benefits, and financial benefits, but will be a long way from an established commercial product or model. The rollout of early-stage neighbourhood batteries is occurring within the context of the transition of Australia's energy system to renewable energy, which brings with it significant change. This transition means that the financial information presented in this business case is subject to material changes as developments in Australia's energy sector, and in neighbourhood battery operational models, continue. This section provides a high-level account of changes underway, and how they are likely to impact the delivery and operation of neighbourhood batteries. Importantly, many of the changes underway support, rather than hinder, the commercial delivery of neighbourhood batteries.

Technology

Battery technology is rapidly developing, resulting in new chemistry types and higher storage and power density. The commercial deployment of energy management system technology and associated software for distributed energy resources is in its infancy for behind the meter neighbourhood battery management. For instance, the development of an algorithm or procedure to balance resilience objectives with financial objectives would be an output of any 100 NB delivery program.

Commercial

Commercial arrangements for delivering neighbourhood batteries are in early stages of development. Virtual power plant options are available from electricity retailers 'off the shelf', but these have a focus on supporting the operation of household batteries and are not optimised for the neighbourhood scale. There is no 'off the shelf' commercial option for neighbourhood scale batteries and commercial models are typically bespoke. This project has developed commercial options based on a survey of project participants.

Regulatory

The renewable energy transition is occurring alongside significant policy and regulatory change. Known regulatory changes include the termination of renewable energy certificates under the Renewable Energy Target in 2030. Other likely changes are not known but are expected to be in support of smaller scale renewable energy generation and storage, or distributed energy resources. More detail on these trends can be found on AEMO's website.

Financial

It is likely that the financial performance of neighbourhood scale batteries will improve over the long term.

Wholesale prices: Wholesale energy forward curves used in analysis in this project indicate a future pattern of low or negative spot prices during times of high solar production, and high overnight electricity prices, particularly as coal fired generation continues to exit the market. High prices are correlated at times of low renewable energy production, overnight and winter, and low prices are correlated with times of high renewable energy production, during the day and in summer. These changes will support battery financial performance allowing low cost battery charging and higher electricity sell prices.

Capital costs: The National Renewable Energy Laboratory suggests that 4-hour utility scale battery costs could fall by as much as 47% by 2030[1]. These reduced capital costs are likely to flow through to neighbourhood batteries and be supported by lower installation costs due to increased contractor familiarity and competition.

Network tariffs: Especially in Victoria, network tariffs are poorly suited to community battery operation. This is already changing in New South Wales, where the new network tariff regulatory period commences on 1 July 2024, and is likely to change in Victoria in the new regulatory period, which commences 1 July 2026. Network tariffs are likely to include low cost import tariffs during the day and increased import tariffs during the evening peak. From 2024 in New South Wales, some network tariffs also reward battery owners for exporting in the evening peak.

Additional value streams: There may be additional revenue streams for neighbourhood batteries in the future as markets for demand response and network support services are initiated or further developed.

The changes that improved financial performance of community batteries are expected to negatively impact sites that don't have battery storage. Sites are likely to be exposed to higher evening electricity prices through higher wholesale prices and network tariffs. The analysis carried out in this business case assumes that network tariffs remain unchanged. In the likely event that they do change, cost savings with a neighbourhood battery are likely much higher.

1.4 Commercial Arrangements

Neighbourhood batteries can realise several outcomes across social, environment and financial categories. Different commercial and/or operational arrangements are required for the realisation of these outcomes. These are detailed in Table Two below.

Table Two. Description of the commercial arrangements necessary to realise community battery outcomes.

Outcome	Commercial/operational Requirement
Energy Sharing	The solar and battery system can supply renewable energy to the host site and share energy with the community. Energy sharing connects a community battery facility to electricity consumers in the community and requires the involvement of an electricity retailer able to aggregate and process data on customer consumption and community battery export. Doing this in a meaningful way requires additional software to match local consumption with the site's export. See Indigo Power's energy sharing software as an example[2].

