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Appendix W

Preliminary Battery Recycling Strategy

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Tully Battery Energy Storage System

Prepared for: RWE Tully Battery Pty Ltd

Date: 4 June 2026

Document information

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Abbreviations and Statutory Terms

Term	Meaning
ABRI	Association for the Battery Recycling Industry
AEMO	Australian Energy Market Operator
BESS	Battery Energy Storage System
BSF	Battery storage facility
CCRC	Cassowary Coast Regional Council
EOL	End-of-Life
ECDMP	End of Construction Decommissioning Management Plan
EODMP	End of Operation Decommissioning Management Plan
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (cth)
Li-ion	Lithium Ion (battery)
LFP	Lithium Iron Phosphate ($LiFePO_4$) battery
OEM	Original Equipment Manufacturer
PBRS	Preliminary Battery Recycling Strategy
QLD Waste Strategy	*Waste Management and Resource Recovery Strategy*
SARA	State Assessment and Referral Agency
SDAP	State Development Assessment Provisions
SoC	State of Charge
State Code 27	*State Code 27: Battery storage facility development*
WRR Act	*Waste Reduction and Recycling Act 2011* (Qld)

1. Introduction

1.1 Background

RWE Tully Battery Pty Ltd (RWE) are seeking to develop the proposed Tully Battery Energy Storage System (BESS) (the Project) across a 28.7 hectare (ha) site (the Site), consisting of two freehold parcels, Lot 1on RP735276 and Lot 1 on RP852238.

The Site is located approximately 4 km southwest of the township of Tully in far north Queensland in the Cassowary Coast Regional Council (CCRC) local government area (LGA).

The Project will have a capacity of up to 200 MW / 800 MWh (4 hour duration) and is proposed to take electricity from the grid in periods of low demand and feed back into the grid at periods of high demand. Grid connection will be via the existing Powerlink Tully substation.

Construction of the Project is anticipated to commence in 2027 and is expected to take approximately 18 months.

RWE has commissioned Attexo Group Pty Ltd (Attexo) to prepare this Preliminary Battery Recycling Strategy (PBRS) to address contemporary State regulator expectations. Specifically, this strategy addresses the decommissioning outcomes applicable to the reuse, recycling and recovery of battery components within *State Code 27: Battery storage facility development* (State Code 27) under the Planning Act's *State Development Assessment Provisions* (v3.6).

1.2 Purpose and Scope

RWE has commissioned Attexo Group Ptd Ltd (Attexo) to prepare this PBRS to address contemporary State regulator expectations. Specifically, this report addresses the decommissioning outcomes applicable to the reuse, recycling and recovery of battery components within *State Code 27: Battery storage facility development* (State Code 27) under the Planning Act's *State Development Assessment Provisions* (v3.6). The State Code 27 Planning Guideline requires a development application to be supported by a Preliminary Battery Recycling Strategy to address the Performance Outcome (PO) 34 (Department of State Development, Infrastructure and Planning, 2025).

This high-level strategy is intended to be flexible and will be further refined throughout the operational life of the Project as new technologies and recycling processes emerge.

Detailed decommissioning plans for the end of construction and end of operations of the Project will be prepared prior to the completion of construction (in an End of Construction Decommissioning Management Plan) and prior to the cessation of operations (in an End of Operations Decommissioning Plan).

This PBRS is part of the broader decommissioning requirements for the Project and will be updated with key information incorporated into the End of Operations Decommissioning Plan (conditioned) prior to decommissioning. It specifically considers battery recycling options and opportunities with the Decommissioning Security Report, Tully BESS (Attexo 2026b) providing an overview of likely decommissioning strategies for the whole of Project. These high-level strategies are flexible and will be further refined as part of detailed decommissioning planning in future stages of the Project.

The State Code 27 battery recycling performance objectives and requirements of the Battery Recycling Strategy (BRS) (conditioned) and PRBS outlined in the associated planning guideline are presented in **Table 1.1.** This PBRS has considered these requirements, with information available at this stage of the Project and **Table 1.1** shows where they are addressed in this PRBS.

Table 1.1: State Code 27 compliance assessment table

State Code 27 PO and associated guideline requirements	Section addressed
PO34 Decommissioning incorporates design features that enable reuse, recycling, and recovery of battery components and associated infrastructure at end-of-life	Refer to **Section 2**, **Section 5** and **Section 6**
• Details of a qualified professional to assist with deinstallation of batteries	Refer to **Section 6.2.1**
• Any risks associated with deinstallation of batteries, in particular management steps necessary to contain harmful and dangerous battery materials and any direction provided from the supplier regarding an 'end-of-life' plan	Refer to **Section 6.2.2**
• Whether the battery system contains recycled content and if it is recyclable	Refer to **Section 6.1**
• Itemised breakdown of materials to be reused, recycled and/or recovered. Additionally, this should detail what happens to other system components associated with the decommissioned BSF	Refer to **Section 6.3**

1.3 Defined Terms

Where applicable, terms used within this report are consistent with the definitions provided in State Code 27 (v3.5). A summary of the meaning of key terms used in this report are defined in **Table 1.2**.

Table 1.2: Key terms used within this report

Term	Definition
Project Site	The extent of the lot boundaries (28.7 ha) for Lot 1 on RP735276 and Lot 1 on RP852238.
Grid Connection	The proposed OHTL to the existing 132kV Powerlink Tully substation within Lot 1 on RP716718. The Grid Connection requires approximately 60 m of OHTL to be constructed within Lot 1 on RP716718, as described in **Section 2**.
Development Footprint	The 9 ha area that will be directly impacted by the Project.
Battery Storage Facility	The entire Project excluding the OHTL, as described in **Section 2**.
Battery Unit	The modular containerised battery system containing battery modules, cooling systems and control equipment, as described in **Section 5.1**. For this Project, the specified battery unit is the Tesla Megapack 3.
Battery Module	The smallest field replicable energy storage component of the Battery Unit, as described in **Section 5.1**
Battery Cell	The actual energy storage component containing an cathode and anode, as described in **Section 5.2**

1.4 Other Relevant Reports

This report has considered the following key reports, as submitted with the Project's development application:

- Planning Assessment Report, Tully BESS (Attexo, 2026a).
- Decommissioning Security Report, Tully BESS (Attexo 2026b).

