# YARRA ENERGY FOUNDATION

NBI3 | Greenhouse Alliance Neighbourhood Battery Investigation (Metropolitan)

**Business Case Report**

— July 2024

YARRA ENERGY FOUNDATION


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## Disclaimer



## Acknowledgment of Aboriginal land and peoples

We acknowledge Aboriginal and Torres Strait Islander people as the Traditional Owners and custodians of the land and water on which we all rely. We acknowledge the Wurrundjeri Woi Wurrung peoples as the custodians of the land on which the Yarra Energy Foundation is based.

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# 1. Executive Summary

# 1. Executive Summary



Neighbourhood Batteries (NBs) present a unique opportunity to support Victoria's net-zero future, and when deployed by Councils they have the potential to empower communities to participate in, and benefit from, the energy transition. In this project, the Yarra Energy Foundation presents 22 individualised business cases for metropolitan Victorian councils spanning various front-of meter (FOM) and behind-the-meter (BTM) configurations.

NBs are mid-scale (30kW–1MW) energy storage solutions that can generate financial, network and community benefits. By connecting to a low voltage network these systems can reduce peak demand, manage voltage rise issues from existing solar exports, and support new Distributed Energy Resources such as rooftop solar and electric vehicle chargers. NBs offer a whole of community solution, and when delivered well can become a focal point for community engagement in the energy transition. Unlike alternative solutions, neighbourhood batteries can generate benefits for the whole community and have the potential to be a key enabler for transition of our energy networks.

Each of the 22 NB business cases defines a site, system configuration, business model, project benefits, risk assessment, schedule and financial projections for revenue, earnings and Net Present Value (NPV, assuming grant funding under the 100 Neighbourhood Battery program) over a 10-year life. Request-for-information (RFI) processes were undertaken for battery suppliers and retail/system dispatch service providers, with results informing the financial projections.

The 22 GANBIM business cases were found to have total revenues between $87,498 and $247,561 per system with the greatest revenues generated by Medium (100kW/200kWh) systems operating BTM at sites with large solar installations and high demand charges. The total earnings of all 22 systems combined was projected to be $1,696,492.

21 of 22 business cases we found to generate a positive NPV for owners when delivered with up to $300,000 in grant funding support (as per the scope of Round 1 of the 100 Neighbourhood Battery Program). One site was found to have a NPV of -$1,637, however the OPEX at this site can likely be lowered as it is a small system. NPV values for positive sites varied between $9,236 and $120,367 with the total NPV of all 22 sites being $672,722.

In addition to site specific business case materials, YEF also proposes four possible project orchestration pathways, including three for councils that do not wish to own the proposed NB in their municipality. Seven possible 3rd party owners were identified during a preliminary ownership assessment, the vast majority of which are also able to provide retail/dispatch services.

Not including any grant application and negotiation timelines, it is anticipated that all FOM NB projects could be delivered in approximately 9 months, while BTM projects could take approximately 7.5 months. Key risks identified include project design and delivery issues, engagement issues, battery safety issues, and system operational performance issues.

Funding requests have been developed for each of the 22 projects in accordance with their anticipated budgets. This information, along with all other business case information, can be used by councils to seek funding for the proposed systems through the 100NB funding program.

# 2. Introduction

## 2.1. Neighbourhood batteries

Neighbourhood batteries are battery energy storage systems (BESS) located in neighbourhoods, where they are typically connected to the low-voltage (LV) distribution network. Sized somewhere between a household battery and a grid-scale battery (e.g., 30kW–1MW), neighbourhood batteries can play an important role in supporting the decarbonisation of the energy system by managing increasing levels of distributed generation (i.e., rooftop solar) and demand, while firming the grid by time shifting the supply of energy.

Neighbourhood batteries can generate revenue in several ways, most commonly by trading energy on the wholesale energy market (energy arbitrage), providing Frequency Control Ancillary Services (FCAS), and through favourable network tariffs. Some operating models also incorporate other revenue streams such as subscriptions or Electric Vehicle (EV) charging.

Neighbourhood battery systems are installed in one of two configurations: Front of Meter (FOM, with a dedicated network connection and meter) or Behind the Meter (BTM, on a child meter, co-located with a load behind an existing connection point).

### Neighbourhood Battery Initiative

The Victorian Government's *Neighbourhood Battery Initiative (NBI)* has supported numerous feasibility and implementation projects with an emphasis on innovation and knowledge-sharing. This business case has been developed under Stream 1 of the third round of the NBI (NBI3). The outputs of NBI3 business cases are designed to dovetail into grant funding applications under the *100 Neighbourhood Batteries (100NB)* funding program, which supports cost-efficient, scaled deployment of storage.

**Figure 1: YEF's Fitzroy North Community Battery (FN1), delivered in 2022 with funding from the NBI**

## 2.2. Greenhouse Alliance Neighbourhood Battery Investigation (Metropolitan) – GANBIM

The Greenhouse Alliance Neighbourhood Battery Investigation (Metropolitan) project (GANBIM) is an initiative funded by the Victorian Government to deliver individualised business cases for neighbourhood batteries within 22 councils in the wider Melbourne metropolitan area.

GANBIM considers both behind the meter and front of meter batteries with YEF's experience feeding into proposed operational, battery energy storage system (BESS), and retailer arrangements. The business cases assess the community, network and council benefits delivered by each of the neighbourhood batteries. Each business case also details the economic value of each battery with 100NB grant funding support and quantifies the pool of benefits that can be shared with local communities.

The primary outcome of these business cases is to set out the information required by councils to pursue 100NB funding for the battery proposed in their municipality. More details on the 100NB program are presented in section 11.1.

The appendices detail council-specific information that assesses the viability and impacts of the 22 individual neighbourhood batteries.

**Table 1** lists the GANBIM Councils and corresponding appendices.

**Table 1: List of GANBIM Councils**

| Council | Relevant Appendix |
|---|---|
| City of Banyule | Appendix 01 |
| City of Bayside | Appendix 02 |
| City of Boroondara | Appendix 03 |
| Hobsons Bay City Council | Appendix 04 |
| Hume City Council | Appendix 05 |
| City of Kingston | Appendix 06 |
| Knox City Council | Appendix 07 |
| Manningham City Council | Appendix 08 |
| Maribyrnong City Council | Appendix 09 |
| Maroondah City Council | Appendix 10 |
| City of Monash | Appendix 11 |
| Mornington Peninsula Shire | Appendix 12 |
| Nillumbik Shire Council | Appendix 13 |
| City of Port Phillip | Appendix 14 |
| Borough of Queenscliffe | Appendix 15 |
| City of Stonnington | Appendix 16 |
| Surf Coast Shire | Appendix 17 |
| Whitehorse City Council | Appendix 18 |
| City of Whittlesea | Appendix 19 |
| Wyndham City Council | Appendix 20 |
| City of Yarra (Officeworks) | Appendix 21 |
| Yarra Ranges Shire | Appendix 22 |

## 2.3. Exploring the viability of GANBIM projects

This document serves the dual purpose of exploring YEF's findings on the viability of 22 NB projects in the GANBIM councils and presenting an overview of the total value of these systems if they are all delivered. This could possibly be done as a single Virtual Power Plant (VPP), or as individual orchestrated projects (see section 4.6).

A VPP is a system that coordinates distributed energy resources (DER) on a large scale, with the goals of coordinating operations, in some cases stabilising the grid, and generating financial returns. Current VPP products largely focus on aggregating energy storage (often coupled to rooftop solar), but with the introduction of more smart energy assets their scope may grow to include EV charging, Vehicle to Grid (V2G) and smart hot water systems.

For NBs, VPPs are a means to aggregate multiple batteries into a single operating system. This would allow for multiple BESS to bid into FCAS markets together and utilise the same optimisation engine for energy trading. YEF's RFI results also suggest retailer cost benefits from a VPP's economy of scale.

In this project, YEF has included consideration for the ease with which GANBIM projects, BESS suppliers, and retailers could participate in a broader VPP consisting of grant-funded NBs. While the intent of this project is not the delivery of a VPP, YEF believes that it is important to design projects in such a way that they can readily be incorporated into VPPs as this is becoming increasingly common in the industry.

**Structure of project deliverables**

YEF has structured the outputs of the NBI3 GANBIM project as follows:

- **Main Business Case Report (this document)** – which summarises the 22 individual council business case documents and provides an overview of what the GANBIM project could look like in its next phase. In council appendices this is referred to as the "main document".
- **Attachments A-F[1] -** which provide more detail on the sections of this report and contain important inputs for individual business cases.
- **Individual Business Cases (Appendices 1-22)[2]** – which detail the business case developed for each individual council.

**Stakeholder Engagement Plans (available on request)[2]** – these have been provided separately and are only referred to generally in the Main Business Case Report. Each council appendix includes a short summary of the relevant stakeholder engagement plan.

[1] Appendix F is commercial in confidence and has been redacted from this public document.
[2] These documents are commercial in confidence.

# 3. Program Needs and Alternative Solutions

## 3.1. Program Objectives

**Short term objectives of the 100NB Program**

Local benefits from local Distributed Energy Resources (DER)

Rising energy costs and transition targets have resulted in an urgent need for cheaper, cleaner energy solutions. Through on-site energy generation, or by reducing the need for network augmentation with distributed storage, DER can reduce energy costs for households and the broader community.

Unfortunately, many households cannot afford to invest in generation and storage. More energy projects that engage and benefit the surrounding community and enable everyone to participate in the energy transition are needed.

Increase energy reliability

The energy transition presents numerous challenges for the management of distribution networks, and the reliability and security of the broader power system. As such, solutions are needed to firm variable renewable energy production by time shifting energy, provide network support, and enable the continued uptake of DER.

In the longer term, it is critical that solutions enable the ongoing decentralisation of the grid by DER uptake, thus supporting more localised energy supply, storage, and consumption.

Reduce costs of network upgrades

Network upgrades represent a major cost to consumers and are increasingly required due to electrification and rooftop solar production. Deferring or minimising upgrades is critical to keeping electricity affordable. Solutions such as smart charging of EVs and home batteries are needed to manage increasing loads and voltage fluctuations on LV networks. These solutions represent a shift to location-specific network support that minimise DNSP investment, as opposed to traditional “pole and wire” upgrades.

Engaging communities to personally contribute to the energy transition

The energy transition represents both an opportunity and a challenge for communities. While some consumers can access more affordable energy or more rewarding retail arrangements, there is also significantly more complexity and responsibility for consumers. There is therefore a need to support consumers to navigate this evolving landscape and recognise the role they can play as energy transition participants. Additionally, councils are increasingly required to play an important role in the transition, providing guidance and services to their communities regarding energy. Efforts to build expertise and experience in the energy space are essential to empowering councils to make their own contributions to the energy transition, and to support their communities to do the same.

Scale up delivery of operational storage solutions

Energy storage solutions are important enablers in the energy transition and are needed to meet current storage targets. Immediate needs for storage include tackling network constraints and managing the scale-up of DER including solar panels, and EV chargers. The wide-scale adoption of energy storage is yet to be realised and there is a need for knowledge sharing and capacity building to encourage uptake. Further demonstration of ownership, benefit and delivery models is needed to prove the significant benefits for community, network, and others.

**Long-term strategic priorities for the energy transition**

Building capacity to transition together

To scale a community focused approach to the transition, more players need to get involved, and the barriers hindering community energy projects need to be overcome. Capacity building of community leaders like councils would empower them to play a larger role in DER projects.

Additionally, models that simultaneously deliver win-win benefits to council, community, networks, and private industry, are needed to enable a truly collaborative approach.

Unlocking the value of Victoria's DER

Rapid uptake of energy storage is needed to achieve Australia's long-term ambitions. This is reflected in both the Victorian storage target (2.6 GW by 2030) and AEMO's 2024 ISP forecasted storage requirements (49 GW by 2050 for the 'Step Change' scenario).

BESS are enablers of other DER such as solar and EV charging and are required to unlock the value of existing assets. NB models that derive stakeholder benefits are needed to drive adoption of mid-scale storage and lay the groundwork for the more localised energy networks of the future.

Smoothing the transition of the grid

The evolution of our electricity network must minimise the disruption and cost to the community. Support for the transition to DER and the firming of variable renewable energy are needed at both local and grid scales. Without intervention there is a risk that the required supports will not be introduced in time, and that the transition will result in avoidable disruption to our energy networks.

## 3.2. Alternative Solutions

The complex nature of the energy transition requires a multifaceted solution, and while mid-scale energy storage such as neighbourhood batteries are important, they are not a silver bullet. Below is a short overview of alternatives to NBs that must be considered when evaluating the merits the proposed projects.

**Public funding for other technological interventions**

Local Generation through Solar PV

*Subsidising local community, individuals, and/or businesses to install solar PV and increase local generating capacity.*

This is a relatively simple intervention given Australia's high solar uptake and would be an effective means to increase local renewable energy production. This type of project is well known and understood by community and industry, has tangible emissions reduction benefits, and is a low-risk option, although it can exacerbate voltage and minimum demand issues.

Electric Vehicle Charging Projects

*Driving EV uptake and decarbonisation of transport through installation of charging facilities.*

There is strong desire for more EV chargers in Victorian communities, especially in metropolitan areas, and many regions suffer from limited access to these facilities (especially public facilities).

Public familiarity with this technology makes it easier to secure a social licence. Additionally, the technology is also relatively easy to install in parking lots without occupying valuable open spaces. In the future, this solution could possibly offer additional benefits of vehicle to grid (V2G) technology, which could address the extra load EV charging creates.

Subsidising home batteries

*Subsidising installation of small BESS for homes and businesses.*

This solution directly contributes to meeting storage requirements, is an effective means of lowering peak demand from consumers and can reduce voltage instability in LV networks. These systems could provide network services like FCAS and firming of renewables if operated in a VPP and would be installed on private property, which reduces land access issues.

The delivery of individual projects would be relatively easy and would require little council capacity building. This solution is relatively low risk and utilises an existing market of residential scale BESS products and services, although potentially costly at current BESS prices.

Energy efficiency programs for homes and businesses

*Supporting homes and businesses to adopt more energy efficient technologies (e.g. draft proofing, insulation, lighting, AC hot water, kitchen appliances etc) to reduce energy consumption.*

These programs would be very easy to deploy, with an existing social licence and little community education required. The program could be administered without council capacity building and is a very low-risk option. Gas electrification is excluded in this solution as it increases electrical demand.

**DNSP storage or network augmentation**

*DNSP-led Neighbourhood Battery projects, or augmentation of the local network to meet growing demand.*

This approach is an effective means to deliver solutions to network issues as DNSPs are well placed to identify constrained networks and can maximise network benefits of batteries or infrastructure upgrades. This solution may also benefit from DNSP's land access rights for network projects.

