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Introduction

Project Background

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

The project generated a suite of documents including:

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. Technical feasibility assessment by RMIT.
5. Business case: provides financial analysis and commercial models.

The investment-ready 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.

Indigo Power attended a community event that 2030Yea had organised which was chaired by Indigo Power Foundation. This was an opportunity for the local Yea community to gain an understanding of what a neighbourhood battery is, hear the results of Indigo Power and RMIT's work and ask questions. Community feedback regarding what they considered important for a neighbourhood battery included:

- Chemistry type
- Fire and vandalism risk
- Ownership and financial benefits to the community
- Impact in reliability of power in the township

As part of this project, the RMIT conducted the technical feasibility assessment by constructing a detailed power flow model for the Yea covering the geographical area of seven potential battery sites. The key outcomes and recommendations of RMIT's report are:

Two potential sites were identified: Yea Railway Park and Yea Recreation Reserve. Both sites have been assessed for their suitability based on factors such as existing infrastructure, solar generation, and network capacity.

The Yea Railway Park is recommended for an "in-front-of-the-meter" battery, the Yea Recreation Reserve can accommodate either an "in-front-of-the-meter" or "behind-the-meter" battery. A Behind the Meter battery at this location offers additional energy resilience for the pavilion clubrooms.

A detailed technical analysis was conducted by RMIT to assess the feasibility and benefits of the battery systems at each site. The study found that both locations could significantly improve grid reliability, reduce peak demand, and support the local community. The work packages that RMIT performed involved:

1. Yea Electricity Network Modelling
2. Energy Data Analytics & Battery Sizing
3. Battery Size Optimisation and Benefit Assessment

RMIT analysis identified, that the Yea township has the following characteristics:

- Yea is supplied from the Seymour zone-substation through a 22 kV SMR14 feeder which is approximately 50 km long and serves around 2400 customers. Yea is positioned towards the tail of the feeder and consumes about 50% of the total feeder load demand.
- A total installed solar-PV capacity of ~4.5 MW by end of 2023, and approximately 44% dwellings have solar PV systems. Therefore, the Yea solar-PV penetration is higher than the Victoria average.
- Has a total solar PV potential of 40 MW.
- Most transformers in the Yea network that were analysed have less daytime loading than the night-time due to the solar PV capacity associated with these transformers relative to their load demand. The

analysis also showed indicated a higher peak demand around 1 am due to domestic and commercial electric resistive hot water system operation during this time. The result is that the voltage may drop below the allowable limit during the night, and a higher voltage may result in during the high solar export hours. This creates grid instability.

- A favourable and likely scenario is that the battery charges when the local site and/or transformer load demand is low and discharges when local site and/or transformer load demand is high.

The network studies investigated the with allowable charge and discharge capacities of battery under likely and worst-case scenarios.

Based on the grid studies and the consideration for the commercial opportunities, a battery capacity was determined for best optimisation and the grant funding available. The battery capacity determined was:

1. Yea Recreation Reserve: 50kW/200kWh including the existing solar PV system onsite with no additional solar to be installed as part of the project.
2. Yea Railway Park: 100kW/300kWh

Both business cases outline the commercial options for the delivery of a neighbourhood battery.

If the commercial settings are assessed purely on financial outcomes, neither of the sites offer a positive financial outcome when relying on grant funding alone. When considering grid reliability, energy resilience and environmental benefits, a neighbourhood battery could offer the Yea community demonstratable benefit if external funding is available to cover significant portion of asset/installation costs. This could be available through community or private investment.

Ultimately, the project has determined the optimal location and configuration for the community battery, with the next step being to submit a funding application to the Victorian government's 100 Neighbourhood Batteries program.