[1] https://www.nrel.gov/docs/fy23osti/85332.pdf
[2] https://indigopower.com.au/community-energy-hub/

Electricity sales	Improved electricity sales outcomes are achieved by linking the facility to the national electricity market and managing the battery to capture high electricity prices. This requires an arrangement with a third party market participant with appropriate licences and registrations.
Frequency control ancillary services sales (FCAS)	Additional revenue streams for battery storage are through the provision of services that moderate the frequency of electricity in the network, referred to as FCAS. Access to contingency FCAS[3] revenue requires an arrangement with a third-party market participant and aggregator with appropriate licences and registrations.
Energy Resilience	Sites with large energy storage systems can provide access to energy for the community during an emergency outage. This outcome requires an appropriate software platform linked to an onsite control device to switch between day to day and emergency functioning. Emergency operation typically involves charging the battery and holding its capacity for emergency use only. Energy resilience outcomes are dependent upon high system reliability; it is important that the system isn't out of order during an emergency event. This requires an arrangement with an appropriate electrical services provider to ensure the system is monitored and maintained.
Network support	Batteries can provide network support services to the local electricity grid, including demand raise and lower services and voltage control. There is no ready market for the delivery of these services. However, network support opportunities for small scale storage may occur in the future, which would require an arrangement with an appropriate aggregator to control and deploy storage according to a network support contract or market-based system.

The functions listed in Table Two would be provided by third party service provider under the commercial options presented below.

1.5 Business case Options

The following two commercial options have been developed following a survey of project participants. Survey results indicate that project participants are primarily seeking environmental, resilience, and cost/budget saving outcomes from the delivery of neighbourhood battery projects.

Project participants:

1. Have a low appetite for taking on the risk associated with neighbourhood batteries.
2. Showed a general trend towards a lower appetite for investing in neighbourhood batteries.
3. Had no appetite or a low appetite for allocating existing staff resources to the management and maintenance of neighbourhood batteries.
4. Showed a slight trend towards a lower desire for day-to-day flexibility and decision control of neighbourhood battery management.

The following two commercial options were developed to deliver a simple, low risk, and low input neighbourhood battery solution that maximises environmental, resilience and cost/budget savings. The two options are differentiated through the ownership of the solar and battery facility.

1. **Option One Third Party Ownership:** An appropriately qualified third-party invests in, builds, owns, operates and maintains the existing solar and battery facility and leases the necessary ground from the host site on commercial terms. The third party

[3] Single community batteries cannot participate in regulation FCAS markets.

uses the storage capacity to trade in markets managed by the Australian Energy Market Operator (AEMO). A resilience service are provided to the site through a site-specific power purchase agreement (PPA). The third party insures the battery and is responsible for management and maintenance. No cash contribution is required from the host site, who achieves environmental and resilience outcomes at no cost.

2. **Option Two Host site ownership with equipment lease:** The host site invests in the facility and procures services from an appropriately qualified third party for the installation of the battery. The host site owns the battery and engages an appropriately qualified third party to operate and maintain the battery under an equipment lease agreement. It is recommended that the installation and operating party are the same entity, which allows for the operating party to ensure installed technology is compatible with preferred operating technology and software. Either a fixed or variable rent fee is paid to the owner of the battery and there is no operating or maintenance cost for the owner. Stored energy and a resilience service is provided to the host site through a site-specific PPA. The third party uses the storage capacity to trade in markets managed by AEMO. The host site insures the battery. The host site funds the capital cost of the battery and seeks to recover these costs through equipment lease rental payments.

The financial outcomes of both options are presented in Section Three below.