2. Project Description

The Project includes a proposed Battery Storage Facility (BSF) with a capacity up to 200 MW / 800MWh for a duration of 4 hours and associated infrastructure (e.g. transformer, OHTL, air insulated switchgear, access roads, laydown areas, foundations, hard stand, parking, switch rooms and storage). The BSF and grid connection will comprise a total development footprint of approximately 9 ha within the 28.7 ha Project Site.

The primary components of the Project will consist of the following:

- Battery Units: Up to 188 battery units will cover a total area of up to 2.5 ha. The foundations for the proposed battery units will likely be screw piles, piers or concrete pad formations. The BSF will be connected to the adjacent switch rooms via underground cables.
- Switching Station: A switching station will be located to the north of the battery units and will include a 132/33 kV high-voltage transformer, associated switchgear, an auxiliary transformer, two 33 kV switch rooms, and, if required, harmonic filters.
- Stormwater Management: Stormwater infrastructure will be designed and constructed to ensure the safe collection, containment, and management of runoff across the site during both construction and operational phases. This will include any emergency containment storage for containment for fire water in an emergency event.
- Site Access and Internal Circulation: Access to the site will be via the existing road network, including the Bruce Highway and Tully Gorge Road, with upgrades proposed to the two access point from Sandy Creek Road. The BSF will be secured by perimeter fencing. Internal access tracks will be provided around the battery units to facilitate operations, maintenance, and emergency response.
- Grid Connection Infrastructure: The Project will connect to the adjacent substation via an overhead transmission line extending north from the BSF area. The line will be supported approximately five (5) single-circuit 132 kV poles, each approximately 27.5 m in height.
- Asset Protection Zone (APZ): An Asset Protection Zone will be established and maintained around the battery infrastructure to mitigate bushfire risk and provide access for firefighting activities.
- Fire Safety Measures: Fire protection infrastructure will include, subject to detailed design, approximately 472,000 litres of on-site static water storage, together with a fire hydrant system designed in accordance with Australian Standard AS 2419.1.
- Acoustic Treatment: A 6-metre-high acoustic wall is currently incorporated along the northern boundary of the BSF area to mitigate potential noise impacts. The requirement for this wall will be confirmed during detailed design and may be refined or omitted subject to equipment specifications and acoustic performance.
- Earthworks: Earthworks will include site levelling, formation of batters, and clearing necessary to facilitate construction and access.
- Lighting: Lighting will be installed to support maintenance activities, when maintenance works are to be undertaken at night; these will be on 10m high poles. Security lighting will be sensor-controlled. All lighting will be designed and operated in accordance with AS 4282:2023 Control of the obtrusive effects of outdoor lighting.
- Lightning Protection: Lightning arrestors, up to 20 m in height, will be installed within the development footprint to protect critical infrastructure.
- Laydown and Operations Areas: Temporary construction laydown areas and a permanent operations and maintenance (O&M) building will be established adjacent to Sandy Creek Road. This will include an O&M building, yard, parking areas, office facilities, and storage sheds.
- Landscaping and Screening: Landscape buffer planting will be established along the frontage and partially along the side boundaries of Lot 1 on RP852238 to provide visual screening and enhance integration with the surrounding landscape.

3. Regulatory Framework

The below sections provide a summary of the key legislation for battery storage facility development, with respect to primary approvals and associated reuse, recycling and recover requirements.

3.1 Planning Act 2016

The Planning Act is the principal legislation that establishes the framework for Queensland's planning system. SARA is the Assessment Manager for DAs for an MCU for battery storage facility developments. The Project is impact assessable development under the Planning Act and is subject to assessment under the SDAP (v3.5). This report has considered the battery recycling requirements (PO34) of State Code 27.

3.2 Environmental Protection Act 1994

The EP Act establishes Queensland's key regulatory framework for protecting environmental values. The following regulatory requirements are relevant to decommissioning at end of construction and end of operations of the Project:

- The general environmental duty: a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonably practicable measures to prevent or minimise the harm.
- Duty to restore the environment: this provision applies where an incident involving contamination of the environment has caused unlawful environmental harm. The person must, as soon as reasonably practicable after the incident happens, take measures, as far as reasonably practicable, to rehabilitate or restore the environment to its condition before the harm.
- Duty to notify: notification requirements to report events, or changes in land condition, that relate to contaminated land or notifiable activities.
- Removal of contaminated soil: a soil disposal permit will be required to remove and treat or dispose of soil from land listed on the environmental management register (EMR) or contaminated land register (CLR).
- Waste management: waste characterisation is to be undertaken in accordance with the *Environmental Protection Regulation 2019* (EP Regulation) to determine whether waste is a regulated waste (and which type). Trackable waste will be transported offsite by a regulator waste transporter in accordance with regulated waste tracking provisions. Waste will be taken to a facility that is authorised to accept that type of waste.

Used lithium-ion batteries are classified as regulated waste under the EP Regulation.

3.3 Waste Reduction and Recycling Act 2011

The *Waste Reduction and Recycling Act 2011* (WRR Act) is Queensland's principal legislation for waste avoidance and reduction, resource recovery, and transition to a circular economy. The WRR Act has linkages to the EP Act for the regulation and management of waste.

Section 8AA of the WRR Act defines waste as:

- Any thing that:
  - is left over, or is an unwanted by-product, from an industrial, commercial, domestic or other activity; or
  - is surplus to the industrial, commercial, domestic or other activity generating the waste.
- However, waste does not include:
  - a resource under an end of waste approval
  - a thing prescribed by regulation not to be waste.
- A thing can be waste whether or not it is of value.