Storage solutions could be mid-scale systems that support local networks, provide firming and time-shifted energy. These projects would smooth the network transition and contributing to meeting storage targets.

Network upgrades would be simple and fast solutions to meeting demand constraints but would come at a cost to consumers.

**Private industry-led medium and high-voltage storage**

*Private industry-led storage projects, connected at a medium-voltage substation or sub-transmission level.*

This approach would introduce a large quantum of storage per-project and could contribute significantly to meeting storage targets. This is an industry-led solution that is driven by a commercial business case and may not require as much public investment as other options. These systems could provide some firming of grid-scale renewables and have a direct contribution to increasing renewables content of the grid. They also have the possibility of delivering network benefits at medium and high-voltage levels. They do not, however, resolve network constraints at the low-voltage level, and may need to be coupled with distribution network augmentation to deliver increasing energy levels to low-voltage networks.

# 4. Program Solutions

## 4.1. Summary of GANBIM Neighbourhood Battery Business Cases

Within this NBI3 business case project, YEF is proposing business cases for 22 individual neighbourhood batteries (one per participating council). In developing these business cases, YEF has applied rigorous Neighbourhood Battery project design methodologies to define all key aspects of the proposed projects. A summary of key aspects of the proposed solutions are as follows:

- **Site selection –** based on multifaceted assessment processes.
- **Configuration –** Front of Meter (FOM) or Behind the Meter (BTM).
- **BESS System Sizes –** Small (~50kW/~150kWh) or Medium (~100kW/~300kWh) systems recommended for all projects.
- **Business Models –** One of 2 FOM and 4 BTM models, see Section 4.4 for full details.
- **Possible ownership –** Active Council Ownership, Passive Council Ownership, or Third-Party Ownership.
- **Short-listing of suppliers –** through Retailer, BESS & installer Request-For-Information (RFI) processes.
- **Project Schedule –** informed by YEF's experience.
- **Project Risk Assessment** – informed by YEF's experience.
- **Project outcomes and benefits** – based on stakeholder priorities.
- **Financial Projections –** developed from advanced modelling and cost estimates from RFI.
- **Project Funding** – proposed funding arrangements based on real pricing data provided by RFI participants.

<u>Proposed GANBIM neighbourhood batteries</u>

Table 2 provides a high-level summary of the 22 GANBIM systems, a more detailed overview can be found on the next page of this report.

**Table 2: Summary of proposed projects**

| | FOM Systems | BTM Systems |
|---|---|---|
| **Number of Projects** | 10 | 12 |
| **Sites** | Mostly in reserves, parklands, public spaces and near sports and community centres | Mostly located at council facilities such as community centres and sports/aquatic centres |
| **System sizes** | 1 x Small BESS<br>9 x Medium BESS | 12 x Medium BESS |
| **Business models**[3] | 8 pure market trading and 2 offering network support in addition to market trading | 9 market exposed and 3 non-market exposed.<br>7 with potential for backup services |

[3] Refer to section 4.4 for detailed explanation of business model archetypes.

## Overview of proposed systems

| Council | Type | Power (kW) | Storage (kWh) | Ownership[4] | Market exposure | Backup power | EV charger | Business Model[5] |
|---|---|---|---|---|---|---|---|---|
| Banyule | FOM | 50 | 200 | 3rd party / passive | ✓ | N/A | ✓ | Market trading (FOM) |
| Bayside | FOM | 100 | 200 | 3rd party / passive | ✓ | N/A | ✗ | Market trading with network support (FOM) |
| Boroondara | FOM | 100 | 200 | 3rd party | ✓ | N/A | ✗ | Market trading with network support (FOM) |
| Hobsons Bay | BTM | 100 | 200 | Active | ✓ | ✗ | ✓ | Market trading and demand offsetting (BTM) |
| Hume | BTM | 100 | 200 | Active | ✓ | ✓ | ✗ | Market trading, demand offsetting and possible backup capability (BTM) |
| Kingston | FOM | 100 | 200 | 3rd party / passive | ✓ | N/A | ✓ | Market trading (FOM) |
| Knox | FOM | 100 | 200 | 3rd party | ✓ | N/A | ✓ | Market trading (FOM) |
| Manningham | BTM | 100 | 200 | Active | ✓ | ✓ | ✗ | Market trading, demand offsetting and possible backup capability (BTM) |
| Maribyrnong | BTM | 100 | 200 | Passive | ✓ | ✓ | ✓ | Market trading, demand offsetting and possible backup capability (BTM) |
| Maroondah | BTM | 100 | 200 | Active | ✗ | ✓ | ✗ | Consumption offsetting with possible backup capability (BTM) |
| Monash | BTM | 100 | 200 | Active | ✗ | ✓ | ✗ | Consumption offsetting with possible backup capability (BTM) |
| Mornington | FOM | 100 | 200 | Passive | ✓ | N/A | ✓ | Market trading (FOM) |
| Nillumbik | BTM | 100 | 200 | Active | ✓ | ✗ | ✓ | Market trading and demand offsetting (BTM) |
| Port Phillip | FOM | 100 | 200 | 3rd party | ✓ | N/A | ✓ | Market trading (FOM) |
| Queenscliffe | BTM | 100 | 200 | Active | ✓ | ✗ | ✗ | Market trading and demand offsetting (BTM) |
| Stonnington | BTM | 100 | 200 | Active | ✓ | ✓ | ✗ | Market trading, demand offsetting and possible backup capability (BTM) |
| Surf Coast | FOM | 100 | 200 | 3rd party | ✓ | N/A | ✓ | Market trading (FOM) |
| Whitehorse | FOM | 100 | 200 | 3rd party | ✓ | N/A | ✓ | Market trading (FOM) |
| Whittlesea | FOM | 100 | 200 | Passive | ✓ | N/A | ✓ | Market trading (FOM) |
| Wyndham | BTM | 100 | 200 | Active | ✓ | ✗ | ✗ | Market trading and demand offsetting (BTM) |
| Yarra | BTM | 100 | 200 | 3rd party (Officeworks) | ✗ | ✗ | ✓[6] | Consumption offsetting (BTM) |
| Yarra Ranges | BTM | 100 | 200 | Active | ✗ | ✓ | ✗ | Consumption offsetting with possible backup capability (BTM) |

[4] Refer to section 4.5 for detailed explanation of ownership archetypes.
[5] Refer to section 4.4 for detailed explanation of business model archetypes.

[6] Provided a suitable Third Party owner and operator of EV Charger can be found.

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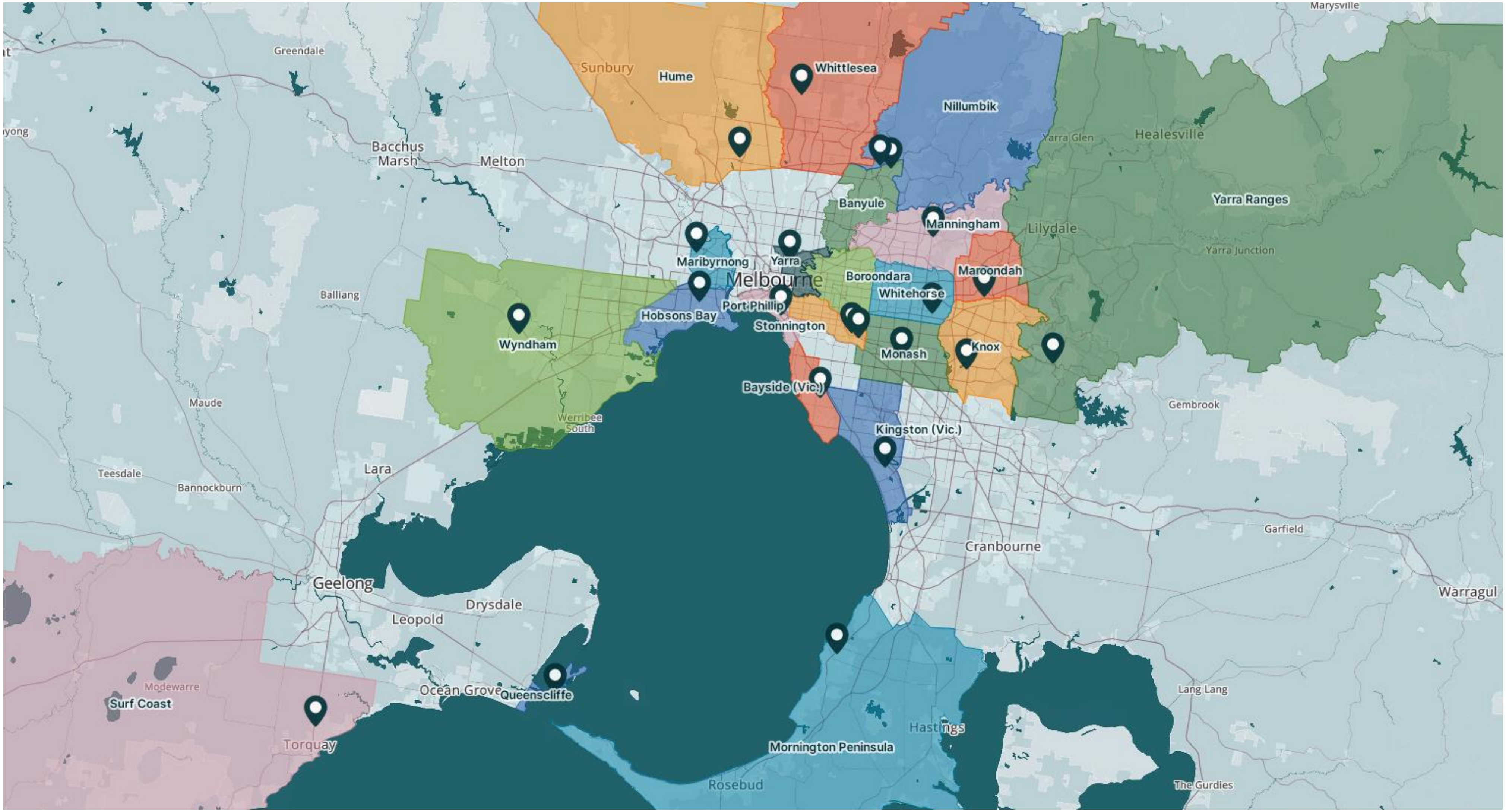
**Map of Project Locations**[7]




[7] Refer to Attachment A – Supplementary Information for supplementary maps of project locations. Detailed site information is presented in individual council appendices.

## 4.2. BESS Selection

As part of this project, YEF conducted a Request for Information (RFI) process to canvas the market for mid-scale BESS suitable for the front-of-meter and behind-the-meter neighbourhood battery use cases.

BESS manufacturers and vendors were invited to propose suitable products that aligned with a selection of standard configurations for both front-of-meter (outdoor) and behind-the-meter (indoor and outdoor) installations (**Table 3**). In addition to pricing, vendors were also asked to outline and evidence:

- the system's technical specifications and compliance;
- the system's design and safety features;
- the vendor's commitments to sustainability and human rights; and,
- the vendor's industry experience and customer support.

The submissions were assessed with respect to the above, and selection recommendations made with respect to affordability and suitability for specific sites and use cases. The evaluation criteria are shown in **Table 4**.

**Table 3: Standard BESS configurations**

| Outdoor (FOM & BTM) | | Indoor (BTM only) | |
|---|---|---|---|
| Small | ~50kW / ~150kWh | Small | ~50kW / ~150kWh |
| Medium | ~100kW / ~300kWh | Medium | ~100kW / ~300kWh |
| Large | ~150kW / ~450 kWh | Large | ~150kW / ~450 kWh |
| X-Large | ~200kW / ~600 kWh | X-Large | ~200kW / ~600 kWh |

**Table 4: BESS Evaluation Criteria**

| | |
|---|---|
| **Key criteria** | 1. Technical specifications, incl. noise, and standards compliance<br>2. Performance and lifetime (efficiency, degradation etc.)<br>3. Safety specifications, features, and compliance<br>4. Total cost (incl. est. installation cost, warranty, etc.)<br>5. Value ($/kWh)<br>6. Annual system maintenance costs<br>7. Product availability and construction/delivery time |
| **Organisational criteria** | 8. Market and industry experience<br>9. Customer support structure and policies/warranty<br>10. Commitment to environmental sustainability<br>11. Commitment to responsible sourcing and human rights |
| **Design criteria** | 12. Design features (e.g., monitoring capabilities, EMS/BMS)<br>13. Enclosure (protection rating, aesthetic)<br>14. Energy density (by footprint [m2]) |

### BESS RFI outcomes

The RFI was conducted on an invite-only basis to reduce administrative workload and ensure that only competitive submissions would be received. Bespoke BESS manufacturers were not invited as they are not cost-competitive. Out of 18 BESS vendors, eight made a submission, of which seven were compliant and assessable, and YEF listed the leading candidates in **Table 5** with a high-level assessment of their submissions.

Data are anonymised as RFI submissions are commercial-in-confidence. The costs are based on the product proposed for a Medium, outdoor, front-of-meter configuration (refer **Table 3**); qualitative assessments range from Adequate – Strong – Very Strong. The best value offering among these vendors formed the basis of capital costs used in the financial projections.

**Table 5 : Overview assessment of BESS vendors (Medium, outdoor, FOM configuration) – top four leading candidates**

| Vendor | Company F | Company E | Company A | Company C |
|---|---|---|---|---|
| Unit cost (installed; Medium) | $310,000-$340,000 | $250,000-$280,000 | **$150,000-$180,000** | $250,000-$280,000 |
| Annual Maintenance costs | $2,500.00 | Included | $1,800.00 | TBC |
| Technical compliance | Yes | Yes | Yes | Yes |
| Performance specifications | Strong | Adequate | Strong | Strong |
| Safety and design features | Strong | Strong | Strong | Strong |
| Industry experience and customer support structure | Strong | Strong | **Very strong** | Adequate |
| Commitment to sustainability and responsible sourcing | Strong | Adequate | Adequate | Adequate |
| System and enclosure design | Strong | Adequate | **Very strong** | Strong |
| Grid-forming functionality | Expected late 2024 | No | **Yes** | **Yes** |

<u>BESS Selection for GANBIM Projects:</u>

**Medium BESS:** Company A has been selected as the leading candidate for all medium systems based on the maturity and functionality of their product and their pricing relative to competitors. YEF has used the specifications and pricing for this system in all financial projections of systems with a medium-sized battery.