2. Method

Modelling of the designed community battery is performed to determine the financial outcomes of the two options presented in Section 1.4 above. The modelling is performed in two stages. The first stage models energy flows at the site, incorporating load, the existing solar generation, and battery energy storage. The battery operates optimally for all price signals (wholesale prices and network charges). This produces an operational model for the battery that maximises financial outcomes. Environmental objectives are incorporated by design – using the existing behind-the-meter solar. This reduces battery charging from high emissions electricity overnight. Modelling provides an estimate of the revenue potential of the battery over a fixed time horizon. This modelling is carried out using the energy modelling software Gridcog.

The second modelling stage post-processes the cashflows resulting from the Gridcog models. This allows the terms of the agreement between the host site and a third-party owner or operator to be developed and demonstrates the business case for both parties. Power purchase agreement and annual lease agreement fees are the output of this process as well as host site cost savings.

As grant funding is currently available for community batteries the analysis includes grant funding for a proportion of the capital cost of the community battery only. The existing 18kW solar PV system is assumed to be leased and incorporated into the battery storage system by the third-party owner from the host site in each option and incorporated into the analysis. Assumptions used in the energy flow modelling and the financial modelling are presented in Appendix One.

3. Results

Both business case options involve the operator of the system selling electricity to the host site to meet all the site's electricity needs. This would be done through a power purchase agreement (PPA).[4] Prices are modelled as fixed, increasing annually in line with inflation. The assumed PPA price, which is applicable for both options, is presented in Table Three below. These rates are designed, where possible, to provide a reduction in the host site's electricity costs.

Table Three: Assumed power purchase agreement rates.

Category	Description
Sale of electricity to the site through a behind the meter power purchase agreement	• Peak consumption (7-10 am & 3-10 pm Mon-Sun, local time): 35.00 c/kWh • Shoulder consumption (10pm-7am Mon-Sun, Local Time): 21.00 c/kWh • Off peak consumption (10 am- 3pm Mon-Sun, Local Time): 11.00 c/kWh • No daily supply charge or other electricity retail or network associated charges.

Note: The existing site solar can continue to deliver power to the site at no cost under either arrangement.

[4] The PPA is required for both ownership models to ensure simplicity and the alignment of incentives for the operator of the battery.

3.1 Option One: Third Party Infrastructure Ownership

The following analysis outlines the host site's position under an arrangement whereby an appropriately qualified and licenced third-party provider leased the site to install the proposed system. The analysis assumes the third party sells electricity to the host site through a PPA in line with the rates set out in Table Three above. Analysis assumes that any third-party owner of the system is seeking at least an 8% internal rate of return on its investment.

If the host site's electricity retail rates (baseline) were to increase only with inflation[5], the host site would pay less under the proposed arrangement: $452 or 16% in year one as shown in Table Four. Analysis suggests the host site pays $4,356 less over ten years under the proposed arrangement, as shown in Figure One below. The host site is protected from future increases/changes to energy and network charges with a fixed price PPA. No financial contribution would be required from the host site either upfront or across the life of the facility.

[5] As discussed in section in section 1.3, the structure of electricity retail tariffs is expected to change materially over the coming years. It is likely that retail prices will increase at a greater rate than inflation.

Table Four. Summary host site energy profit and loss under a lease agreement for year one.

Yea Rec Reserve - Energy Summary

Indigo Power

Summary		Year 1	Note
Current:			(i)
Retail Supply			
- inflows		-$685	
- outflows		$3,602	
Certificates			
- inflows		$0	
- outflows		$0	
Network			
- inflows		$0	
- outflows		$0	
	Net cost:	$2,917	(iv)
Proposed:			
Retail Supply			
- inflows		-$654	
- outflows		$3,118	
Certificates			
- inflows		$0	
- outflows		$0	
Network			
- inflows		$0	
- outflows		$0	
	Sub total:	$2,464	
Plus Operator Payment		$0	(v)

Net cost:	$2,464	(vi)
Saving:	$452	(vii)
Percentage Saving:	**16%**	

Notes/Assumptions

(i) All figures exclude GST.

