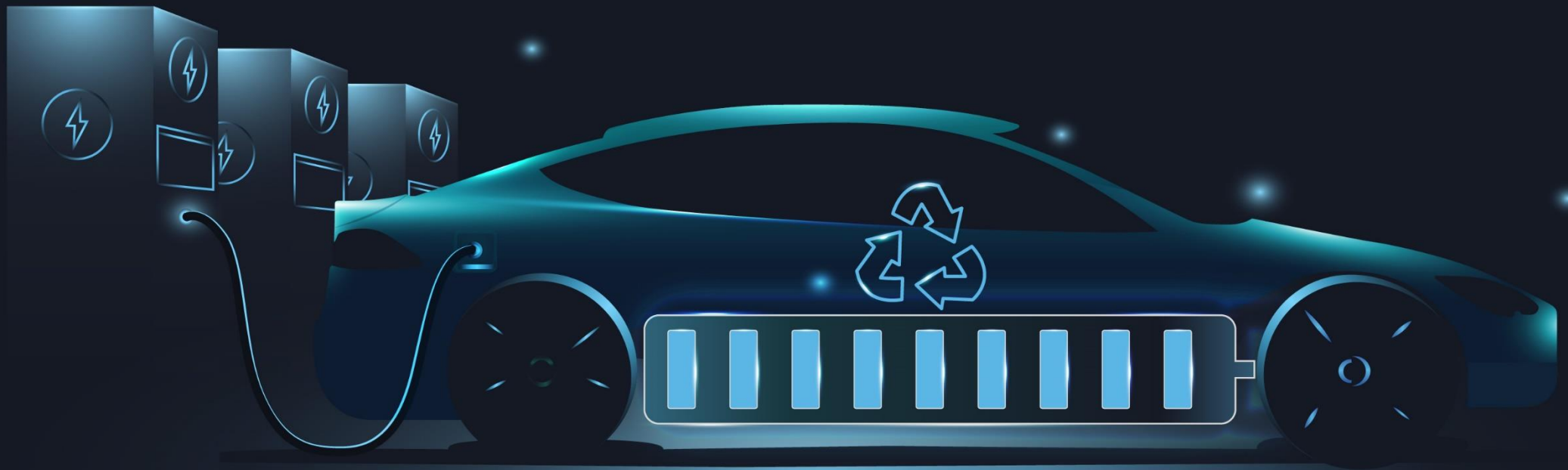


Using the GREEN framework to assess high-growth, high-return areas within lithium-ion battery recycling

CASE STUDY – CIRCULAR ECONOMY





Recycling is everywhere these days, from daily-use kitchen plastics to the medals awarded to winning athletes at the recent Tokyo Olympics. And with electric vehicles (EVs) seen as the sustainable transportation of the future in line with the Net Zero 2050 mission, it is imperative to increase recycling across their value chain as well.



Our client – a global conglomerate which designs, manufactures, and markets professional, industrial, and commercial products and services – wanted to understand where opportunities existed within the EV landscape, and so, by looking at the current lifecycle of the most prominent EV battery type, lithium-ion (Li-ion), Evalueserve decided to narrow the project scope down on it.



We then guided our client about the possible avenues for high-growth and high-return areas within the Li-ion battery recycling space. Before we presented a solution, we had to identify the key factors to back interest and investment in the field of battery recycling.

