4R ENERGY

Creating a Battery Ecosystem

REPAIR | REFURBISH | REPURPOS | RECYCLE

- *With the need to combat carbon emissions from transportation and electricity generation, the battery usage is growing. This increasing use of batteries will see a parallel increase in the quantities of waste batteries when they reach end-of-life. This toxic and potentially environmentally damaging waste requires proper management and large-scale solutions will soon be needed. However; most Electric Vehicle batteries especially those used in mining can have a second life in another application such as Energy Storage and Uninterruptible Power Supplies.*

- *The Western Australian mining sector has around 125 operating mining projects across Western Australia, accounting for around 94% of the State's income. Research has found that 61% of next generation mines will be completely electric and 89% of existing mines will be electrified within the next two decades. Mining companies are rapidly adopting greener practices and will need circular solutions such as the 4R battery Ecosystem to support them meet their ESG requirements.*

- *Globally, demand for batteries is expected to grow at least nine-fold over the next decade, driven by technological improvements, demand for energy storage and regulatory changes designed to drive systemic change and achieve emissions reduction targets. Globally, the largest application for LIBs is likely to be electric vehicles, with batteries for commercial EVs making up 15% of the market, at around US$19b.*

- *The innovative Battery Ecosystem concept combines integrated service, repair, refurbishment with advanced robotic battery pack manufacturing, repurposing, and recycling of Lithium batteries, offering a solution to the whole of life cycle management of a growing number of lithium-ion batteries use by industry.*

- *Market Segmentation for Repurposed Batteries*
  - *Mining*
  - *Oil & Gas*
  - *Water and Electricity Utilities*
  - *Renewables*
  - *Residential and Commercial Energy Storage*

- *4R Energy creates new supply chains for spent batteries, a significantly increasing waste product from the electrification of mining vehicles.*
- *This approach will enhance battery stewardship, providing the industry with an avenue to responsibly manage batteries from design through to end of life.*

Proposed Battery Ecosystem