(ii) This represents cost of operating and maintaining the solar system - including cleaning the panels and connections, framing, corrosion and visual checks, etc.
(iii) The cost of operating and maintaining the battery system - connection checks, software updates, checking for signs of corrosion, battery room inspection, etc.
(iv) The current net cost of electricity at your site including connection, supply, operation and servicing, after deduction of any feed-in credit.
(v) This is the operational net surplus shared with the operator. It is not part of the energy calculation.
(vi) The proposed net annual cost of electricity at your site after any fees paid by the operator.
(vii) Estimated saving of the business case, when compared to your existing situation.

3.2 Option Two: Host Site Infrastructure Ownership

Under this model the host site would be the beneficiary of grant funding to fund the installation of the battery and would invest in the remaining portion of the system. An appropriately licenced and qualified third party would operate and maintain the system under an equipment lease agreement, supplying power to the site as per the rates in Table Three, and accessing wholesale electricity and FCAS revenue.

This model could have one of two fee structure options:

1. A net surplus share arrangement whereby the third party and the host site share the operational net surplus for the facility. Current modelling assumes the third party pays an annual equipment lease fee (rent) to the battery owner which is based on 50% of the annual operating margin of the battery. The operating margin is calculated by:
    a. Taking the operating revenue.
    b. Subtracting the operating costs of the battery from the revenue, which are paid for by the battery operator.
    c. Excluding depreciation, grant funding, and financing costs from the calculation.
2. A fixed fee arrangement whereby the third party pays to the host site battery owner an annual amount sufficient for the host site to recover the inflation adjusted (3%) cost of its investment over the fifteen-year life of the project. The annual payment amount under this model is $2014.

All analysis presented in this section assumes option one, sharing the operational net surplus, is applied. A host site energy analysis for year one is presented in Table Five and a ten-year analysis is presented in Figure Two. Table Six details the expected financial case for the host site if it were to invest in, and own, the battery. Table Six only considers cash flows directly related to the performance of the battery, it does not consider the whole site and its expected cost savings (relative cash flows). Table Seven considers the performance of the whole site, including both the site cost savings and the financial performance of the battery.

Table Five. Simple one year host site energy analysis under option two, the equipment lease agreement.

Yea Rec Reserve - Energy Summary

Indigo Power

Summary		Year 1	Note
Current:			(i)
Retail Supply			
- inflows		-$685	
- outflows		$3,602	
	Net cost:	$2,917	(iv)
Proposed:			
Retail Supply			
- inflows		-$654	
- outflows		$3,118	
	Sub total:	$2,464	
Operator Payment		-$2,401	(v)
	Net cost:	$63	(vi)
	Saving:	$2,853	(vii)
	Percentage Saving:	**98%**	

Notes/Assumptions

(i) All figures exclude GST.

(ii) This represents cost of operating and maintaining the solar system - including cleaning the panels and connections, framing, corrosion and visual checks, etc.

(iii) The cost of operating and maintaining the battery system - connection checks, software updates, checking for signs of corrosion, battery room inspection, etc.

(iv) The current net cost of electricity at your site including connection, supply, operation and servicing, after deduction of any feed-in credit.

(v) This is the operational net surplus shared with the operator. It is not part of the energy calculation.
(vi) The proposed net annual cost of electricity at your site after any fees paid by the operator.
(vii) Estimated saving of the business case, when compared to your existing situation.

Figure Two. Ten-year host site energy analysis under a scenario where the host site owns the battery and leases its use to a third party.

As Table Six below shows, the capital cost of the system is not recovered over a ten-year period, the internal rate of return is negative at -5.1%. This analysis considers only the financial performance of the existing 18kW solar and the new battery system, without considering host site cost savings. The revenue for the Neighbourhood battery would mainly generated by income from wholesale, arbitrage and FCAS. Financial performance would improve with greater battery grant funding.

Table Six. Detailed profit and loss and cash flow analysis under option two, the equipment lease agreement.