**Small BESS:** Pricing for the leading small systems was found to be no better than for Company A's medium system offering. As a result, YEF has selected and modelled Company A's medium-sized offering, with output derated to 50kW, as the leading candidate for projects with a small system.

## 4.3. Retail arrangements

YEF conducted a second RFI for the procurement of retail services for management of BESS operation and market participation. Energy retailers, FCAS aggregators and DER optimisation providers were invited to submit information on various services including FOM, BTM, BTM with backup, and co-located EV chargers. Retailers were asked to provide information on pricing, operation strategies and capability to deliver key market services. The scope of these enquiries is listed in **Table 6**.

The RFI also requested information on the retailer's ability to operate at scale and evidence of similar projects that demonstrated their capacity. The criteria for assessment of submissions are listed in **Table 7**.

The results of this RFI were used to identify leading candidates for provision of retailing services to future GANBIM projects. YEF utilised the pricing from leading candidates when developing financial projections and have recommended retailer candidates for each individual council.

Additionally, the averaged expense was calculated for a Medium BESS archetype (100kW/300kWh) under a 'fee for service' model as this is the most predictable pricing arrangement that is independent of performance.

Based on the pricing provided in four submissions, the average retailer price was calculated at about **$2,350 p/a.**

### Table 6: Retailer RFI Scope

| Service Requested | Description |
|---|---|
| Wholesale Arbitrage | Trading energy based on electricity spot market price. Ability to capitalise on price spreads and peak pricing events |
| FCAS | Status of FCAS registration in Victoria |
| BTM Optimisation | Ability to optimise BTM value streams |
| EV Charger Integration | Ability to integrate and optimise EV chargers |
| **Additional Information Requested** | **Description** |
| BTM Backup & market trading capability | Ability to support backup power functionality without compromising optimisation services |
| Interest in Ownership | An indication of interest in ownership of BESS at nominated project sites. |
| Compatibility with BESS products | An overview of current integrations and costs |

### Table 7: Retailer RFI Assessment Criteria

| Criteria | Explanation |
|---|---|
| **Real-time optimisation and advanced price forecasting** | Sophistication of optimisation services, ability to perform advanced price forecasting and applicability to common project archetypes. |
| **Pricing provided** | Pricing provided, either as estimated dollar values, or details of pricing models. |
| **Maturity of product offering** | A measure of how immediately available and proven the product is. |
| **Financial viability** | Assessment of whether the commercial arrangements would be profitable enough to support ongoing operation and generate community the required benefits. |
| **Alignment with goals of 100NB** | Alignment with the goals of the 100NB program. Community focus, environmental and social credentials and social licence. |

### Retailer RFI outcomes

The RFI process engaged with known industry leaders and service providers in the VPP space, as well as companies providing FCAS aggregation services. 20 vendors were invited (17 retailers, 3 FCAS aggregation services) of which 10 made a submission.

All 10 submissions provided sufficient information to be considered assessable. Each of the retailers was given a letter identifier, sequenced from A to J, and applications were then assessed by YEF's team.

Of the 10 submissions, 1 was categorised as an "Alternative Proposal" that was not suitable in the context of an NBI3 business case, 5 were relevant but lacking some key information (e.g. pricing), and 4 were determined to be competitive. All 4 competitive submissions were shortlisted based on assessment against criteria listed in **Table 6**.

The details of the shortlisted candidates and indicative pricing for their services are presented in **Table 8**.

**Table 8: Summary of competitive Retailer RFI submissions**

| | Vendor | Retailer E | Retailer A | Retailer J | Retailer B |
|---|---|---|---|---|---|
| Services | Advanced Optimisation | Yes, including price forecasting | Yes, including price forecasting | Yes, including price forecasting | Yes, including price forecasting |
| | BTM Backup | Supported | Supported | Not supported | Supported |
| | EV Charger Optimisation | Yes, some development required | Yes, some development required | Yes, some development required | Yes, some development required |
| Maturity of VPP product | | High | Very High | High | Very High |
| Commercial Models | Capacity lease payments[8] (~100kW/~300kWh) | $10,000+ p/a | PPA + Lease Income | **Not offered** | **Not offered** |
| | Revenue Split | Offered, detail TBC | PPA + 50% revenue split | 80% passthrough | **Not offered** |
| | Fee for service (100% passthrough) | $400-$1000 p/a[9] | **Not offered** | **Not offered** | $1,600-2,100 p/a |
| # Integrated BESS brands | | 3 | 3 | 6 | 3 |
| Alignment with goals of 100NB | | High | High | Low | High |

[8] Capacity lease is a commercial model in which the retailer pays the owner a fixed, agreed upon rate to operate the battery. This guarantees a stable revenue.
[9] Note that this pricing is estimated based the retailer's assumption that ~100 systems are being integrated into the retailer's platform.

**Recommended Retailer Offerings:**

Preferred retailing suppliers for generalised FOM and BTM configurations are detailed in this section. Relevant retailers have also been listed in council appendices, but no individual selections have been made.

Multiple suppliers and commercial arrangements should be considered when moving business cases to the next stage. In some of these cases, options like capacity lease fees and revenue split arrangements may prove attractive to councils, instead of fee-for-service, and it is important to note that not all retailers offer these.

For the purposes of financial modelling, YEF has used the pricing information provided by Retailer B as it is believed to be the most reliable representation of the industry standard for NB retailer pricing. However, it must be noted that there may be more competitive offerings for BTM projects. and that the actual retailer costs will vary based on the vendor selected for each project.

Recommended BTM offerings

For all BTM systems YEF have recommended Retailer A and Retailer E as first choice suppliers. Both candidates demonstrated the required capabilities and experience and between them offer BTM solutions that can meet the requirements of GANBIM projects.

For BTM projects with no backup power requirements, Retailer J is a strong alternative offering. However, Retailer J does not support projects with a backup power requirement, and as such, proponents seeking a third supply offer may wish to approach Retailer B.

Recommended FOM offerings

For all FOM systems, YEF has recommended Retailer E and Retailer B as first choice suppliers, and Retailer J as an alternative. All three of these candidates demonstrated a sophisticated approach to NB operation in their RFI submissions, however the experience of Retailer B and strong alignment of Retailer E with the 100NB program mark them as leading candidates.

Recommended offerings for projects with EV charging

In assessing RFI submissions it was found that while there is a strong interest in incorporating public EV charging, no retailer clearly demonstrated a proven record of integrating DC EV charging. While some retailers have incorporated home EV chargers into their VPP offerings, YEF believes there may be some development work required to integrate with DC chargers. The shortlisted candidates show promise in their ability to develop these capabilities; however, the lack of a readily available solution is a consideration that proponents should be aware of when committing to a project with an EV charger. This sits outside of the scope of 100NB funding but may influence grant funding inputs such as project timelines and risk assessments.

YEF recommends that proponents wishing to pursue EV charging follow the same FOM and BTM project retailer recommendations but note that considering alternative retailers may be necessary.

## 4.4. Business model

### Overview of GANBIM Business Models

Business models are governed by NB configuration (BTM or FOM) and the benefits prioritised by the owner. For GANBIM sites, YEF classified all projects according to the six business models outlined in **Table 9.**

Please note that all the listed business models can be configured to include EV charging as an additional value stream and project benefit. This is not addressed in the GANBIM business models as EV charging is not within the scope of NBI3 or 100NB programs.

**Table 9: Business Model Archetypes for GANBIM Projects**

| Business Model | | # NBs |
|---|---|---|
| FOM | Market trading | 8 |
| | Market trading with network support | 2 |
| BTM | Consumption offsetting | 1 |
| | Market trading and demand offsetting | 4 |
| | Consumption offsetting with possible backup capability | 3 |
| | Market trading & demand offsetting with possible backup capability | 4 |

### FOM Business Models

Market trading (FOM)

**Goal:** Maximise financial return through trading in the wholesale energy market and FCAS markets.

**Operation:** Council or a third party would own the battery, contracting operations to a retailer to participate in the markets. Retailer price forecasting and optimisation services are used to dispatch the battery for maximal returns. Revenue generated by the project is then shared with the community through a community benefit fund or similar mechanism.

Market trading with network support (FOM)

**Goal:** Maximise financial return through trading in the markets, community battery tariffs, and providing local network support.

**Operation:** As per *Market trading (FOM)* but with owner working closely with the local DNSP to address network constraints in the local LV network. Retailer operates as per *Market Trading (FOM)* but also observes the operating envelopes required to provide desired network support. In some cases, DNSPs may compensate the NB through a network support agreement which would contribute to system revenue.

Revenue generated by the project is shared with the community through a community benefit fund or similar mechanism.

**BTM Business Models**

Consumption offsetting (BTM)

**Goal:** Generate financial return through bill savings for the host site.

**Operation:** Council would own the battery, which would operate based on local monitoring and controls. Dispatching the battery when there is onsite demand will reduce energy and network charges for the host site. These cost savings could then go into a community benefit fund or be passed on to host site tenants.

Market trading and demand offsetting (BTM)

**Goal:** Maximise financial return through bill savings for host site and market participation.

**Operation:** As per *Consumption offsetting (BTM)* with the addition of wholesale energy and FCAS market participation through use of a child meter at the battery. Under this model the battery can reduce demand charges for the host site but is unable to reduce energy charges as discharged energy is sold on the market. The market revenue and network charge cost savings are then shared through a community benefit fund or similar mechanism.

Consumption offsetting with possible backup capability (BTM)

**Goal:** Generate financial return through bill savings for host site and provide back-up power to host site during network outages.

**Operation:** As per *Consumption offsetting (BTM)* but with possible backup power supply capabilities. For backup power supply capability, the operator or site manager could be directed to maintain a minimum state of charge, or to reserve capacity when extreme weather is forecast, to ensure capacity is available when required.[10,11] Benefit-sharing through a community benefit fund or passing on savings to tenant.

Market trading, demand offsetting and possible backup capability (BTM)

**Goal:** Maximise financial return through bill savings for host site and market participation and provide back-up power to host site during network outages.

**Operation:** As per *market trading and demand offsetting* (BTM) but with the possible inclusion of BTM backup capability that would provide additional value to the community in times of emergency or network outages.

[10] Detailing the capital cost and economic benefit of establishing backup power supply is beyond the scope of this project, and these figures are therefore not included in the analysis. Nonetheless, the operational considerations and non-economic benefits are explored as these were central to some Councils' objectives and preferred project model.

[11] Some retailers have already integrated weather data feeds into their dispatch platforms, both for better market optimisation and to flexibly maintain backup power capacity.

## 4.5. Ownership and Operation

**Ownership arrangement typology**

Councils have differing capacity and appetite for NB ownership. As such, we generalise between three broad-based models of ownership considered in this business case:

(a) Active council ownership

This model involves a council owner who takes an active interest in, and potentially some decision-making responsibility for, how the BESS is dispatched. This allows the council to derive organisational learnings about batteries and the energy market through their involvement in operation. As the owner, the council maintains financial responsibility for operating expenses (e.g., insurance and maintenance fees) while contracting operation of the system to a retailer/operator. Retail arrangements best suited to this ownership model include fee-for-service or revenue-sharing arrangements.

(b) Passive council ownership

This model involves a council owner who may not have the capacity or capability to be involved in the operation of the BESS beyond some administrative oversight. The opportunity to build capacity and share knowledge remains, though it is reduced compared with Active ownership (a). As the owner, the council maintains financial responsibility for operating expenses (e.g., insurance and maintenance fees) while contracting operation of the system to a retailer/operator, who may largely determine how the BESS should be operated subject to the terms of the retail and operation contract. Retail arrangements best suited to this ownership model include revenue-sharing or capacity lease arrangements.

(c) Third party ownership

Under this model, council lease the proposed site to a third-party owner, potentially including in the lease stipulations regarding how the site may be used (e.g., ensuring benefit-sharing with the community). This model suits councils who are unable to take on any financial responsibility for capital or operating expenses, or for whom NB ownership is not strategically aligned with council priorities. The opportunities for organisational learning, community engagement and other social benefits are somewhat less than through council ownership. However, it involves the least risk and leverages third party resources to achieve the project's anticipated outcomes.

**Recommendation of Ownership Models**

The attached business cases recommend an ownership model of each council. Despite this, YEF recommends that councils consider all ownership possibilities when making a final decision on how to proceed with their NB project, and notes that there are many third parties interested in owning NBs.

### Third party ownership options

During this NBI3 project, YEF investigated potential options for third party ownership. The purpose of this investigation was to identify legitimate, capable candidates for councils to engage with, and understand their interest in owning and delivering a NB under the 100NB funding program.

#### Identification of possible owners

YEF sought to determine interest in ownership from retailers in the RFI process and non-retailers through informal channels.

Note that the assessment of possible owners was not exhaustive, and other candidates may exist in the market. Only two types of owners were considered; retailers with existing operations and capability; and non-retailers who own similar assets and are very active in this space.

YEF only considered candidates well aligned with the assessment criteria in **Table 10**. A total of 7 candidates were identified and a general assessment was conducted to examine their suitability for ownership.

**Table 10: Ownership Assessment Criteria**

| | Criteria | Weight |
|---|---|---|
| 1 | Reputation (Social Licence) and Experience (Trust) | 20% |
| 2 | Financial Stability | 15% |
| 3 | Willingness to co-fund the project | 15% |
| 4 | Project alignment with100NB goals and objectives | 15% |
| 5 | Owner business alignment with council business practices | 15% |
| 6 | Understanding of NB operational requirements | 10% |
| 7 | Ability to scale and own multiple systems | 10% |

#### Results of ownership investigation

Based on the findings of this initial analysis, YEF has provided a summary of strengths and weaknesses for each candidate in **Table 11**. Note that a detailed ownership assessment needs to be conducted to fully assess suitability of candidates against the listed criteria. Council proponents are welcome to consult YEF for an assessment and recommendation.

**Table 11: Ownership Candidates**

| Candidate | Summary |
|---|---|
| Retailer A | Proven NB delivery, advanced dispatch system and strong social licence. Limited experience with FOM systems and have some restrictive commercial requirements. |
| Retailer B | Proven NB delivery, advanced VPP and strong financial backing. BTM capability is unclear, as is approach to benefit sharing. |
| Retailer E | Have delivered BESS, advanced operating system and strong social licence. Yet to own a NB and some setup work may be required to integrate systems into their VPP. |
| Retailer H | Have delivered similar projects, functional VPP and strong financial backing. Poorly aligned with 100NB program values and optimisation is not market leading. |
| Retailer I | Have delivered similar projects and have a strong social licence. Dispatch system is unproven and likely needs some development. |
| Retailer J | Have delivered similar projects, advanced operating system and offer joint ownership. Poorly aligned with 100NB program values. |
| Owner A | Experienced owner of electrical infrastructure and delivery of battery systems. Currently operating NBs through a retail partner. |

## 4.6. Orchestration

Multiple orchestration pathways exist for 100NB funded projects, and as such there are several ways in which councils can act as proponents for a NB in their LGA. YEF has identified four main cases under which the battery projects outlined in the GANBIM business cases could be orchestrated. The most suitable approach for each individual council should be determined by the councils based on their review of the final business case.