The WRR Act enacts Queensland's *Waste Management and Resource Recovery Strategy* (QLD Waste Strategy) which establishes targets and high-level strategies for Queensland to become a zero-waste society where waste is avoided, reused and recycled to the greatest extent possible (Queensland Government, n.d.). The QLD Waste Strategy acknowledges that strategic investment in diverse and innovative resource recovery technologies and markets is required to produce high-value products and generate economic benefits. The QLD Waste Strategy is centred around the waste and resource management hierarchy (**Figure 3.1**) and circular economy principles (**Figure 3.2**) as established in the WRR Act.

Higher order preferences in the waste and resource management hierarchy and circular economy principles will be key standards adopted during detailed design, construction methodology, and decommissioning optioneering. The fate of end-of-life infrastructure components and other waste materials will depend on viable market solutions for recycling, reuse, repurposing, and recovery of materials. Accordingly, waste and resource recovery options considered within this PBRS are based on current achievable options in Australia and will be further investigated as the Project progresses. Waste management and decommissioning optioneering is further discussed in **Section 6** and in the Tully Decommissioning Security Report Tully BESS (Attexo 2026b).

Figure 3.1: Waste and resource management hierarchy (WasteOnline, 2024)

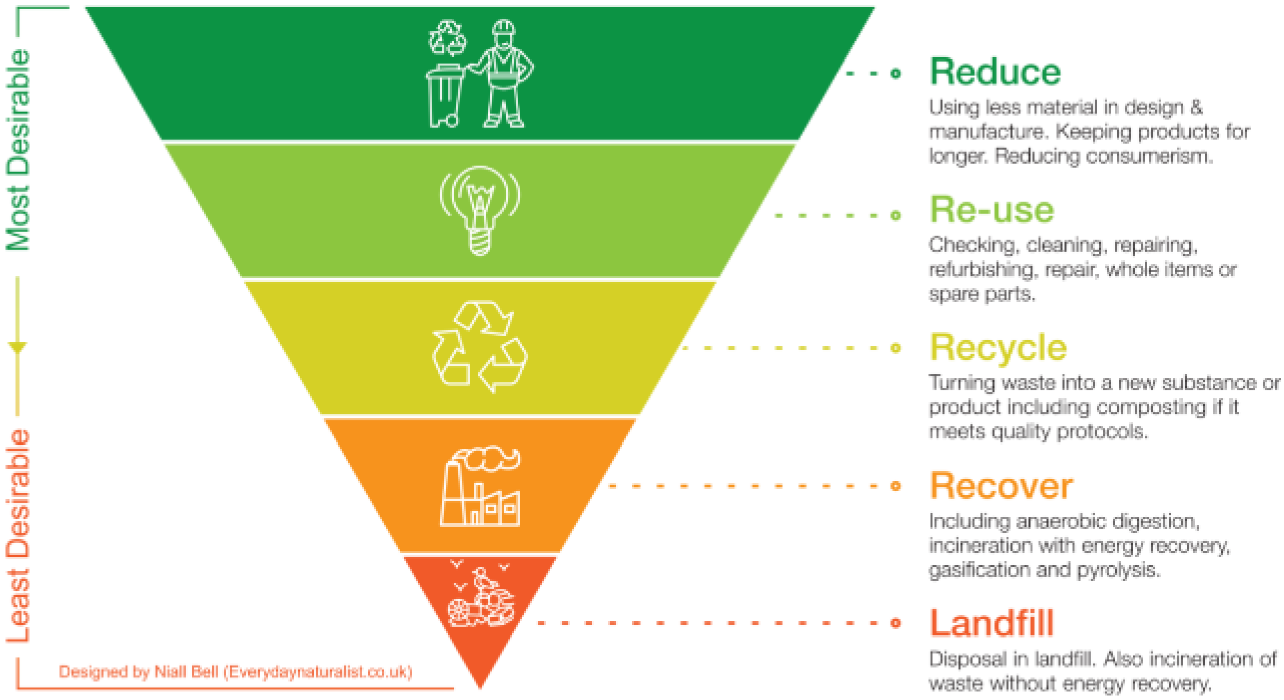
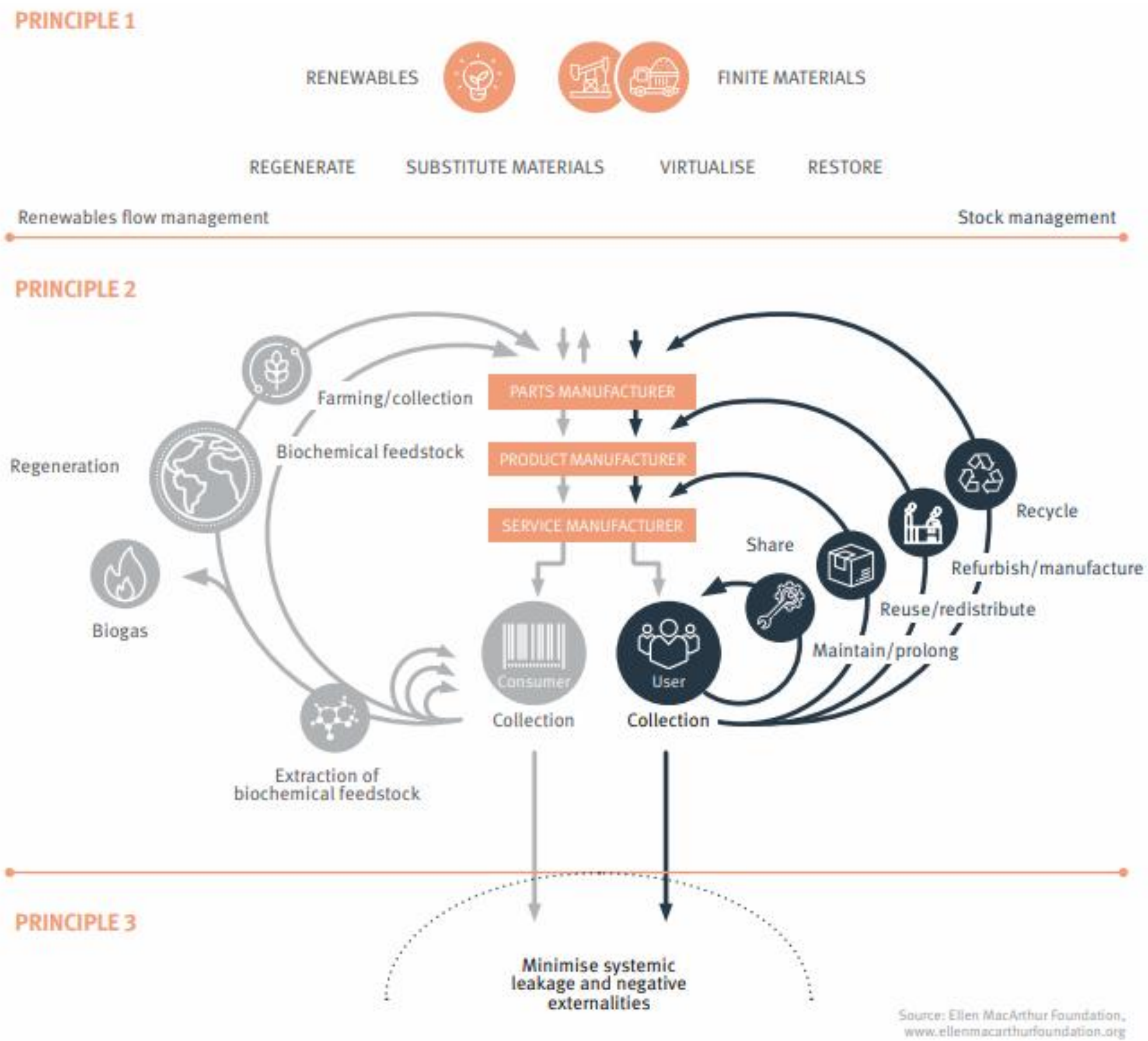