Indigo Power - Financials - Yea Rec Reserve

Indigo Power

Income Statement	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Income:										
Wholesale export	$5,071	$4,476	$4,437	$5,287	$4,738	$3,809	$5,067	$5,480	$7,310	$7,678
Export	-$654	-$625	-$596	-$571	-$543	-$519	-$496	-$475	-$452	-$432
Energy Import Off-Peak	$65	$68	$71	$75	$92	$81	$85	$89	$93	$97
Energy Import Peak (7-10am & 3-10pm Mon-Sun, Local Time)	$1,932	$2,019	$2,110	$2,206	$2,361	$2,408	$2,516	$2,632	$2,748	$2,871
Energy Import Shoulder (10pm-7am Mon-Sun, Local Time)	$1,121	$1,171	$1,224	$1,283	$1,350	$1,397	$1,460	$1,529	$1,594	$1,666
Grants*	$26,757	$26,757	$26,757	$26,757	$26,757	$26,757	$26,757	$26,757	$26,757	$26,757
Ancillary services	$3,008	$2,934	$2,847	$2,662	$2,531	$2,380	$2,147	$1,934	$1,678	$1,439
Total:	$37,300	$36,802	$36,850	$37,699	$37,286	$36,313	$37,535	$37,945	$39,727	$40,076
Expenses:										
Network charges	$1,932	$1,913	$1,975	$2,142	$2,026	$1,864	$2,317	$2,397	$2,466	$2,436
Wholesale import	-$59	-$16	$45	$242	$250	$223	$866	$1,177	$1,543	$2,099
Certificate charges	$1,124	$717	$662	$681	$643	$512	$0	$0	$0	$0
Operations - battery	$2,000	$2,090	$2,184	$2,282	$2,385	$2,492	$2,605	$2,722	$2,844	$2,972
Insurance	$743	$776	$811	$848	$886	$926	$968	$1,011	$1,057	$1,104
Interest on Loan	$478	$0	$0	$0	$0	$0	$0	$0	$0	$0
Depreciation	$19,820	$19,820	$19,820	$19,820	$19,820	$19,820	$19,820	$19,820	$19,820	$19,820
Total:	$26,039	$25,300	$25,497	$26,016	$26,011	$25,838	$26,576	$27,126	$27,730	$28,431

Gross Surplus/Deficit:	**$11,261**	**$11,502**	**$11,353**	**$11,683**	**$11,276**	**$10,475**	**$10,960**	**$10,818**	**$11,997**	**$11,645**
Equipment lease payment:	**$2,401**	**$2,282**	**$2,208**	**$2,373**	**$2,169**	**$1,769**	**$2,011**	**$1,941**	**$2,530**	**$2,354**
Net Surplus/Deficit:	**$8,860**	**$9,220**	**$9,145**	**$9,310**	**$9,107**	**$8,706**	**$8,949**	**$8,877**	**$9,467**	**$9,291**

*All figures ex GST/*Grants accounted for as income over a ten-year period in the income statement. Grant is recorded in cash inflows as a one-off payment*

Cash Flow	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Opening balance:	$0	-$27,807	-$25,525	-$23,317	-$20,944	-$18,774	-$17,005	-$14,994	-$13,053	-$10,524
Cash inflows:										
Grants	$267,570	$0	$0	$0	$0	$0	$0	$0	$0	$0
Loan	$29,730	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operating income	$10,543	$10,045	$10,093	$10,942	$10,529	$9,556	$10,778	$11,188	$12,970	$13,319
Total:	$307,843	$10,045	$10,093	$10,942	$10,529	$9,556	$10,778	$11,188	$12,970	$13,319
Cash outflows:										
Capital costs	$297,300	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operating expenses	$6,219	$5,480	$5,677	$6,196	$6,191	$6,018	$6,756	$7,306	$7,910	$8,611
Equipment lease payment	$2,401	$2,282	$2,208	$2,373	$2,169	$1,769	$2,011	$1,941	$2,530	$2,354
Loan payments (principal)	$29,730	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total:	$335,650	$7,762	$7,885	$8,569	$8,360	$7,787	$8,767	$9,247	$10,440	$10,965
Net cash flow:	-$27,807	$2,283	$2,208	$2,373	$2,170	$1,769	$2,012	$1,940	$2,530	$2,354
Closing balance:	**-$27,807**	**-$25,525**	**-$23,317**	**-$20,944**	**-$18,774**	**-$17,005**	**-$14,994**	**-$13,053**	**-$10,524**	**-$8,170**