**Case 1: Retailer Owner, with VPP**

Multiple systems owned by a single retailer and some systems owned by councils, orchestrated into a single VPP under that retailer, with leasing payments and benefit sharing mechanisms in place to meet the priorities of the funding program. A funding application made by the retailer, with letters of support from non-owner-councils, and separate applications by the owner-councils.

**Case 2: Private Owner with VPP**

Systems owned by non-retailer, non-council party, aggregated into a VPP by a single retailer, with leasing payments and benefit sharing mechanisms in place to meet the priorities of the funding program. Individual funding applications made by owners, or a joint application by retailer with funding passthrough agreements. A good option for councils who do not want to actively own the BESS.

**Case 3: Council Owners with VPP**

Systems owned by individual councils aggregated into a VPP by a single retailer, systems can be operated under any business model and councils have active control of distribution of benefits. Individual, council-led applications. Good option for councils wanting to own the BESS whilst also collaborating and coordinating with other proponents.

**Case 4: Council Owners with no VPP**

Like Case 3, but without aggregation of systems by a single retailer. Individual retailers selected for each project. Good for councils with appetite for ownership and unique project needs or who wish to work with a specific retailer.

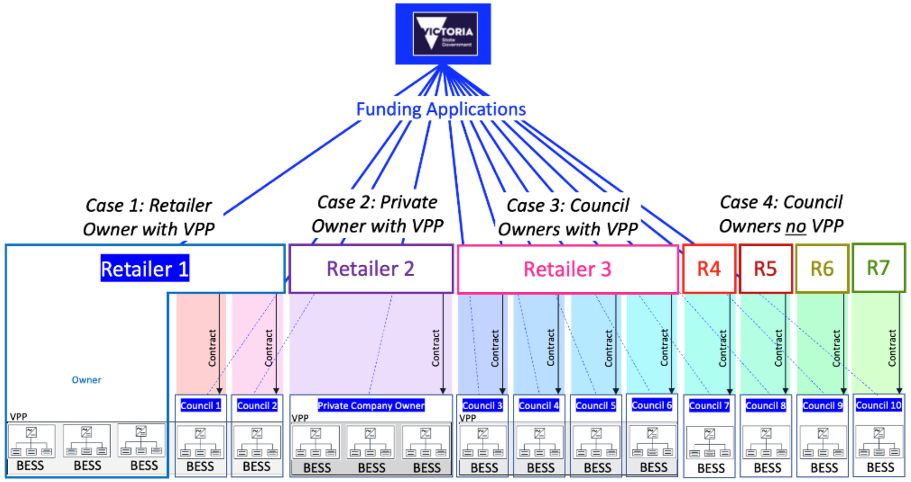



**Figure 2: Overview of orchestration pathways**

# 5. Project Benefits

## 5.1. GANBIM Program alignment to objectives and priorities

### Table 12: Neighbourhood battery alignment to objectives and priories

| Priority | Benefit of project |
|---|---|
| **100 Neighbourhood Batteries funding program** | |
| Passing on benefits of local energy generation and storage to consumers | Projects will distribute profits from battery operation through mechanisms that finance community initiatives aligned with community and council priorities (e.g., subsidise installation of solar or energy-efficient appliances). BTM systems will include mechanisms for sharing host site bill savings with the community or provide bill savings to community organisations who are tenants at the host site. |
| Increasing energy reliability | Building greater storage capacity contributes to the overall development of a more reliable network by reducing dependence on high voltage transmission and distribution feeders. GANBIM batteries will provide firming, may address network constraints, may lower peak demand and in some cases will be configured to provide backup power services. |
| Reduced cost of network upgrades | Installing an NB in a low-voltage network with load capacity limitations may obviate network augmentation and reduce costs to consumers. Projects may reduce peak demand on a local transformer, contribute to network flexibility and enable DER without a need for traditional "pole and wire" upgrades. |
| Enabling community contribution to the energy transition | Projects may increase solar hosting capacity in the local network by addressing constraints, support solar installations for low-income households through benefit-sharing, and boost public engagement in the energy transition. Community engagement works carried out for these projects will give the community a voice in how value is generated and distributed. |
| Accelerating scaled deployment of NBs and new operational models. | The 22 GANBIM projects would represent a meaningful acceleration NB deployment in Victoria and could mainstream NB deployment by local governments and other non-energy sector organisations. Moving towards mass deployment will contribute to benefits from economies of scale and thus further improve the value proposition of NB projects. |
| **DEECA DER policy** | |
| Supporting people to transition together | The projects share the value generated with the community and encourage greater community involvement in the energy transition through community engagement, benefit-sharing and education. Councils delivering NB projects represents the community as a whole participating as a leader in the energy transition and enable all to benefit from local energy storage. |
| Unlocking the value of Victoria's DER | Projects will increase network hosting capacity, enabling greater solar penetration, increase minimum operational demand, and reduce solar curtailment or export limiting, enabling better utilisation of Victoria's DER. |
| Smoothing the transition of the grid | NBs address both grid-scale and LV network-scale transition challenges while generating value for community, council and networks. Projects may also support sustainable transport through co-located EV chargers and meeting rising demand from residential EV charging. |

## 5.2. GANBIM Site Benfits Matrix

**Table 13: Site Benefits Matrix**

| LGA | Type | Community benefits | | | | | | Technical benefits | | | Council benefits | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Community Benefit Fund | Access EV Charging | Support DER uptake | Shared Savings | Tenant Savings | Backup Power | Peak reduction | Less voltage rise | Network Flexibility | Support local power | Sustainable Transport | Community Action | Leadership & Innovation | Community Resilience | Council Resilience |
| Banyule | FOM | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Bayside | FOM | ✓ | | ✓ | | | | ✓ | | ✓ | ✓ | | ✓ | ✓ | | |
| Boroondara | FOM | ✓ | | ✓ | | | | ✓ | | ✓ | ✓ | | ✓ | ✓ | | |
| Hobsons Bay | BTM | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| Hume | BTM | ✓ | | | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | |
| Kingston | FOM | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Knox | FOM | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Manningham | BTM | ✓ | | | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | |
| Maribyrnong | BTM | ✓ | ✓ | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Maroondah | BTM | ✓ | | | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Monash | BTM | | | | ✓ | | ✓ | | | ✓ | | | | ✓ | ✓ | ✓ |
| Mornington | FOM | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Nillumbik | BTM | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Port Phillip | FOM | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Queenscliffe | BTM | ✓ | | | | ✓ | | ✓ | | ✓ | | | ✓ | ✓ | | |
| Stonnington | BTM | ✓ | | | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Surf Coast | FOM | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Whitehorse | FOM | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Whittlesea | FOM | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Wyndham | BTM | ✓ | | | ✓ | | | | ✓ | ✓ | | | ✓ | ✓ | | |
| Officeworks (Yarra) | BTM | ✓ | ✓ | | ✓ | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| Yarra Ranges | BTM | ✓ | | | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | |

# 5. Project Benefits

### Assessment of GANBIM Benefits

In developing this business case, YEF worked closely with council representatives to identify key project objectives, including benefits. This insight was used to help inform site selection and recommendations on operational and ownership models.

The results presented in **Table 13** have been determined based on the project architectures presented in each individual council business case and are dependent on the project being delivered as recommended by YEF.

Determining Council Benefits

For the purposes of this project YEF has identified council objectives based on the content of their individual climate action plans. These objectives have been summarised into six council benefits listed in **Table 13** and **Table 14**, which encompass the key themes of the 22 action plans.

The council objectives have not been included in the program objectives and alternatives section as they sit outside of the direct requirements for project funding and have been covered in this section and the council appendices.

**Table 14: Explanation of benefits**

| Benefits | Shorthand | Explanation |
|---|---|---|
| Community Benefits | Community Benefit Fund | A Community Benefit Fund or similar mechanism that makes system profits available for supporting community initiatives. |
| | Access EV Charging | Improving access to Electric Vehicle Charging stations by co-locating DC charger and NB. |
| | Support DER | Supporting community uptake of DER such as solar PV and maximising value of existing assets. |
| | Shared Savings | Benefit-sharing of bill savings with community group, mostly applicable to BTM sites with council tenancy. |
| | Tenant Savings | Reducing energy bills for tenants, applicable for BTM projects with a non-council tenant. |
| | Backup Power | Provision of backup power at BTM sites for community use. |
| Technical Benefits | Peak reduction | Peak demand reduction by time shifting energy from periods of low demand to periods of high demand. |
| | Less Voltage rise | Addressing voltage rise, reverse power flow or significant exports, by charging during peak solar PV generation. |
| | Network Flexibility | Increasing network flexibility through distributed energy storage. |
| Council Benefits | Support local power | Support electrification and local clean energy generation by encouraging uptake of solar PV. |
| | Sustainable Transport | Support sustainable transport through public EV charging access and supporting networks to host residential chargers. |
| | Community Action | Engage and mobilise communities in climate action, and empower them to participate in the energy transition |
| | Leadership & Innovation | Demonstrating council leadership and innovation in responding to the climate emergency. |
| | Community Resilience | Building community resilience and adaptive capacity. |
| | Council Resilience | Enhancing resilience and reducing emissions of council facilities |

# 6. Competitive Advantage

## 6.1. Comparison to alternative solutions

**Table 15: Comparison of alignment of neighbourhood batteries and alternative solutions to objectives and priorities**

| | | Objectives and Priorities | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local benefits from local DER | Increased energy reliability | Reduced cost of network upgrades | Engaging community in transition | Scale up solutions to meet storage targets | Building capacity to transition together | Unlocking value of VIC DER | Smoothing transition of grid |
| Alternative Solutions | Solar PV | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ | ✗ | ✗ |
| | Home Batteries | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ |
| | EV Charging | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | ✓[12] | ✓[10] |
| | DNSP BESS/upgrades | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ | ✓ |
| | Medium-Voltage BESS | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ | ✓ |
| Neighbourhood Batteries | FOM NB | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | BTM NB | ✓ | ✓ | ✓ | ✓[13] | ✓ | ✓[11] | ✓ | ✓ |

[12] If smart charging
[13] If NB is visible and active community engagement undertaken

## 6.2. Competitve Advantage of Neighbourhood Batteries

**Neighbourhood batteries are whole of community solution.**

Neighbourhood batteries promise to play an important role in the energy transition as a key enabler of DER and electrification, and a cost-effective means of introducing local energy storage.

NBs offer a unique value to our LV-Networks and local communities in that they can simultaneously tackle emerging network issues, whilst also generating revenue that can be equitably shared with the community. They have a strong social value, and are local by nature, meaning that when delivered well they become a focal point for community engagement in our collective energy future.

As a whole-of-community solution, NBs make energy storage accessible to all and enable communities to transition together.

Unlike Solar PV and Electric Vehicle Charging Projects, NBs time shift energy exchanges for greater financial gain. This enables NBs to generate greater value that is shared with the whole community, not just those who own an EV or a home.

NB's have a similar advantage over subsidising home batteries as they offer a whole-of-neighbourhood solution. If delivered by non-DNSPs and grant-funded, they can resolve local network constraints without increasing electricity bills, and address the whole neighbourhood, not just individual households.

As illustrated in **Table 15**, although they rely on grant funding at this time, NBs are the only solution that align with all identified needs and priorities and are unique in that they can equitably benefit the whole community.

**Neighbourhood batteries are an opportunity for councils to meaningfully contribute to the energy transition.**

NBs offer a unique opportunity to empower councils to deliver energy storage projects that make a meaningful contribution to the transition.

Council-led NBs demonstrate that organisations other than DNSPs, and state and federal governments can play an active role in the energy transition. They are also proof that communities can benefit from engaging in the transition and should be supported to do so.

These projects are an opportunity to build council's capacity to move beyond the bounds of their existing sustainability programs, and in doing so create new opportunities for local government to be a part of our energy future.

While there are many alternative approaches to consider, YEF believes that NBs are an important step in scaling the impact that councils have on meeting our transition targets.

# 7. Stakeholder Engagement

## 7.1. Overview, Purpose and Objectives

### Overview

Stakeholder engagement is a core component of delivering a neighbourhood battery and can unlock better outcomes for the nearby community and the project itself. As part of GANBIM, YEF developed Stakeholder Engagement Plans tailored to each site.

### Purpose

The purpose of developing Stakeholder Engagement Plans under the GANBIM program is to outline best-practice engagement activities that could support delivery and installation of the proposed battery projects.

Specifically, each plan has a purpose of securing social licence for the ongoing operation of the battery for 10+ years.

### Objectives

The objectives of these Plans are to:

- explain project elements and ideas,
- understand benefits, impacts and potential mitigation measures,
- raise awareness of the project,
- enable participation and incorporation of ideas and
- respond to questions and concerns.

### FOM and BTM Plans

Two main approaches are proposed: one for front-of-meter projects and another for behind-the-meter projects.

Front-of-meter projects, being more public and visually exposed, require greater public engagement. Behind-the-meter projects are less public-facing and focus on the host site.

### Core engagement activities

In both FOM and BTM plans core engagement activities include:

- determining negotiable elements (artwork, vegetation etc.),
- initiating engagement through emails & letter drops,
- hosting information sessions or meetings,
- establishing a reference group to decide on key negotiables,
- notices for disruptions and,
- launch events.

### Influence on project

Based on YEF’s experience, engagement and delivery are intertwined. Decisions made by reference groups may need to be integrated into the project timeline.

In some instances, local knowledge surfaced through engagement may trigger project changes outside of these pre-defined negotiables.

## 7.2. Plan Development and Structure

Plan development was informed by the International Association for Public Participation (IAP2) Quality Assurance Standard and other relevant guidance. **Table 16** details this process and a detailed methodology can be made available on request to YEF.