Figure 3.2: Circular economy principles (Queensland Government, n.d)



4. RWE Internal Policy

RWE is one of the largest renewable energy companies in the world, leading the energy transition by investing EUR50 bn gross by 2030 in renewable and low carbon technologies. They are:

- Committed to become climate neutral by 2040 and their ambition is to reduce their GHG emissions in line with a 1.5°C compliant pathway.
- Committed to grow their asset fleet sustainably and to operate in a way that creates progress towards the UN Sustainable Development Goals
- Aiming to be fully circular by 2050.

RWE have an internal Circular Economy Policy (March, 2023) that will guide and support the decommissioning process consistent with the regulatory requirements.

> *We implement the principles of Circular Economy in our way of working. We reduce the consumption of natural resources, minimise waste and design our assets so that materials can either be reused or recycled.*

5. Battery Storage Facility

Grid scale battery technology is nascent with the Hornsdale Power Reserve, commissioned in 2017, in South Australia widely considered the world's first commercial grid scale BESS. Over the following nine (9) years since this project, there has been a large uptake of grid scale BESS installation in Australia and worldwide. This demand has driven rapid improvements in grid scale battery technology with new product offerings, battery chemistries and battery types becoming commercially available.

An example of this is the evolution of the Tesla grid scale battery offering with the Tesla Powerpack 2 (approximate capacity of 200 kWh per unit) which was installed at the Hornsdale Power Reserve in 2017. Tesla then went on to develop and release the much higher capacity Megapack 1 (approximate capacity of 3 MWh per unit) in 2019, followed by the Megapack 2 and 2XL (approximate capacity of 3.9 MWh per unit) in 2022, with a new battery chemistry and finally the Megapack 3 (approximate capacity of 5 MWh per unit) in 2025.

As a result of this, battery technology continues to rapidly evolve, meaning that the battery chemistries and materials used in previously installed batteries are different to batteries installed today and will likely be different to batteries installed during the duration of the Project lifetime. The Tesla Megapack 3 is proposed for the Project and is further described in **Section 5.1**.

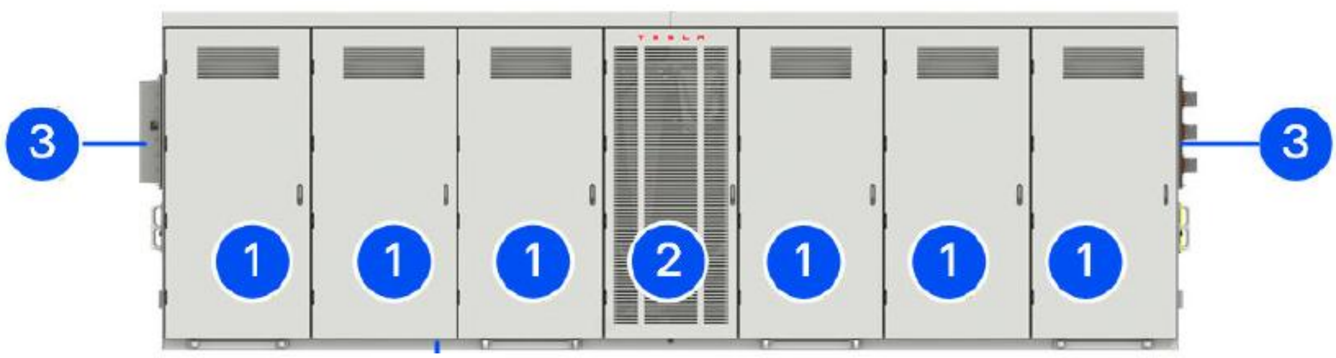
5.1 Battery Unit

The Project is currently designed based on the Tesla Megapack 3 technology, representing the current industry standard for utility scale energy storage. It is acknowledged that as battery technology rapidly evolves, a newer or updated product may be selected during the final procurement and detailed design phase.