Internal Rate of Return	
Internal Rate of Return:	-5.1%

Payback Period:	>10 Years
Avg annual RoI:	N/A

Table Seven considers the performance of the whole site, considering the financial performance of the battery as well as expected cost savings against an expected baseline (relative cashflows). The IRR calculation presented in this table includes cost savings, and we refer to this calculation as the adjusted rate of return. The inclusion of cost savings means the adjusted rate of return is greater than the internal rate of return when there are electricity cost savings for the site. The adjusted rate of return is applicable if the owner of the battery facility and the organisation who pays the electricity bills at the site are the same.

Table Seven. The relative performance of the whole site under option two, equipment lease agreement.

Financials - Yea Rec Reserve

Indigo Power

Detailed Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Current										
Retail Supply										
- inflows	-$685	-$686	-$686	-$687	-$684	-$685	-$685	-$688	-$685	-$686
- outflows	$3,602	$3,764	$3,934	$4,111	$4,296	$4,489	$4,691	$4,902	$5,123	$5,353
Total:	$2,917	$3,079	$3,248	$3,423	$3,611	$3,804	$4,006	$4,214	$4,437	$4,668
Proposed										
Retail Supply										
- inflows										
Export	-$654	-$625	-$596	-$571	-$543	-$519	-$496	-$475	-$452	$0
Energy Import Off-Peak	$65	$68	$71	$75	$92	$81	$85	$89	$93	$97
Energy Import Peak (7-10am & 3-10pm Mon-Sun, Local Time)	$1,932	$2,019	$2,110	$2,206	$2,361	$2,408	$2,516	$2,632	$2,748	$2,871

Energy Import Shoulder (10pm-7am Mon-Sun, Local Time)	$1,121	$1,171	$1,224	$1,283	$1,350	$1,397	$1,460	$1,529	$1,594	$1,666
Equipment lease payment	-$2,401	-$2,282	-$2,208	-$2,373	-$2,169	-$1,769	-$2,011	-$1,941	-$2,530	-$2,354
Total:	$63	$352	$601	$619	$1,091	$1,598	$1,554	$1,833	$1,453	$1,848
Net savings/cost:	**$2,853**	**$2,727**	**$2,647**	**$2,804**	**$2,520**	**$2,206**	**$2,452**	**$2,381**	**$2,985**	**$2,819**

Adjusted Rate of Return	
Adj Rate of Return*:	-2.1%
Payback Period:	>10 Years
Avg annual RoI:	N/A

3.3 Results Discussion

The Yea Recreation Reserve neighbourhood battery business case has the following characteristics:

- Third party ownership of the system (Option One): is expected to deliver a positive outcome for the site over a ten-year period modelled at $4,356 over ten years. This assumes that current electricity retail tariffs remain unchanged in structure, and that prices increase only by inflation. However, it is likely that retail tariffs change in structure to include higher peak charges and that electricity prices increase by more than the inflation rate. Locking in electricity prices for the site from the existing solar and battery system would assist in protecting the site against future expected electricity price changes.
- The equipment lease agreement (Option Two): is expected to have a negative internal rate of return over a ten-year period at -5.1. The adjusted rate of return, which includes electricity cost savings, is negative at -2.1%.

The financial case for the installation of the battery system including the existing solar system at the site is positive for option one. It is a negative outcome for option two.