**Table 16: Stakeholder Engagement Plan Development Process**

| Stage | Outcome |
|---|---|
| Problem Definition | Defined by relevant funding requirements and consultation with councils. |
| Agreement of purpose and negotiables | Purpose identified as securing social licence for project life. Specific goals included in each engagement plan. Engagement negotiables determined. |
| Identification of negotiables | Identification of decisions that may be influenced by external stakeholders. |
| Level of Influence | 'Level of influence' allocated to stakeholders based on desktop analysis and council input. |
| Identifying Stakeholders | Mapped stakeholders, determined communication / liaison needs and categorised into “Tiers”. |
| Project Requirements | Communicated requirements of NBI program and potential funding sources and incorporated council-specific needs. |
| Development of Plans | Produced 22 engagement plans following the structure outlined in this section. |
| Review | Council reviewed drafts and plans were updated. |
| Finalisation | Finalised plans and submitted to councils. |

**Structure of engagement plans**

The GANBIM engagement plans are structured as follows:

- ***Project overview***: purpose and goals, project and site details, context and mapping potential roles/responsibilities
- ***Stakeholders:*** demographics, stakeholder mapping and tiers
- ***Engagement:*** negotiables, levels of influence, engagement opportunities (tools), implementation plans and risks identification
- ***Communications:*** placeholder for key messages, collateral, enquiries, and complaints
- ***Monitoring, Evaluation and Reporting (MER)***: high-level MER plan
- ***Appendices:***
    - Stakeholder Mapping Spreadsheet
    - Implementation Plan
    - Challenges and Risks
    - Stakeholder Impact Analysis

**Please note**: It is recommended that parties who receive 100NB funding further refine their stakeholder maps and engagement plans. Individual Plans have been delivered to councils separately and can be provided again upon request to YEF.

# 8. Program Delivery Schedule

# 8. Program Delivery Schedule

## 8.1. Program Schedule

For this project, YEF has developed two generic project schedules that can be applied to projects – one for FOM systems and one for BTM systems. These schedules can be found in **Attachment B – FOM Program Schedule** and **Attachment C – BTM Program Schedule**.

A high-level overview of the key project schedule phases is presented in **Table 17**. It is expected that the main variations in schedules between projects will depend on the final complexity of connection and retailing arrangements. As such, YEF recommends that councils revise timelines based on the final outcomes of their detailed design and procurement activities.

**Program Schedule Assumptions**

The program schedules have been developed on the assumption that there are no major modifications to the site selection or layout once the project has commenced. BESS procurement, manufacturing and delivery timelines are based on YEF's understanding of the mid-scale battery market and findings from the BESS RFI.

Community engagement timelines have been developed in coordination with YEF's in-house engagement team, and timings are largely dictated by the completion of the project setup phase and the progress of the BESS manufacturing, delivery and installation.

**Table 17: Summary of project delivery phases**

| Phase | Description | Duration |
|---|---|---|
| **Project Setup Phase** | Securing site access, complete detailed design and procurement | **~2 months** |
| **Engagement & Preparation Phase** | Commence community engagement, BESS manufacture & securing approvals and lease contract | **~2-3 months** |
| **Installation & Commisioning Phase** | BESS installation and comissioning, and ongoing comunity engagement. | **~2.5-3 months** |
| **Operation Phase** | Opperation of BESS and ongoing reporting | **Ongoing** |

# 9. Program Risk Assesment

## 9.1. Neighbourhood Battery Risk Asessment

In this project, YEF has drawn on their experience priming and delivering NB projects to develop generic risk assessment schedules that can be readily applied to the proposed GANBIM projects. These risk assessments can be found in **Attachment D – FOM Risk Assessment** and **Attachment E – BTM Risk Assessment**. Below is a summary of the general risks faced by GANBIM proponents, and the general mitigation measures that can be applied to overcome these risks.

**Table 18: Summary of general risk categories and mitigation strategies**

| General Risk Classification | General Mitigation Strategies |
|---|---|
| **Project delivery risks**<br>Such as unexpected costs and schedule overruns, connection issues (FOM) and switchboard upgrade issues (BTM). | **Realistic and informed project planning**<br>YEF has utilised its extensive experience in the NB space to ensure that the GANBIM business cases include realistic project schedules with sufficient contingency. RFI findings and informed procurement processes should be used to ensure that proponents select vendors that can reliably deliver an NB project. |
| **Engagement issues – key project stakeholders and community**<br>Risks associated with the community facing nature of NBs and dependence on council and other landowners for project delivery. | **Comprehensive engagement with stakeholders throughout project**<br>Proactive engagement of community as project “owners”, engagement of site owners (council or external) throughout project design, securing lease agreements as early as possible. |
| **General BESS Safety Issues – fire, electrical, system malfunction**<br>Risks associated with the failure of BESS due to malfunction or external factors. | **Adhere to Australian standards for equipment and safety**<br>Procure only from reputable suppliers who can demonstrate their compliance to Australian standards and safety practices. |
| **Risks of poor NB performance and corresponding financial impact**<br>Risks associated with underperformance of BESS, failure of hardware or software, resulting in a non-functional system and financial exposure. | **Only use reputable suppliers**<br>Minimise risks by avoiding immature products and contractually safeguarding against performance issues where possible. |

# 10. Program Financial Projections

## 10.1.Overview of Approach to Financial Projections

For this business case, YEF used an intelligent asset optimiser to conduct simulation modelling for each of the 22 neighbourhood battery projects, using Gridcog modelling software. For FOM systems, the project value is derived from the battery's performance in the wholesale and FCAS markets. While for the BTM systems, it is determined by comparing the baseline scenario (business-as-usual) with the revenue and savings realised by installing a battery. All modelling projected BESS performance over a 10-year project life based on wholesale and FCAS price projections.

YEF has adopted a conservative approach to financial projections and excluded revenue from future market opportunities to ensure project risks are properly accounted for. The CAPEX and OPEX assumptions are based on the best value offers sourced through the RFI process detailed in sections 4.2 and 4.3, reflecting real-world pricing.

**Figure 3** illustrates the approach taken to modelling, including key inputs and calculated results. For a detailed overview of the financial projection methodology, please refer to **Attachment F – Modelling Methodology**.

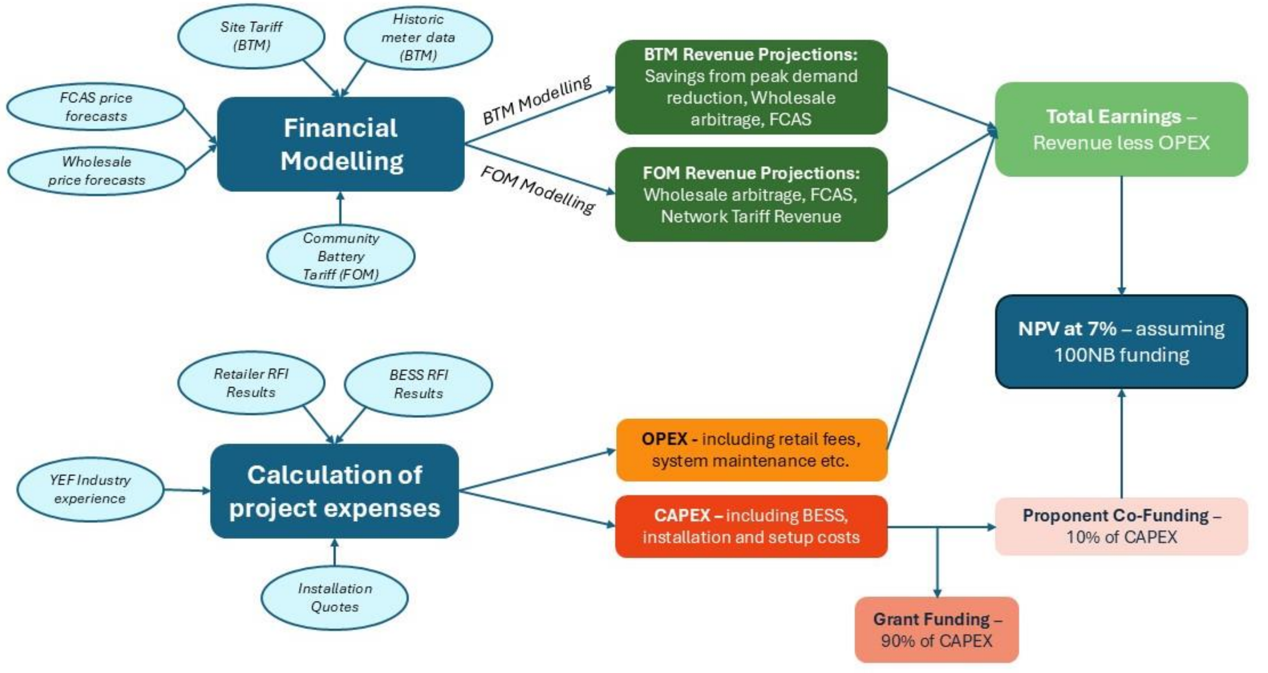



**Figure 3: Overview of Modelling and Financial projections**

## 10.2.Summary of Financial Projection Results

### Front of Meter Systems

Front of meter modelling results are presented in relevant council appendices and focus on small (~50kW) and medium (~100kW) size systems, as the CAPEX for these systems can be funded by the NBI3 grant program. Large (~150kW) and X-Large (~200kW) systems, despite their potential to generate more revenue, are unfeasible due to high CAPEX which requires substantial co-contributions from proponents.

Projects were evaluated in the CitiPower/United Energy/Powercor, and AusNet network areas[14]. The results indicate that system earnings are better in CitiPower network area compared to AusNet, primarily due to higher annual fixed charges in these networks. However, CitiPower's favourable network tariff is expected to be updated in 2026 which may result in a higher fixed cost.

Modelling based on the RFI submissions shows that a medium-sized system with a 2-hour duration offers the best value in terms of earnings over a 10-year period and maintains a positive NPV when grant-funded. For sites with smaller connection capacity, a 100kW medium system limited to 50kW output, but with 200kWh storage capacity, still generates operational profits. The modelling summary for the proposed system configurations in each of networks is presented in **Table 19**.

**Table 19: FOM Financial Modelling Results**

| Network Area | # Projects | Power | Storage | Revenue per system | Earnings per system | NPV[15] per system | Total Revenue | Total earnings | Total NPV |
|---|---|---|---|---|---|---|---|---|---|
| CitiPower/United Energy/Powercor | 8 | 100kW | 200kWh | $125,833 | $72,333 | $26,980 | $1,006,664 | $578,664 | $215,840 |
| AusNet | 1 | 100kW | 200kWh | $101,961 | $48,481 | $9,236 | $101,961 | $48,481 | $9,236 |
| | 1 | 50kW | 200kWh | $87,498 | $33,998 | ($1,637) | $87,498 | $33,998 | ($1,637) |
| **FOM Subtotal** | **10** | **0.95MW** | **2.0MWh** | - | - | - | $1,196,123 | $661,143 | $223,439 |

[14] Note that no FOM projects have been proposed in the Jemena network area, and as such no results for the Jemena area are displayed in table 19.
[15] NPV calculations assume 7% indexation, and that the project is 100NB funded. The NPV is calculated using the council co-contribution as the cost of the project.

### Behind the Meter Systems

A 100kW/200kWh system was modelled for all BTM sites, with results showing significant variance in bill savings and market revenues. The greatest savings were observed at sites with a steep demand charge component to their electricity bill (e.g., Manningham and Monash).

For sites with little or no solar, councils see the NB as an enabler of additional solar, which if installed improves the overall business case. We have therefore modelled these sites with the recommended additional solar capacity and assume that councils will fund the cost of these systems separately.

Total earnings for market exposed BTM systems varied considerably, ranging from $48,127 to $199,061, with the highest returns observed at Maroondah's site, largely due to the expected installation of additional solar alongside the NB. The NPV of systems varies from $9,733 to $120,367[16].

The variability in returns highlights the significant impact that local consumption, production, retail and network charges, and connection constraints have on the value and efficacy of a BTM project. A summary of market exposed financial results (YEF's recommended approach) for the 12 BTM sites is presented in **Table 18**. Individual project results are provided in each council appendix (including non-market exposed where requested).

**Table 20: Summary of BTM Financial Projection Results**

| LGA | Type | Power (kW) | Storage (kWh) | Modelled Operation | Revenue & Savings | Total Earnings | NPV (at 7%) - with 100NB funding |
|---|---|---|---|---|---|---|---|
| Hobsons Bay | BTM | 100 | 200 | Market Exposed + Solar[14] | $149,621[14] | $101,121[14] | $47,844[14] |
| Hume | BTM | 100 | 200 | Market Exposed | $110,577 | $62,077 | $19,426 |
| Manningham | BTM | 100 | 200 | Market Exposed | $160,483 | $111,983 | $56,298 |
| Maribyrnong | BTM | 100 | 200 | Market Exposed | $114,598 | $66,098 | $22,890 |
| Maroondah | BTM | 100 | 200 | Market Exposed + Solar[14] | $247,561[13] | $199,061[14] | $120,367[14] |
| Monash | BTM | 100 | 200 | Market Exposed | $137,526 | $89,026 | $39,510 |
| Nillumbik | BTM | 100 | 200 | Market Exposed | $144,349 | $95,849 | $44,459 |
| Queenscliffe | BTM | 100 | 200 | Market Exposed + Solar[14] | $103,768[14] | $55,268[14] | $14,514[14] |
| Stonnington | BTM | 100 | 200 | Market Exposed | $99,012 | $50,512 | $11,428 |
| Wyndham | BTM | 100 | 200 | Market Exposed | $122,455 | $73,955 | $28,171 |
| Yarra (Officeworks) | BTM | 100 | 200 | Market Exposed | $130,772 | $82,272 | $34,643 |
| Yarra Ranges | BTM | 100 | 200 | Market Exposed | $96,627 | $48,127 | $9,733 |
| **BTM Subtotal** | | **1.2MW** | **2.4MWh** | | **$1,617,349** | **$1,035,349** | **$449,283** |

[16] Note that financial projections do not include the cost of additional solar that is expected to be installed alongside the NB.

### Summary of Financial Results

FOM and BTM systems have a slightly different means of generating revenue. FOM systems rely heavily on a favourable DNSP network tariffs to generate profits, while BTM systems take advantage of a battery's flexibility to generate savings against a site's network tariff. Larger systems generate more revenue to cover operating expenses but exceed the grant funding limits and require higher co-contribution and upfront investment from the proponents.

We have verified the viability of these projects by calculating NPV at 7 percent discount rate over ten years. However, this is not purely a business investment for councils. The actual benefits delivered to the community will be far greater, as councils are likely to reinvest total earnings back into the community. This requires councils to view their co-contributions as investments in the community and broader council goals, rather than as profit generating investments. For both FOM and BTM systems, keeping operating costs to a minimum is integral to improve earnings, especially for single systems. It is also clear that BTM sites with large solar systems utilise the battery's capacity more effectively, deriving site-specific benefits (by reducing peak demand), local network benefits (by enabling local solar) and system-level benefits (by time-shifting renewable energy).