The Tesla Megapack 3 is a factory-assembled, utility-scale BESS. Each unit integrates battery modules, a bidirectional power conversion system (inverter), thermal management, fire detection and suppression, and a battery management system (BMS) within a single enclosed container similar to an intermodal shipping container.

A Megapack unit (**Figure 5.1**) consists of six battery module bays (labelled 1), a thermal bay (labelled 2), and bus assemblies that connect to the Megablock's MV transformer (labelled 3).

Figure 5.1: Megapack overview



Each of the Megapack's six battery bays contains two battery modules (**Figure 5.2**). The battery module is the smallest "field replaceable" battery component within the Megapack 3. With each battery module containing hundreds of individual battery cells, as described in **Section 5.2**.

Each Megapack 3 unit for the Project will be pre-assembled and pre-tested at Tesla's Megafactory in Shanghai, China, reducing on-site installation complexity and risk.

Figure 5.2: Battery module example

5.2 Battery Cell

The Tesla Megapack 3 uses Lithium Iron Phosphate ($LiFePO_4$) battery chemistry also referred to as LFP. LFP battery chemistry has become the most common battery chemistry in grid scale batteries due to its superior safety, longevity and affordability compared to other common battery chemistries such as Nickel Manganese Cobalt (NMC), that had widely been used in previous generations of grid scale batteries.

The main components of an LFP battery cell, and their materials, are:

- Cathode (The positive electrode that provides and stores lithium ions when the battery is empty)
  - Lithium - Lithium source accounts for a substantial part of the cost for raw materials. The primary sources of lithium used in LFP production are lithium hydroxide (LiOH) and lithium carbonate (Li_2CO_3).
  - Iron - Commonly used iron sources include iron(II) phosphate ($Fe_3(PO_4)_2$), iron oxalate (FeC_2O_4), iron(III) phosphate ($FePO_4 \cdot xH_2O$), and iron oxides (e.g., Fe_2O_3 and Fe_3O_4). Iron sources are selected for their relative cost and compatibility with established synthetic techniques.
  - Phosphate - Phosphate rock is the main raw material to produce various phosphorus-containing products through physical and chemical processing.
- Anode (The negative electrode that stores lithium ions when the battery charged)
  - Graphite (Carbon) - Carbon coating or carbon additives offer improved electrical conductivity. Generally, carbon precursors can be classified into organic and inorganic, or biomass-derived (e.g. glucose, cellulose, lignin) and synthetic carbon materials (e.g. carbon nanotubes, graphene) (Rostami et al. 2024).
- Electrolyte (The medium through which lithium ions travel between the cathode and anode)
  - Lithium salt – Lithium salts dissolved with organic solvents. Hexafluorophosphate is the most common used lithium salts, however it is dependent on the specific requirements and manufacture of the battery.
- Separator (Physically separates the cathode and anode while allowing lithium ions to pass through)
  - Microporous polymer – Typically polyethylene or polypropylene however is dependent on the specific requirements and manufacture of the battery.
- Casing (Houses and protects the battery components.)
  - Aluminium or stainless steel - Typically an aluminium or stainless-steel metal and some plastics, however, is dependent on the specific requirements and manufacture of the battery.

6. Battery Recycling Strategy

The Project is committed to the principles of the circular economy as outlined in the Queensland *Waste Reduction and Recycling Act 2011* (WRR Act) and backed by RWE's *Circular Economy Policy* (March, 2023). Recognising that battery technology and recycling capabilities are rapidly advancing, the Project adopts a flexible hierarchy for end-of-life BSF components, as described above in **Section 5**.

This PBRS for the Tully BESS is designed in accordance with the WRR Act and the waste management hierarchy, which prioritises avoidance, then reuse, then recycling, then recovery, then disposal as a last resort.

- **Avoid/Reduce:** Procurement of high-quality cells to maximize lifespan.
- **Reuse (Second-Life):** Potential for repurposing degraded cells for lower-demand applications.
- **Recycle:** Material recovery (Black mass extraction, recovery of lithium, copper, and aluminium).
- **Dispose:** Last resort for non-recoverable inert materials.

Prior to any demolition, an assessment of all buildings, civil infrastructure, plant, batteries, and equipment would be undertaken to identify which materials are able to be reused or recycled. All plant, equipment and other materials suitable for reuse (e.g., sale) or recycling would be classified and removed from the site for direct reuse or transferred to suitably licensed waste recovery or recycling facilities. Material unsuitable for reuse or recycling would be classified and removed from the site for disposal at a suitably licensed waste disposal facility.

6.1 End-of-life Options

End-of-life (EOL) Options will be investigated prior to potential full decommissioning which, for a BSF using LFP batteries, revolve around extending life, repurposing, recycling, or decommissioning. The likely options are:

1. Repowering to extend the life of the facility. Instead of closing the facility, it may be economic to extend the life of the facility by replacing or augmenting battery modules while keeping the rest of the infrastructure.
2. Decommissioning
    a. Reuse of batteries for another purpose. Batteries retired from grid scale BSF are likely to still retain 60% capacity and can potentially be reused in lower-performance applications such as commercial backup power, EV charging buffers, microgrids or community storage.
    b. Decommissioning of BSF and recycling of battery units.

The following sections discuss the strategy for full decommissioning of the BSF and application of the waste minimisation and resource management hierarchy.

EOL options and optioneering is also discussed in the Tully Decommissioning Security Report Tully BESS (Attexo 2026b).

6.1.1 Tesla End-of-Life Protocol and Supplier Direction

Tesla has established a formal EOL protocol for its Megapack battery systems. The following summarises Tesla's published supplier direction and program commitments, which will be followed for the Project.

Tesla requires that before any Megapack unit is decommissioned, a formal performance assessment is undertaken to determine whether the unit is suitable for:

- Continued operation at the existing site (if capacity retention is above the performance threshold specified in the applicable performance guarantee)
- Redeployment at an alternative site for second-life grid storage or other applications, or
- Return to Tesla for battery recycling via its closed-loop program (**Section 6.3.1**).