There are significant non-financial benefits of the business case and these are outlined in Section Four below.

4. Business case Benefits

The proposed battery system would create the following benefits.

1. **Household benefits:** The excess electricity generated and stored by the system could be exported to the local community each evening. The battery could export in the early evening to replace high emissions intensity electricity consumption at this peak demand time with near zero emissions electricity supplied from the existing solar and new battery facility. To enable the local community to track the performance of the battery, the host site would need to seek an operator with energy sharing software.

2. **Energy Resilience:** The existing solar and new battery system would provide long duration backup power to the site, insulating it from power outages. This would support the functioning of the site during emergency or other power outages. Important circuits would be prioritised to ensure long duration power for critical activities.

3. **Environmental:** The battery would be controlled to charge from the solar PV system installed on site with any available generation. Modelling shows that 71% of the site's electricity consumption is expected to be supplied from the existing solar and new battery system. The system would share clean energy with the local community driving additional emissions abatement. Total carbon emissions abatement for the site, as a result of the operation of the modelled system, is expected to be 8.8 tonnes of carbon dioxide equivalent per annum.

4. **Cost Savings:** The community battery facility is expected to reduce the host site's electricity costs across the project's life. PPA prices are modelled as fixed, increasing only with CPI, thereby insulating the site from ongoing wholesale electricity and any network price changes.

5. **Network Benefits:** The community battery has been designed to include advanced, microgrid-enabled control technology to facilitate the delivery of network related support services should the opportunity arise.

6. **Innovation:** There are very few community battery facilities currently in operation in Australia. This business case would establish the business case for the delivery of community batteries at other sites across regional Australia.

5. Conclusion

This business case provides options for the delivery of a 50kW/200kWh battery energy storage system only incorporating the existing 18kW solar PV system at the Yea Recreation Reserve site.

The total cost of the system is expected to be $297,300. Financial analysis assumes that $267,570 of government grant funding is available to cover the battery cost. The financial contribution from the battery owner is expected to be $29,730 to meet grant funding guidelines which require a 10% co-contribution.

Two options are presented for delivery of the system. A third party can build, own and operate the system and lease the space to install the system from the host site. This model does not require a financial contribution from the host site. Alternatively, the host site can choose to contribute the $29,730 co-contribution amount and own the system themselves, leasing the system to an appropriately qualified operator for a fee.

Third party ownership of the system would provide the host site with positive cost savings amounting to 16% of current electricity costs in year one. Third party lease of the equipment is expected to return a negative internal rate of return and a negative adjusted rate of return.

Financial analysis, and project progression, depends upon securing grant funding for battery capital costs at the amounts outlined in this business case.

Appendix One: Modelling Assumptions

Energy Flow Assumptions Table

Assumption or Input	Detail
Platform	Gridcog operational modelling Excel financial modelling
Inflation	4.5%. Applied to PPA rates and all revenue and cost items.
Load	Site meter data for a twelve month period within the previous 24 months. Assume load profile remains unchanged across time.
System sizing	The existing system sizing is based on detailed site assessment from Indigo Power's qualified electrician and included in preliminary modelling in Gridcog.
Solar Generation	The existing 18kW solar system details provided as input to Gridcog software. Generation profile based on system configuration and solar resource assessment and forecasting platform Solcast for the site's coordinates.
Network tariffs	Site network tariffs are based on existing site network tariffs. CPI applied to network tariffs. It is assumed that the tariff structure and inflation-adjusted rates do not change.
Wholesale price	Forward curve from Endgame Economics (Q3 2023 Central Case) are applied.
FCAS	CY2021 contingency FCAS prices were used. Prices are linearly derated 5% year-on-year from 1 Jan 2024 to replicate potential future declines in FCAS prices. FCAS revenue assumes a 50% share of revenues with a licenced and registered third party demand response service provider, responsible for deployment of the battery in applicable FCAS markets.
System responsiveness	Gridcog modelling assumes perfect foresight, with the system performance perfectly responding to all price signals. A derating factor is incorporated in post-processing and applied to wholesale energy exports and imports, mimicking the imperfect foresight operation which will be achieved in practice. The wholesale export performance has been de-rated accordingly.
Retail rates	Baseline analysis assumes electricity retail tariffs for the 2023/24 financial year supplied to Indigo Power by the host site. Where rates are available for the 2024/25 financial year baseline analysis has assumed these.
Solar and battery efficiency loss	While battery round-trip efficiency varies depending on operation and ambient temperature, we have modelled a round-trip efficiency of 80% which we anticipate is conservative. Modelled solar output is derated by 11% to mimic cabling, shading and inverter losses.
Battery depth of discharge	80% of nominal battery storage depth of discharge, consistent with manufacturer recommendations for LFP batteries.