Overall, the 10 FOM systems have total earnings of $661,143 over ten years, a combined NPV of $223,439, and require $2,699,820 of 100NB funding, and $269,980 of council co-contribution. The 12 BTM systems have total earnings of $1,035,349 over the same period, a combined NPV of $449,283, and require $3,147,096 of 100NB funding, and $314,712 of council co-contribution.

Note that the costs associated with the recommended solar systems for Hobsons Bay, Maroondah and Queenscliffe are not included in the financial calculations.

**Table 21: Summary of overall (10 year) financial results**

| | Power | Storage | Revenue/Savings | Total Earnings | NPV[17] |
|---|---|---|---|---|---|
| **FOM systems subtotal** | 0.95MW | 2.0MWh | $1,196,123 | $661,143 | $223,439 |
| **BTM systems subtotal** | 1.2MW | 2.4MWh | $1,617,349 | $1,035,349 | $449,283 |
| **Grand Total** | 2.15MW | 4.4MWh | $2,813,472 | $1,696,492 | $672,722 |

[17] NPV at 7% after factoring in Round 1 100NB funding.

# 11. Program Finance

## 11.1. Funding Opportunities – 100NB Funding Program

The development of the NBI3 GANBIM business cases has been performed so that proponents can dovetail the contents of these business cases into funding submissions for the *100 Neighbourhood Batteries Program* (100NB).

100NB aims to support the installation of 100 neighbourhood-scale batteries in Victoria to improve energy reliability and provide energy storage capacity for locally generated solar power, which is expected to increase access to renewable energy and help lower energy bills. Round 2 of this program is expected to open in August 2024.

Funding under 100NB Round 1 is awarded in 2 streams – refer to details in **Table 22**. It is anticipated that GANBIM councils wishing to pursue funding will make a submission under Stream 2: Community Benefit as this stream is better aligned to council priorities, does not require network data and has a lower level of cash co-contribution.

If councils seek to pursue their NB project with a DNSP third party owner, then the application will likely need to be made under Stream 1: Network and Community Benefits.

For the purposes of these business cases, it is assumed that projects will only apply under Stream 2, and the project funding model outlined in **Section 11.2** has been prepared under this assumption.

Other sources of finance are available and include ARENA's Community Batteries Funding Round 2.

**Table 22: 100NB Program Streams – conditions under Round 1**

| | Stream 1: Network & community benefits | Stream 2: Community benefits |
|---|---|---|
| **Funding per-BESS** | Up to $300,000 | |
| **Must demonstrate benefits for** | The electricity **network** and local electricity **consumers** | Local electricity **consumers** |
| **Minimum cash co-contribution** | 30% | 10% |
| **Minimum battery size** | 25kW/50kWh | 50kW/100kWh |
| **Maximum battery size** | 5MW/10MWh | 5MW/10MWh |

## 11.2. GANBIM Projects Funding Model

### Summary of proposed GANBIM Project Funding

In this project, YEF has developed Neighbourhood Battery delivery budgets as part of the financial projection activities. These budgets can be used to support funding applications. **Table 23** presents a summary of the proposed grant funded components and cash co-contributions for the 22 GANBIM business cases. The table shows the grant-eligible components and the 10% cash co-contribution required from the proponent for these components[18].

As per **Section 4.6 Orchestration**, YEF anticipates that there are several avenues through which projects could be pursued. YEF encourages councils that are not wishing to pursue their applications individually to assess the options presented in this section and reach out to relevant stakeholders who might assist in moving the project through the funding application process.

**Table 23: Summary of project funding requests[19]**

| Council | Grant Funded Component | Cash Co-Contributions | Total Project Delivery Costs |
|---|---|---|---|
| City of Banyule | $269,982 | $26,998 | $296,980 |
| City of Bayside | $269,982 | $26,998 | $296,980 |
| City of Boroondara | $269,982 | $26,998 | $296,980 |
| Hobsons Bay City Council | $262,258 | $26,226 | $288,484 |
| Hume City Council | $262,258 | $26,226 | $288,484 |
| City of Kingston | $269,982 | $26,998 | $296,980 |
| Knox City Council | $269,982 | $26,998 | $296,980 |
| Manningham City Council | $262,258 | $26,226 | $288,484 |
| Maribyrnong City Council | $262,258 | $26,226 | $288,484 |
| Maroondah City Council | $262,258 | $26,226 | $288,484 |
| City of Monash | $262,258 | $26,226 | $288,484 |
| Mornington Peninsula Shire | $269,982 | $26,998 | $296,980 |
| Nillumbik Shire Council | $262,258 | $26,226 | $288,484 |
| City of Port Phillip | $269,982 | $26,998 | $296,980 |
| Borough of Queenscliffe | $262,258 | $26,226 | $288,484 |
| City of Stonnington | $262,258 | $26,226 | $288,484 |
| Surf Coast Shire | $269,982 | $26,998 | $296,980 |
| Whitehorse City Council | $269,982 | $26,998 | $296,980 |
| City of Whittlesea | $269,982 | $26,998 | $296,980 |
| Wyndham City | $262,258 | $26,226 | $288,484 |
| City of Yarra (Officeworks) | $262,258 | $26,226 | $288,484 |
| Yarra Ranges Shire | $262,258 | $26,226 | $288,484 |
| **Aggregated figures** | **$5,846,916** | **$584,692** | **$6,431,608** |

[18] Note that 100NB funding cannot be used to cover BESS operational, maintenance, or decommissioning expenses. Proponents should refer to the latest version of 100NB funding guidelines for guidance on what expenses are eligible for grant funding.

[19] Funding requirements are shown for delivery of a NB only. EV Charger project finance figures are not shown in this table but are listed in the relevant individual appendices.

# Attachment A – Supplementary Information

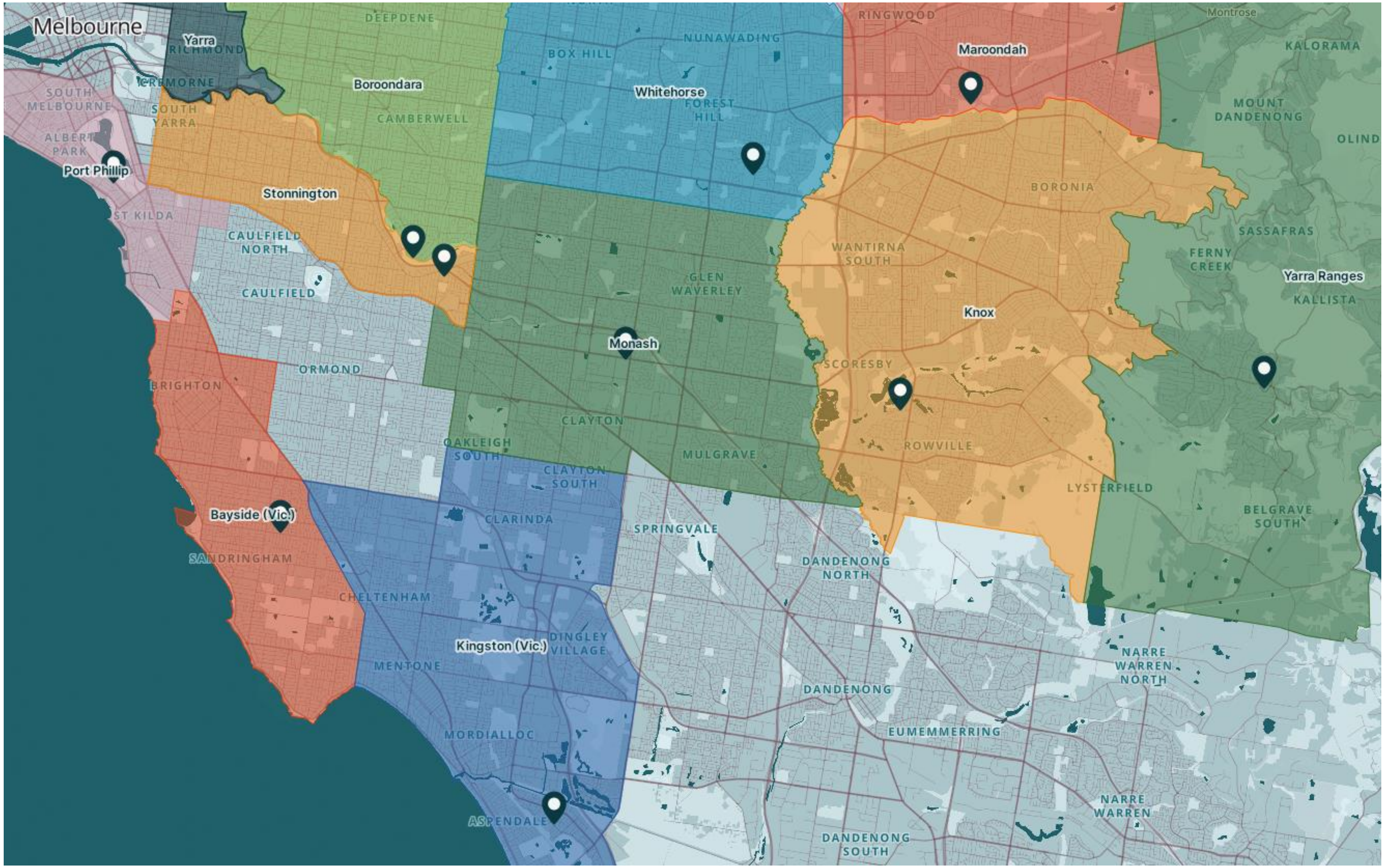
YARRA ENERGY FOUNDATION

## Glossary of abbreviations

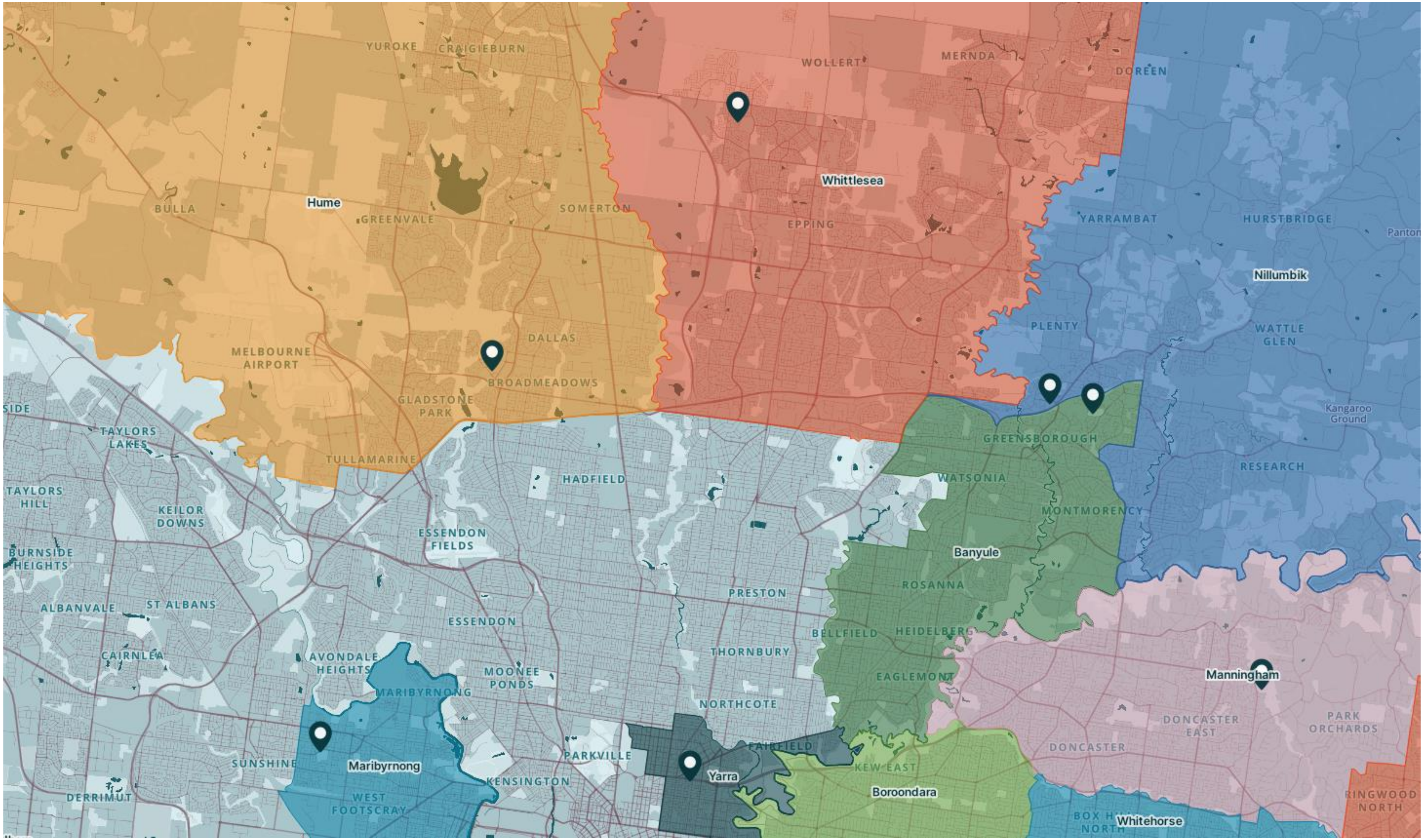
| Acronym | Meaning |
|---|---|
| AEMO | Australian Energy Market Operator |
| BESS | Battery Energy Storage System |
| BTM | Behind the Meter: a system configuration where the battery is connected to the network behind an existing connection point with an existing meter. In this case the battery can be market exposed (when it has a dedicated child meter) or non-market exposed (connected without a dedicated child meter). |
| CAPEX | Capital expense |
| DNSP | Distribution Network Service Provider |
| EV | Electric vehicle |
| FCAS | Frequency Control Ancillary Services |
| FOM | Front of Meter: a system configuration where the battery is connected directly to the network with a dedicated connection point and dedicated meter. |
| GANBIM | Greenhouse Alliance Neighbourhood Battery Investigation (Metropolitan) |
| GW | Gigawatt |
| kW | Kilowatt |
| kWh | Kilowatt-hour |
| LV | Low voltage |
| LVN | Low voltage network |

| Acronym | Meaning |
|---|---|
| MV | Medium Voltage |
| MVA | Megavolt-Ampere |
| NEM | National Electricity Market |
| NB | Neighbourhood Battery |
| NBs | Neighbourhood Batteries |
| OPEX | Operating expenses |
| SOC | State of charge |
| RFI | Request-for-Information |
| VPP | Virtual Power Plant |
| VRE | Variable renewable energy |
| YEF | Yarra Energy Foundation |