Extending the life of a battery pack is a superior option to recycling for both environmental and business reasons. For those reasons, before decommissioning a consumer battery pack and sending it for recycling, Tesla does everything it can to extend the useful life of each battery pack (Tesla Battery Recycling Policy, 2026).

6.2 Decommissioning and Demolition

Decommissioning and Demolition of a BSF is a multi-step process that requires careful planning and coordination. Prior to the start of work, the appropriate waste management pathway for all materials must be defined. The goal is to maximise reuse and repurposing wherever possible and recycling in full compliance with the local safety and environmental regulations, while properly disposing of any hazardous or non-recyclable components.

The decommissioning sequence is summarised below:

1. **De-energisation and Isolation** – The system will be safely disconnected from the electrical grid. All energy sources, including battery modules and ancillary power systems will be isolated using a comprehensive lockout/tagout (LOTO) program. Fire suppression systems will also be deactivated at this stage to allow for safe physical handling.
2. **Module Removal and Packaging** – The battery modules will be manually disconnected and removed from their enclosures and will be palletised, secured, and labelled in accordance with Australian Dangerous Goods standards for safe transport.
3. **Infrastructure Disconnection** – The remaining Balance of Plant infrastructure, including transformers, switchgear and control systems will be physically disconnected. Cabling and structural infrastructure will be dismantled and sorted into specific material streams (e.g., aluminium, steel).
4. **Site Logistics and Removal** - All components will be removed from the site with heavy lifting equipment utilised to load the enclosures and electrical equipment onto transport vehicles. Traffic management protocols will be implemented to ensure safe and efficient removal without impacting the road network.
5. **Material Disposition** – Once removed from the site, materials will be directed to their designated waste management pathway as outlined in **Table 6.1**.
6. **Site Restoration** – Following the removal of all infrastructure, the site will undergo final demolition of foundations and clearing. The area will be rehabilitated to its pre-disturbed state.

A detailed decommissioning plan for the end of operational phase will be prepared prior to the cessation of operations (in an End of Operations Decommissioning Plan).

6.2.1 Required Qualified Personnel

To ensure the safe decommissioning and demolition of the BSF, Tesla, as the OEM, will exclusively manage the work specific to the battery modules to ensure that they are integrated into their closed-loop recycling process or retained for reuse. Rather than managing the complex logistics of individual cell recycling independently, the Project will integrate into the OEM's established closed-loop recycling supply chain.

The OEM will manage the extraction, handling, and transport of the modules to their vetted Tier-1 processing partners. This approach ensures the Project meets its circular economy objectives (refer to **Section 4**), enforcing the requirement that the LFP batteries are recycled for material recovery, with the minimum waste possible directed to landfill.

The remaining demolition work (~90%) will be undertaken by the qualified and experienced demolition contractor.

6.2.2 Risks

The decommissioning and demolition, storage, removal and transportation of a utility scale BSF presents a series of interconnected hazards arising from the nature of the stored electrochemical energy, the high voltages involved, the weight and physical scale of electrical infrastructure, and the chemical composition of battery materials.

Any risks associated with deinstallation and demolition of the battery unit, particularly the containment of hazardous battery materials, will be managed by the supplier's direction. Tesla will assess specific activities at the EOL to ensure any new or introduced risks are controlled appropriately.

Most LFP batteries can be considered hazardous wastes when they are disposed of because they may catch fire or explode if not handled carefully. EOL battery modules will be managed consistent with best practice of hazardous material storage, handling and transport at the time of decommissioning compliant with all relevant legislation, certifications and permits.

Decommissioned LFP batteries are classified as Class 9 Miscellaneous Dangerous Goods (UN3480/UN3481) due to fire risks. The transportation of them will comply with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Australian Dangerous Goods Code) which includes mandatory safe packaging, specific labelling, and documentation.

Handling, lifting, and transportation of the Megapack 3 will be undertaken in accordance with Tesla's *Transportation and Storage Guidelines* (as current at the time of decommissioning).

6.3 Reuse, Recycling and Recover Options (Battery Unit Components)

Where economically feasible, reusing battery systems and other components is more environmentally sound than recycling constituent materials. As batteries degrade over time, they may be less useful for their originally intended purpose, but still valuable for other applications (Energy Storage Association, 2020).

OEMs advise that battery units can be recycled with only the foam between cells, rubber components, some coolant tubing, and small by product from the battery recycling process not currently able to be recycled. The current breakdown of recycling / material recover in major battery unit components include the following:

- Battery Cell - Capacity to recover approximately 92% of materials.
- Battery Unit - Structural enclosure - capacity to recover almost 100%. The Megapack 3 is a heavily integrated system pre-assembled with steel, localized cooling setups, and aluminium internal components. These structural metals are easily separated during mechanical deconstruction and are entirely recyclable.
- Battery Unit - Inverters and power electronics - The bi-directional AC/DC inverters and control boards contain high quantities of copper wiring, heavy casings, and semiconductor materials that follow traditional e-waste recycling pathways to yield high purity metal returns.

Discussion on future opportunities for battery recycling is presented in **Section 7** and due to the potential technological innovation, and economies of scale over the next 20 years it is not possible to accurately predict the battery system reuse, recycling and recovery options.

An overview of the indicative waste streams and potential management solutions for battery unit components for the Project are included in. **Table 6.1**. Further information on decommissioning optioneering is presented in the Decommissioning Security Report Tully BESS (Attexo 2026b).