Financial Assumptions

Assumption or Input	Detail
Energy flows	Energy flows are provided as an output from the operational modelling performed in Gridcog.
Energy flow accounting	We post-process the energy flow outputs from Gridcog to calculate how much of the site's load is supplied from the existing solar and new battery system. We assume that solar preferentially supplies load before any other sink (grid or battery), from which all other terms follow.
Carbon emissions reduction estimation	We take the product-sum of the energy flows from Gridcog and a time-varying average emissions factor to estimate emissions associated with electricity use for the site. This is done for both the baseline (business as usual) and proposed scenarios, then the difference between the emissions of the two scenarios is taken and this is reported as an indicative emissions reduction associated with the project. The average emissions factor time series represents the assumed energy mix in the Endgame Economics forward curve. In this calculation we do not consider renewable energy certificates, transmission losses or distribution losses, nor embodied energy/carbon with the generation and storage system.
Grant amount	The maximum grant funding amount for the 100 NB grant program is assumed. All other funding is provided as an investment from a third-party owner or the host site, depending on the commercial option.
Grant funding amortisation	Grant funding contributions have been amortised over the life of the battery according to accounting standard AASB120, rather than treated as year one revenue.
Behind the meter power purchase agreement price	The sale of electricity to the host site from the existing solar and new battery system has been modelled based on the PPA rates presented above. These rates are fixed and increase annually in line with inflation.
OPEX Battery	A battery opex cost of $1000 p.a per 100 kWh battery installed is applied. Opex costs include monitoring and maintenance, control and aggregation fees, market access fees, and any third party overheads for battery deployment.
Insurance	Insurance of $2500 per 1 million of asset insured has been applied. Paid for by a third party owner or the host site depending on the ownership of the asset.
Network connection and fees	In both options the third party operator assumes responsibility for the site meter. Network charges are absorbed by the third party operator and are not passed on to the host site.
Site lease costs	The cost for a third-party to lease the necessary area to host the solar, battery and associated equipment has been set to zero. Under this analysis, consideration for the lease is represented by low cost PPA rates. Delivery is expected to include commercial rent, which may be offset by a commensurate increase in PPA prices. In any event, the net position of the host site will remain the same.
Lease period	A ten-year period has been modelled, however, further options could take the total period of any lease to at least 15 years, the expected useable life of the battery system.

System lifespan and depreciation	Battery system depreciated over 15 years. Linear depreciation.

Contact

Heath Shakespeare

Project Manager

Email: heath@indigopower.com.au

Ph: 0422 266 314

ABN: 67 629 865 452

Company Name: Indigo Power Ltd

Get in touch

Indigo Power
Old Beechworth Gaol
Corner of William and Ford Streets,
Beechworth VIC 3747, Australia

www.indigopower.com.au
email: connect@indigopower.com.au
ph: 1800 491 739

2022 Greenpeace
Green Electricity Rating
The Green Electricity Guide

Social Traders CERTIFIED SOCIAL ENTERPRISE
Business for good