## Addititonal Maps of Project Locations



YARRA ENERGY FOUNDATION



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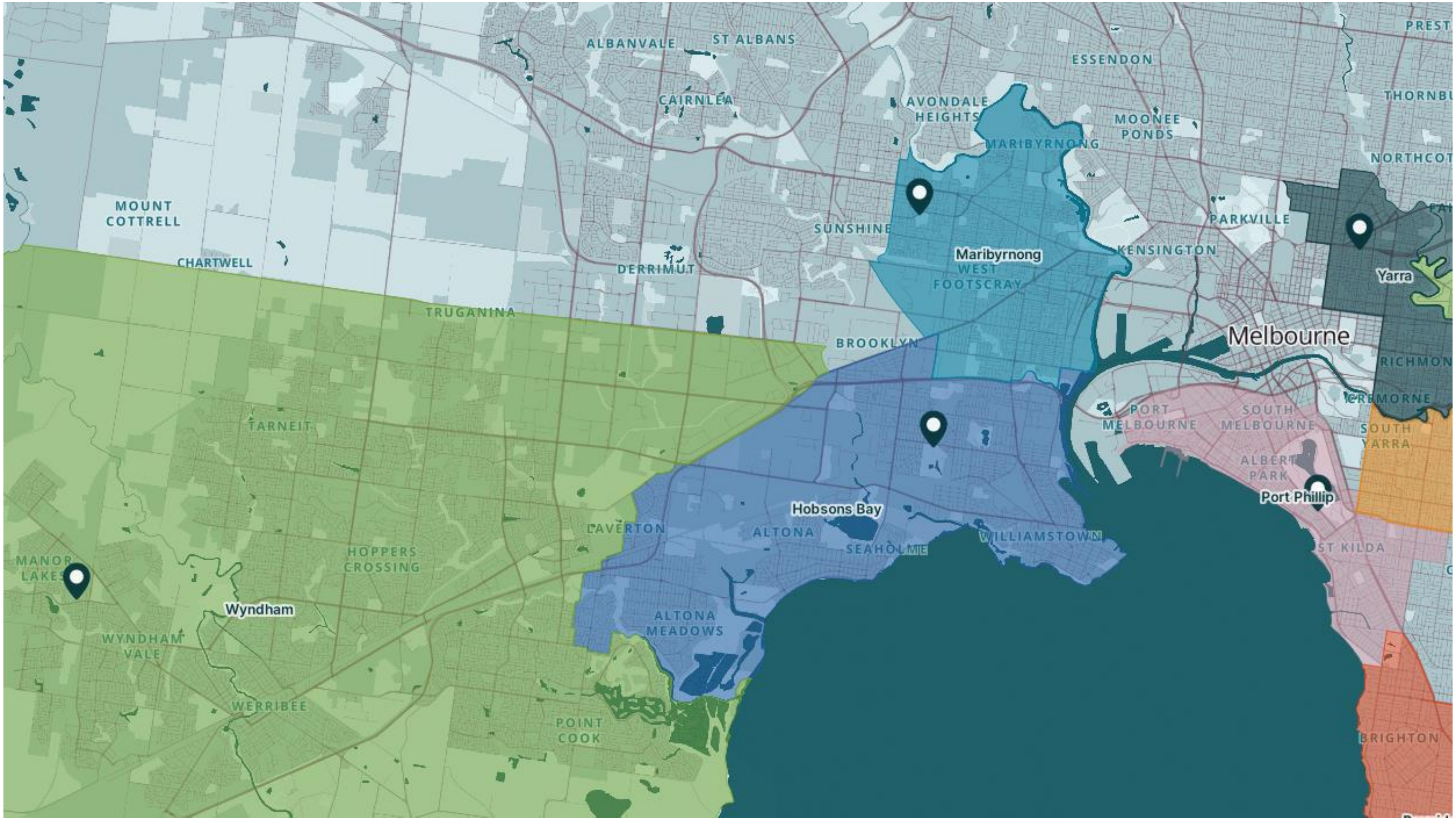
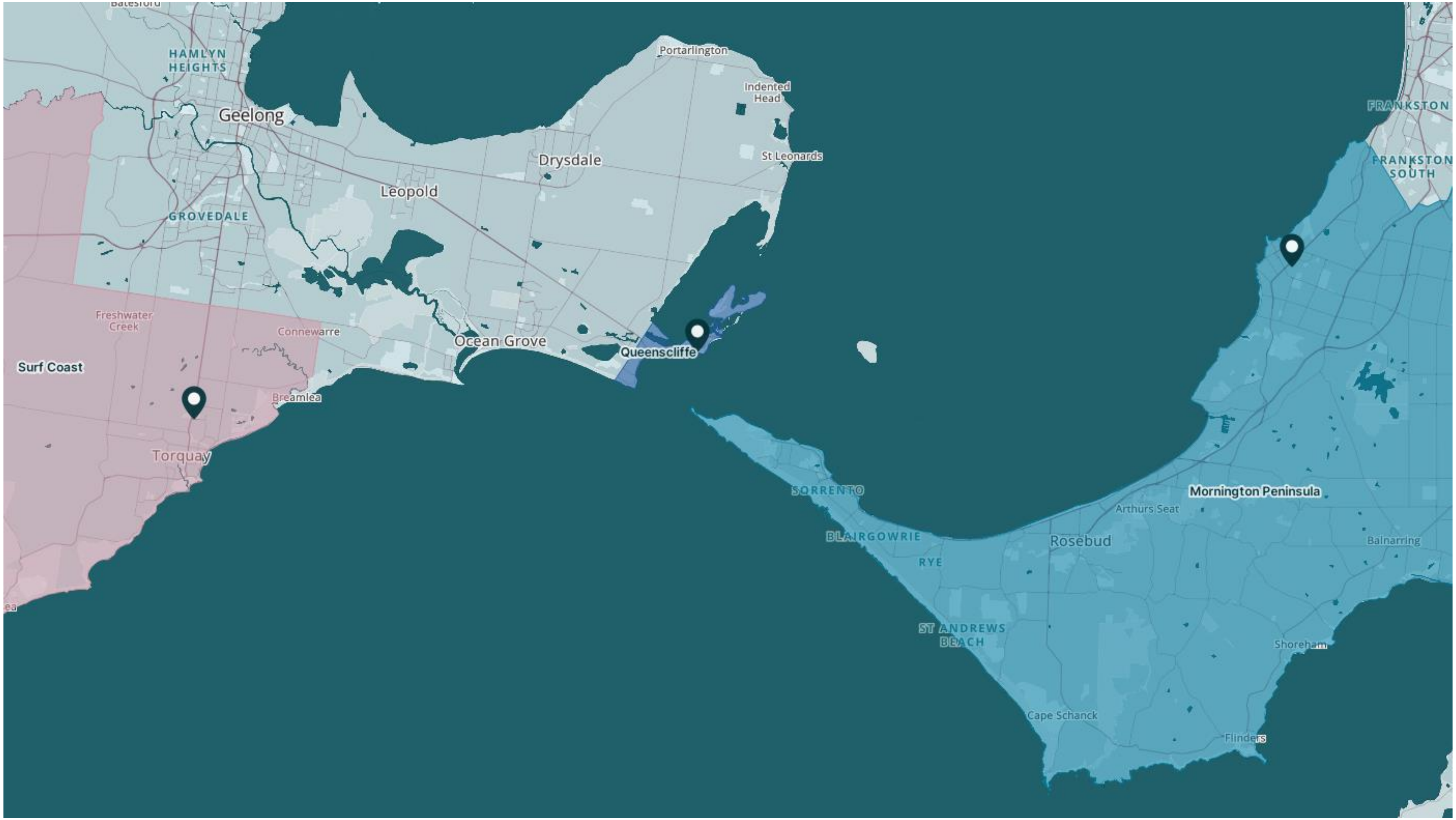


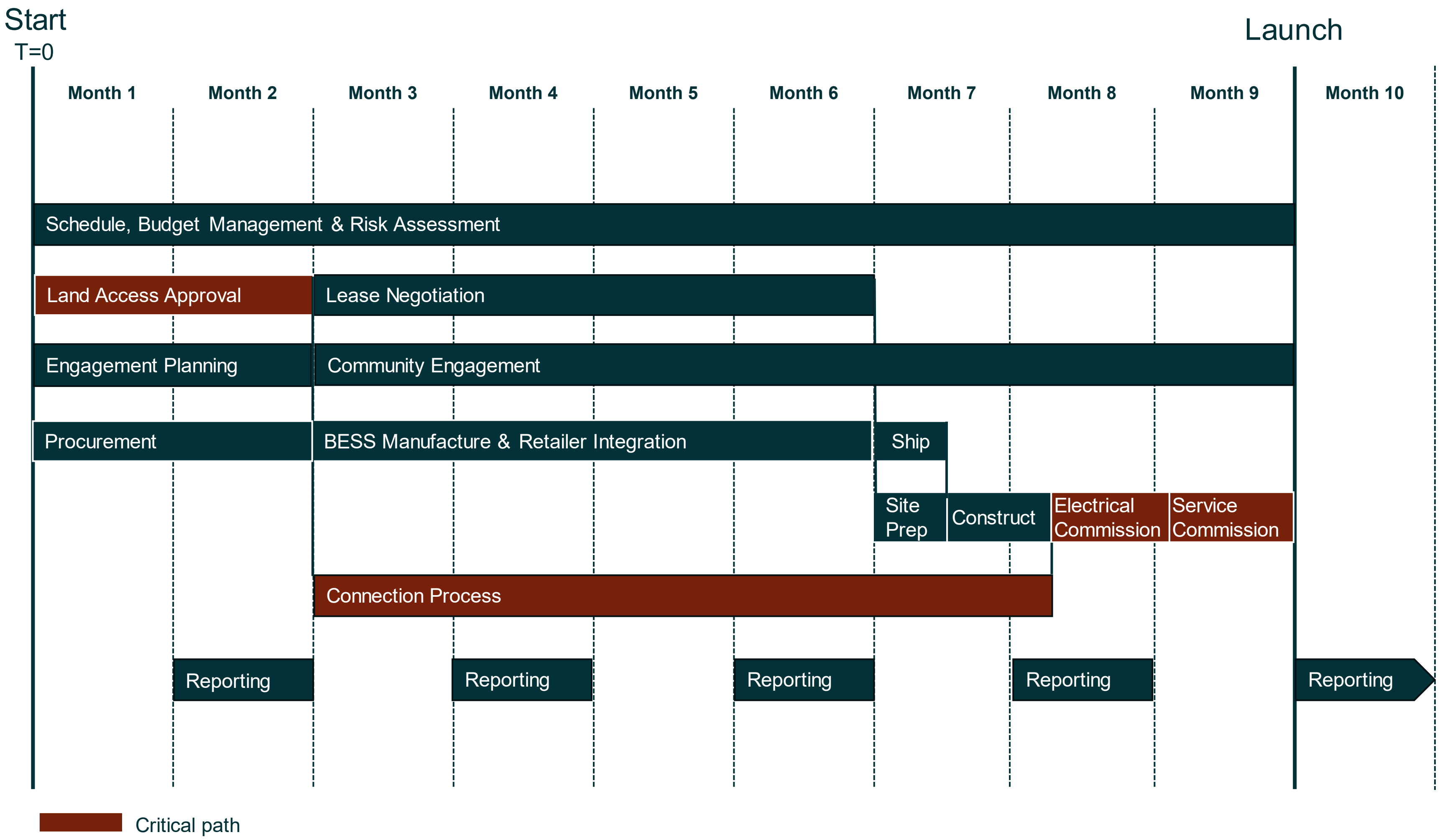


Hamlyn Heights
Geelong
Grovedale
Portarlington
Indented Head
St Leonards
Drysdale
Leopold
Freshwater Creek
Connewarre
Surf Coast
Ocean Grove
Queenscliffe
Breamlea
Torquay
Frankston
Frankston South
Sorrento
Blairgowrie
Rye
Mornington Peninsula
Arthurs Seat
Rosebud
Balnarring
St Andrews Beach
Shoreham
Cape Schanck
Flinders

# Attachment B – FOM Program Schedule

# Attachment B – FOM Program Schedule

YARRA ENERGY FOUNDATION



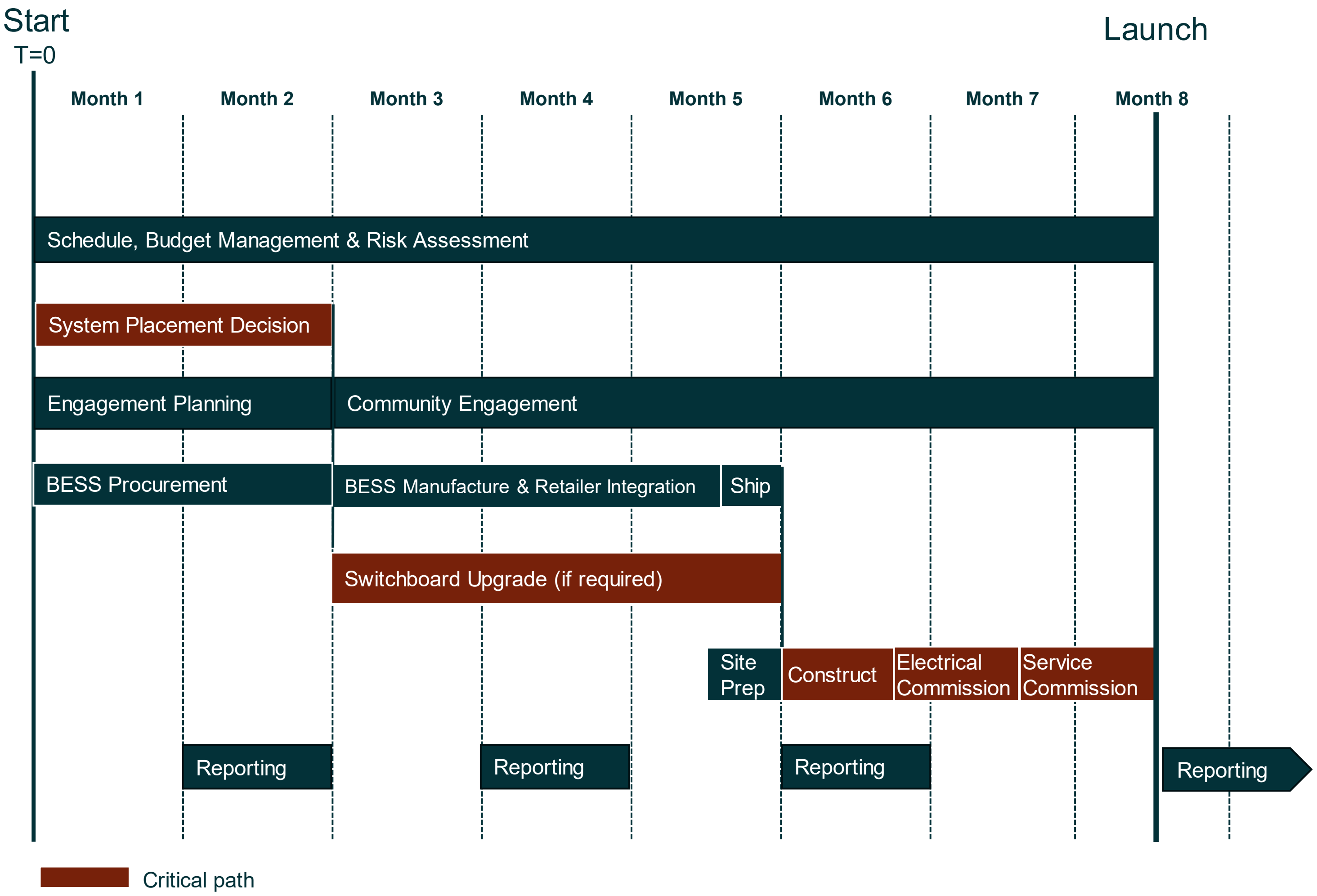

## Notes on FOM project schedule

This schedule outlines the key project activities for a front-of-meter neighbourhood battery project. Critical path items (in dark red) are the tasks with the greatest level of uncertainty and can easily cause a further 9 to 12-month delay if not carefully managed. The schedule excludes funding agreement negotiations.