Table 6.1: Indicative decommissioning waste streams and preferred management options (Battery Unit components)

Waste	Type	Source	Management Options by Order of Preference
Demolition waste			
Structural iron	Solid	Battery Unit	• Transport offsite to a waste and resource recovery facility for disposal.
Metal (steel, aluminium, copper)	Solid	Battery Unit	
Non-recyclable residuals (plastics, wire insulations)	Solid	Battery Unit	
Regulated/hazardous waste			
Battery Modules and Cells	Solid	Battery Unit	• Lithium, iron phosphate, graphite, aluminium foil, and copper current collectors are all recoverable. Capacity to recover approximately 92% of materials. • Transport offsite as Class 9 Dangerous Good to a Tier-1 battery recycling facility. The modules will undergo "wet shredding" or thermal processing to neutralize the volatile electrolyte. The aluminium/copper is sifted out, and the remaining "black mass" (containing the lithium, iron, and graphite) is chemically refined to recover battery-grade lithium for manufacturing new cells.
R134a - refrigerant	Gas	Battery Unit	• Extracted by a licenced contractor and recycled.
Plastics, Polymers and PCB	Solid	Battery Unit	• Transport offsite to a waste and resource recovery facility for disposal.
Thermal coolant	Liquid	Battery Unit	• Transport offsite to a waste and resource recovery facility for disposal.
e-waste	Solid	Battery Unit electrical componentry	• Transport offsite for reuse. • Transport offsite to a waste and resource recovery facility for disposal.

Note: Indicative only, detailed waste characterisation will be carried out as part of the End of Operation Decommissioning Management Plan (EODMP) and/or while decommissioning activities are occurring.

6.3.1 Closed Loop Battery Recycling Program

Tesla has publicly committed that none of its scrapped lithium-ion battery modules go to landfill, and decommissioned battery materials are recycled through its own closed-loop system (Tesla, Inc., 2024) (refer to **Table 6.1**). Tesla has invested substantially in in-house battery recycling capability, with its Nevada Gigafactory incorporating dedicated battery recycling operations. Tesla's recycling program:

- Recovers battery materials and refines them for reuse in new Tesla battery cells, and
- Targets a closed-loop system in which recovered materials are reintroduced into new battery production.

Tesla's Australian service operations, which include the Collie battery service facility in Western Australia, could be engaged to coordinate the Australian-based component of the return program.

6.4 Waste Streams (non-Battery unit components)

Further information on decommissioning and demolition of non-battery unit components of the BSF refer to the Tully Decommissioning Security Report Tully BESS (Attexo 2026b). Ancillary, non-battery unit infrastructure (i.e., transformers, switch rooms, cabling, etc.) and associated materials, such as concrete and steel, are typically recycled through conventional waste management and materials recovery processes or otherwise disposed of at a licensed waste and recovery facility.

7. Recycling Options and Opportunities

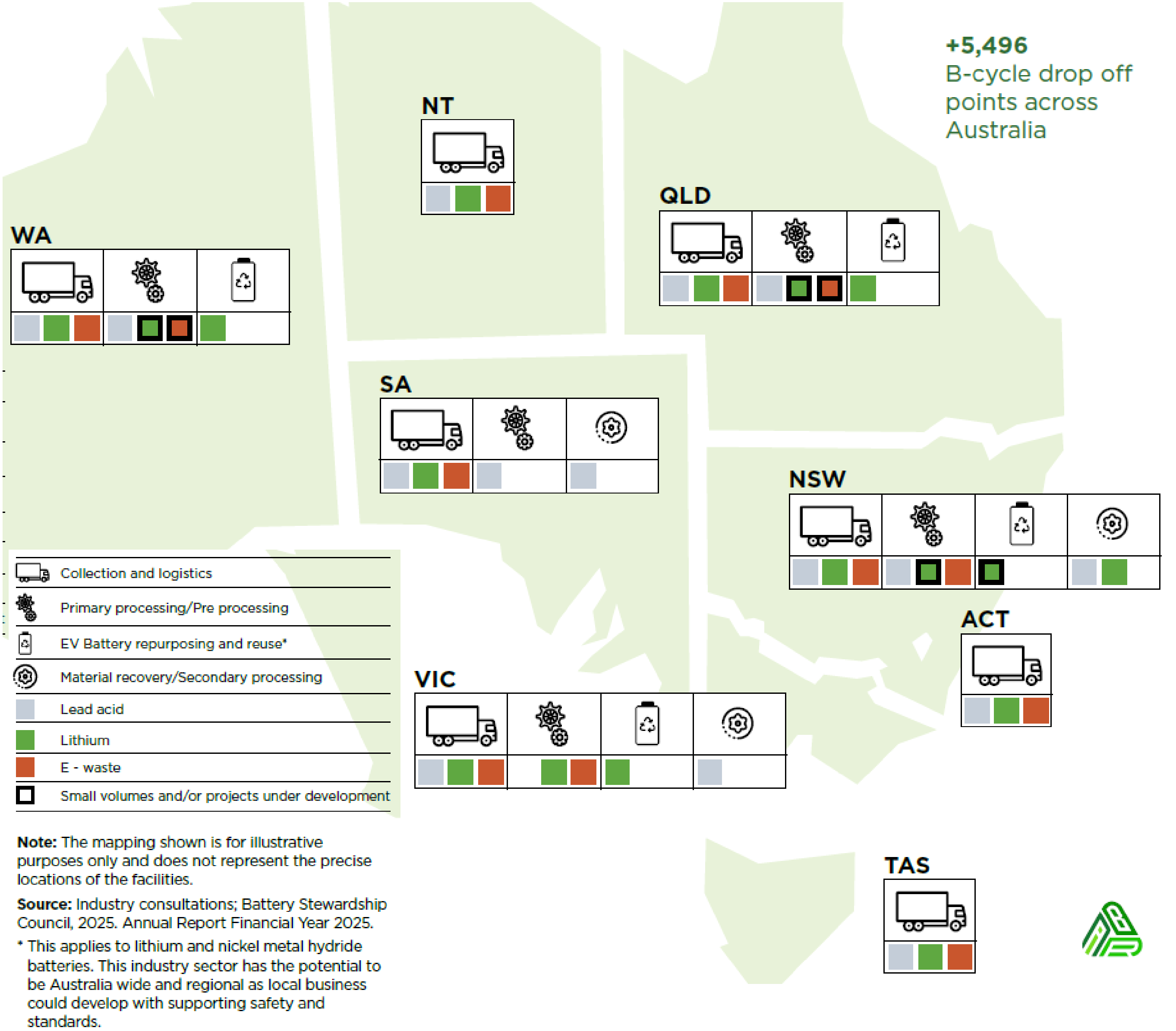
7.1 State of Australia’s Recycling Options

Australia is already a battery recycler and can seize the opportunity of a circular battery economy. In 2021, Australia recycled 90% of lead acid batteries, compared to just 10% of lithium-ion batteries (CSIRO 2022; ABRI 2026). Australia could generate approximately 137,000 tonnes of lithium-ion battery waste annually by 2035, reinforcing the need for expanded recycling infrastructure and improved EOL stewardship (Australian Government, 2024). Lithium-ion battery recycling in Australia faces limitations because of a lack of feedstock, safety concerns and costs. We send most lithium-ion batteries overseas for processing, where they can still end up in landfill (McKell 2022).Many battery manufacturers offer take-back programs that facilitate the recovery and recycling of battery components (i.e., Tesla’s closed-loop battery recycling program), while non-recyclable materials are disposed of in accordance with regulatory requirements (Queensland Renewable Energy Program, 2024).

The Association for the Battery Recycling Industry (ABRI) is working with Standards Australia and Powering Australia to develop used lithium packing and transport guidelines and is building the industry’s profile and awareness that battery recycling is available.

Currently the ABRI reports that Australia’s battery materials recovery industry has over 45 facilities across all states and territories, along with almost 5,500 B-cycle drop off points. The capability of battery recovery industry in Australia is shown in **Figure 7.1**.

Figure 7.1: Battery materials recovery industry profile (ABRI 2026, p16)



There are few e-waste recycling facilities in Queensland, and no dedicated recycling facilities that can take the battery types used at a BSF. However, this is likely to change over the next 20 years, which is the life of the proposed BSF y.

It is anticipated that new battery recycling facilities will be constructed and in operation by the end of the Project with the capacity to process battery modules and cells.

7.2 Future Recycling Opportunities

This PBRS has been developed based on current knowledge of technologies, recycling process and best practice battery recycling. Given the BSF's expected 20 year operational life, the recycling landscape will likely be radically different by its EOL. Significant advances that provide opportunities for improvements in this PBRS are anticipated that will be incorporated into the strategy at the time of decommissioning of the BSF.

Australia's rapidly expanding deployment of BESS is creating a significant future pipeline of EOL lithium-ion batteries, presenting substantial emerging opportunities in recycling, repurposing, and circular economy integration. As large-scale BESS installations installed today begin to reach EOL over the next 15–20 years, the recycling sector is likely to evolve materially in cost, scale, efficiency, and technological capability.

One of the strongest drivers of opportunity is sheer volume growth. Lithium-ion battery waste in Australia is projected to increase at around 20% annually, exceeding 136,000 tonnes by 2036, with total battery waste potentially reaching over 744,000 tonnes by 2050 (REC 2016; CSIRO 2026; ABRI 2026). BESS will represent an increasing share of this waste stream alongside electric vehicles and home batteries, creating concentrated, homogeneous battery flows that are easier and more economical to process compared to dispersed consumer batteries. This scale is critical, as recycling economics improve significantly with throughput and standardisation.

Currently, Australia's recycling capability remains immature, with only around 10% of lithium-ion batteries being recycled and limited domestic processing infrastructure in 2021 (CSIRO 2026; Zhao et al. 2021). However, this gap itself represents a major opportunity. The development of recycling facilities, supported by over 45 existing collection and recovery operators, is expected to expand into a vertically integrated industry encompassing logistics, dismantling, materials recovery, and refining (ABRI, 2026). ABRI notes growth in the number of battery recycling facilities and capabilities across Australia, projected to triple in size, reaching approximately $6.9 billion by 2050 (ABRI, 2026).

As BESS facilities become more common, dedicated recycling hubs co-located with renewable energy zones or industrial precincts could emerge to handle large-format grid batteries efficiently (Zhao et al. 2021).

Technological improvements will also play a decisive role. Advances in automated disassembly, robotics, and hydrometallurgical processing are expected to increase recovery rates (potentially up to ~95% of materials) while reducing labour and safety risks (CSIRO 2026). In parallel, "second-life" applications may delay recycling by repurposing partially degraded batteries for lower-intensity storage uses, maximising asset value before material recovery.

Battery system costs have already fallen dramatically (over 90% between 2010 and 2023 globally), and similar learning-curve effects are expected in recycling (IEA 2023). Australian modelling indicates that while total recycling volumes will increase with larger and longer-duration BESS systems, the unit cost of recycling per MWh is likely to decline due to economies of scale and process optimisation (GHD 2025). This suggests that by the time today's BESS assets are decommissioned, recycling may transition from a net cost centre to a partially value-accretive activity, driven by recovered critical minerals such as lithium,

The convergence of rising BESS deployment, increasing waste volumes, technological innovation, and economies of scale positions battery recycling as a major emerging industry in Australia. Over the next 20 years, it is likely to evolve into a sophisticated, lower-cost, and high-efficiency sector that underpins a domestic circular economy for energy storage materials.

8. Strategy Review and Adaptability

An updated investigation of opportunities and feasibility of recycling of batteries would be undertaken prior to end of operation decommissioning. EOL optioneering will be undertaken as outlined in the Decommissioning Security Report (Attexo 2026b). Where the system is to be retired, as far as practical the batteries within the BSF would be recycled at approved battery recycling facilities, or subject to confirmation, could be returned to the OEM for refurbishment and recycling. Where spent batteries are unable to be recycled, they would be disposed of at a suitably licensed facility

There is an acknowledgement that recycling technology and capacity will likely advance significantly over the next 20 years before the EOL of the BSF which will require a comprehensive review of the contents and approach in this PBRS.

RWE commit to updating the strategy prior to end of operation decommissioning (conditioned).

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