# Attachment C – BTM Program Schedule

# Attachment C – BTM Program Schedule

YARRA ENERGY FOUNDATION




**Notes on BTM project schedule**

This schedule outlines the key project activities for a behind-the-meter neighbourhood battery project. Critical path items (in dark red) are the tasks with the greatest level of uncertainty and can easily cause a further 9 to 12-month delay if not carefully managed. The schedule excludes funding agreement negotiations.

# Attachment D – FOM Risk Assessment

# Attachment D – FOM Risk Assessment

YARRA ENERGY FOUNDATION

| BESS Risk Register | Likelihood | Impact | Impact Rating | Risk Severity | Mitigation |
|---|---|---|---|---|---|
| ***Details of potential occurrence*** | ***Low (1), Moderate (2), High (3)*** | ***Details of potential consequences*** | ***Low (1), Moderate (2), High (3)*** | ***1: Very minor<br>2: Minor<br>3: Moderate<br>4: Significant<br>6: Severe<br>9: Very severe*** | ***Steps to reduce likelihood and/or impact of risk*** |
| Delays in procuring land access for neighbourhood battery installation. | Low | Delay project implementation. | High | 3 | A rigorous site selection process that has identified land that is owned by proponents, or for which a lease is likely to be easily obtained.<br>Engage relevant stakeholders in landowner organisation, seeking letters of support and in-principle agreements to support 100NB application.<br>Continue to work closely with all stakeholders to identify possible issues as early as possible. |
| Lack of community support hindering project implementation. | Moderate | Delay project implementation. | Moderate | 4 | Implement a strategic process for community and stakeholder engagement as per the Community & Stakeholder Engagement Plan provided by YEF.<br>The community and key stakeholders will be brought along the journey of the project with webinars, flyer drops and direct engagement; avenues to raise concerns, ask questions and provide input will be accommodated through the engagement processes. |
| No agreement with landholder on access to site for either battery or EV charger | Moderate | Disruption to project plan and project commitments. | High | 6 | Engage closely with landholder/tenant to work through any issues or conflicts that would prevent access or use of the site. |

| | | | | | |
|---|---|---|---|---|---|
| installation and operation (if applicable). | | | | | Site identification process has considered this risk.<br>Secure letters of support from relevant landholders/tenants to support 100NB application and minimise likelihood of this risk if project moves to implementation. |
| Budget/cost overruns | Moderate | Need to source additional funding or forego non-essential project activities / change project scope. | Moderate | 4 | Detailed planning, financial forecasting and monitoring will underpin the project to minimise budgetary overrun risk.<br>Issues will be found quickly and communicated transparently.<br>An appropriate contingency budget is put forward to allow for unforeseen costs. |
| Delay in procuring battery system or EV charger (if applicable). | Low | Delay project implementation. | Moderate | 2 | Procure early in the project timeline to allow contingency for delays in shipping. |
| Software solution not ready for installation date. | Low | Delay project implementation; possible loss of momentum if too long delay. | Low | 2 | Release 1 Minimum viable product calls for only basic capability and more sophistication in release 2.<br>Work with experienced and competent providers to minimise likelihood of integration issues. |
| Community battery network tariff not applicable to battery + EV charger (if applicable). | Moderate | Potential unviability of operational model; reduced community benefits. | High | 6 | May require separate meters, and additional cost. |

| | | | | | |
|---|---|---|---|---|---|
| Water ingress | Low | Possible damage to electrical equipment | High | 3 | The site selection process has considered flood overlay, BESS RFI has assessed environmental protection rating of BESS housings. |
| Flora and fauna ingress | Moderate | Possible damage to electrical equipment, increased risk of malfunction. | Low | 2 | Final site selection and design should consider the risk of flora nearby, ensure safe spacing of system from flora.<br>Ensure BESS maintenance and inspection schedule includes inspection for fauna ingress, ensure that inspections are conducted as per-manufacturer recommendations. |
| Electrical safety issues arising from battery installation. | Low | The safety of staff working on BESS could be compromised. | Moderate | 2 | Use of reputable Registered Electrical Contractors on battery installation. |
| Failure of battery during operation. | Low | Battery service interruption. | Moderate | 2 | Use of known and trusted suppliers with warrantees on battery operation. |
| Vandalism of battery. | High | Aesthetic damage, possible superficial mechanical damage (unlikely cases of major damage to BESS housing). | Low | 1 | Thorough engagement with community to ensure system is championed by residents.<br>Locate system in a non-secluded location.<br>Apply artwork to system to create sense of civic pride and deter vandals. |
| Battery fire because of malfunction, external impact, bushfire or other cause. | Low | Potentially danger to passersby, local infrastructure and environment. | High | 3 | Use Australian Standard equipment, source fire safety information from BESS suppliers.<br>Site identification process has considered bushfire risk overlay, risk of impact from vehicles, positioning of systems away from structures and vegetation.<br>Follow all local requirements for safety and risk assessments. |

| | | | | | |
|---|---|---|---|---|---|
| Severe underperformance of BESS vs modelled perfect foresight operation. | Moderate | Potential unviability of operational model; reduced community benefits. | Moderate | 4 | Only procure services of industry leading retail partners with a sound system for optimising operations of BESS.<br>Minimise exposure by pursuing best commercial arrangement for each individual project (e.g. passthrough, capacity lease, revenue split).<br>Where possible, ensure contracts insulate proponents from any losses incurred by BESS faults (caused by BESS supplier) or dispatch faults (caused by retailer). |
| **Electric Vehicle Charger Specific Risks** | | | | | |
| Pedestrians or users of the EV charger are injured from use of the car space. | Moderate | Injury e.g. car reversing out of the car space. Noting the space is already used for car parking (there is an underlying risk), so the additional risk may come from enhanced frequency of use of the space (i.e. more cars entering/exiting the space over time) | Moderate | 4 | All equipment must meet Australian safety standards. A risk assessment will be completed for the site and the charge point design to identify what (if any) steps can be taken to minimise risks.<br>Investigate signage options and on-ground markings to identify the driveway and its proposed use. |
| Tripping over EV charging equipment (e.g. the connection between the charger and vehicle). | Moderate | Tripping/falling injury | Moderate | 4 | The charger location and design will be approved to meet all Australian safety standards for EV charging installations.<br>The users of the site will be consulted on how the charger should and could be used to avoid risk of tripping/falling.<br>Considerations may include, for example, how the charger can service vehicles with a connection on any side of the vehicle (left, right, front, rear). |

# Attachment E – BTM Risk Assessment

# Attachment E – BTM Risk Assessment

YARRA ENERGY FOUNDATION

| BESS Risk Register | Likelihood | Impact | Impact Rating | Risk Severity | Mitigation |
|---|---|---|---|---|---|
| ***Details of potential occurrence*** | ***Low (1), Moderate (2), High (3)*** | ***Details of potential consequences*** | ***Low (1), Moderate (2), High (3)*** | ***1: Very minor<br>2: Minor<br>3: Moderate<br>4: Significant<br>6: Severe<br>9: Very severe*** | ***Steps to reduce likelihood and/or impact of risk*** |
| Delays in procuring land access for neighbourhood battery installation. | Low | Delay project implementation. | Low | 1 | A rigorous site selection process that has identified land that is owned by proponents, or for which a lease is likely to be easily obtained.<br>Engage relevant stakeholders in landowner organisation, seeking letters of support and in-principle agreements to support 100NB application.<br>Continue to work closely with all stakeholders to identify possible issues as early as possible. |
| Complications to switchboard upgrade and/or BESS placement and supply. | Moderate | Delay and extra cost. | Moderate | 4 | Carry out a full site assessment and query switchboard supplier for pricing and timelines as part of construction project. |

| | | | | | |
|---|---|---|---|---|---|
| Lack of community support hindering project implementation. | Moderate | Delay project implementation. | Moderate | 4 | Implement a strategic process for community and stakeholder engagement as per the Community & Stakeholder Engagement Plan provided by YEF.<br>The community and key stakeholders will be brought along the journey of the project with webinars, flyer drops and direct engagement; avenues to raise concerns, ask questions and provide input will be accommodated through the engagement processes. |
| No agreement with landholder on access to site for either battery or EV charger installation and operation. | Moderate | Disruption to project plan and project commitments. | High | 6 | Engage closely with landholder/tenant to work through any issues or conflicts that would prevent access or use of the site.<br>Site identification process has considered this risk.<br>Secure letters of support from relevant landholders/tenants to support 100NB application and minimise likelihood of this risk if project moves to implementation. |
| Budget/cost overruns | Moderate | Need to source additional funding or forego non-essential project activities / change project scope. | Moderate | 4 | Detailed planning, financial forecasting and monitoring will underpin the project to minimise budgetary overrun risk.<br>Issues will be found quickly and communicated transparently.<br>An appropriate contingency budget is put forward to allow for unforeseen costs. |

# Attachment E – BTM Risk Assessment

YARRA ENERGY FOUNDATION

| | | | | | |
|---|---|---|---|---|---|
| Delay in procuring battery system or EV charger. | Low | Delay project implementation. | Moderate | 2 | Procure early in the project timeline to allow contingency for delays in shipping. |
| Software solution not ready for installation date. | Moderate | Delay project implementation; possible loss of momentum if too long delay. | Moderate | 4 | Release 1 Minimum viable product calls for only basic capability and more sophistication in release 2.<br>Work with experienced and competent providers to minimise likelihood of integration issues. |
| Change of site owner inside the project lifetime. | Low | Possible commercial and operational issues if owner no longer supports project, or use of site changes dramatically. | Moderate | 2 | BTM projects to be implemented at council owned sites where possible.<br>Contractual agreements for the desired duration of the project. |

| | | | | | |
|---|---|---|---|---|---|
| Water ingress | Low | Possible damage to electrical equipment | High | 3 | The site selection process has considered flood overlay, BESS RFI has assessed environmental protection rating of BESS housings. |
| Flora and fauna ingress | Moderate | Possible damage to electrical equipment, increased risk of malfunction. | Low | 2 | Final site selection and design should consider the risk of flora nearby, ensure safe spacing of system from flora.<br>Ensure BESS maintenance and inspection schedule includes inspection for fauna ingress, ensure that inspections are conducted as per-manufacturer recommendations. |
| Electrical safety issues arising from battery installation. | Low | The safety of staff working on BESS could be compromised. | Moderate | 2 | Use of reputable Registered Electrical Contractors on battery installation. |

# Attachment E – BTM Risk Assessment

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| Failure of battery during operation. | Low | Battery service interruption. | Moderate | 2 | Use of known and trusted suppliers with warrantees on battery operation. |
| Vandalism of battery. | High | Aesthetic damage, possible superficial mechanical damage (unlikely cases of major damage to BESS housing). | Low | 1 | Thorough engagement with community to ensure system is championed by residents.<br>Locate system in a non-secluded location.<br>Apply artwork to system to create sense of civic pride and deter vandals. |
| Battery fire because of malfunction, external impact, bushfire or other cause. | Low | Potentially danger to passersby, local infrastructure and environment. | High | 3 | Use Australian Standard equipment, source fire safety information from BESS suppliers.<br>Site identification process has considered bushfire risk overlay, risk of impact from vehicles, positioning of systems away from structures and vegetation.<br>Follow all local requirements for safety and risk assessments. |

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| Severe underperformance of BESS vs modelled perfect foresight operation. | Moderate | Potential unviability of operational model; reduced community benefits. | Moderate | 4 | Only procure services of industry leading retail partners with a sound system for optimising operations of BESS.<br>Minimise exposure by pursuing best commercial arrangement for each individual project (e.g. passthrough, capacity lease, revenue split).<br>Where possible, ensure contracts insulate proponents from any losses incurred by BESS faults (caused by BESS supplier) or dispatch faults (caused by retailer). |
| **Electric Vehicle Charger Specific Risks** | | | | | |
| Pedestrians or users of the EV charger are injured from use of the car space. | Moderate | Injury e.g. car reversing out of the car space. Noting the space is already used for car parking (there is an underlying risk), so the additional risk may come from enhanced frequency of use of the space (i.e. more cars entering/exiting the space over time) | Moderate | 4 | All equipment must meet Australian safety standards. A risk assessment will be completed for the site and the chargepoint design to identify what (if any) steps can be taken to minimise risks.<br>Investigate signage options and on-ground markings to identify the driveway and its proposed use. |
| Tripping over EV charging equipment (e.g. the connection between the charger and vehicle). | Moderate | Tripping/falling injury | Moderate | 4 | The charger location and design will be approved to meet all Australian safety standards for EV charging installations.<br>The users of the site will be consulted on how the charger should and could be used to avoid risk of tripping/falling.<br>Considerations may include, for example, how the charger can service vehicles with a connection on any side of the vehicle (left, right, front, rear). |

# Attachment F – Modelling Methodology

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The modelling methodology used in this project is confidential YEF IP and has been removed from this public document.

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