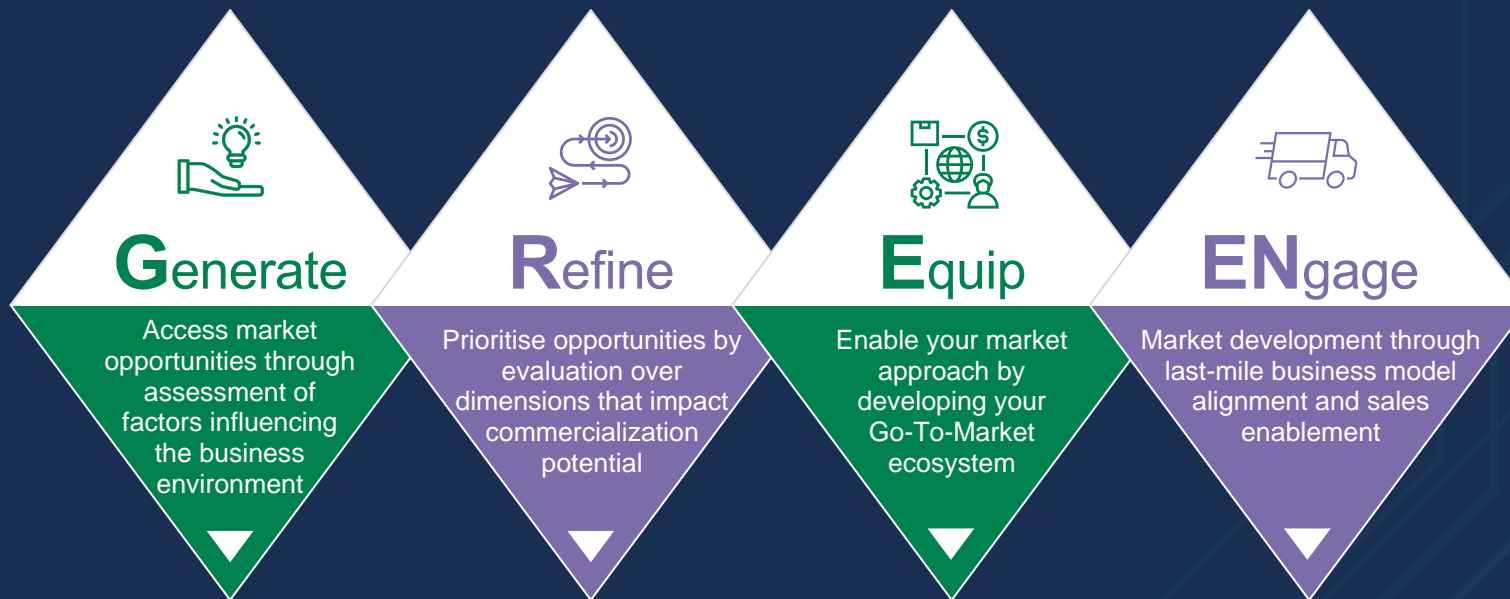


The Challenge

The client's requirements:



The client's requirements led us to leverage the fundamentals of Evalueserve's GREEN Solution Framework. Our GREEN Framework, which stands for **Generate**, **Refine**, **Equip**, and **ENgage**, has been designed to create insights to support decarbonisation initiatives at each stage from strategy formulation all the way to market execution.



Our Solution

Phase 1: Our team first generated the following insights to have a fair assessment of the battery market outlook and hence the landscape for recycling. The primary element of the GREEN Framework applicable to this Phase was Generate:

Market Overview

- Battery market outlook
- Demand for Li-ion battery lifecycle management
- Key industry trends for battery recycling
- Market dynamics within battery recycling



Value Chain Analysis

- EV battery life-cycle assessment
- Typical EV battery recycling value chain
- Battery recycling processes and key



Stakeholders

- Technology Landscape
- Pre-treatment technologies
- Li-ion battery recycling technologies



Phase 2: Based on key takeaways from each aspect of Phase 1, the team then moved forward into Phase 2. During this new Phase, further assessments were made as well as additional directions in continuation of insights from Phase 1 were explored. In addition to Generate, Phase 2 also focussed on the Refine element of the GREEN Framework:

Market Overview

- Regional overview of the regulatory landscape
- Overview of industry associations and consortia involved



Value Chain Analysis

- Region-wise business models
- Role of major value chain players – EV OEMs



Technology Landscape

- Battery recycling processes to enable metal recovery
- Overviews of processes to recover metals from spent batteries using pyrometallurgy, hydrometallurgy, hybrid recycling methods
- Technology comparison between the recovery processes



Stakeholder Company Profiles

- Region-wise profiles of battery recycling companies including their description, structure, revenue details, their value chain presence, technology employed, existing partnerships, as well as attractiveness as a partner
- Their respective process flows



Further refining our Phase 2 findings, the team then delivered a market size assessment and cost analysis covering the following factors:

Market Size and Segmentation

- Li-ion battery recycling market dynamics
- Impact of key parameters on the market
- Technology segmentation based on market size and growth projections
- Technology comparison
- Technology selection criteria – expert opinion
- Understanding the competitive landscape

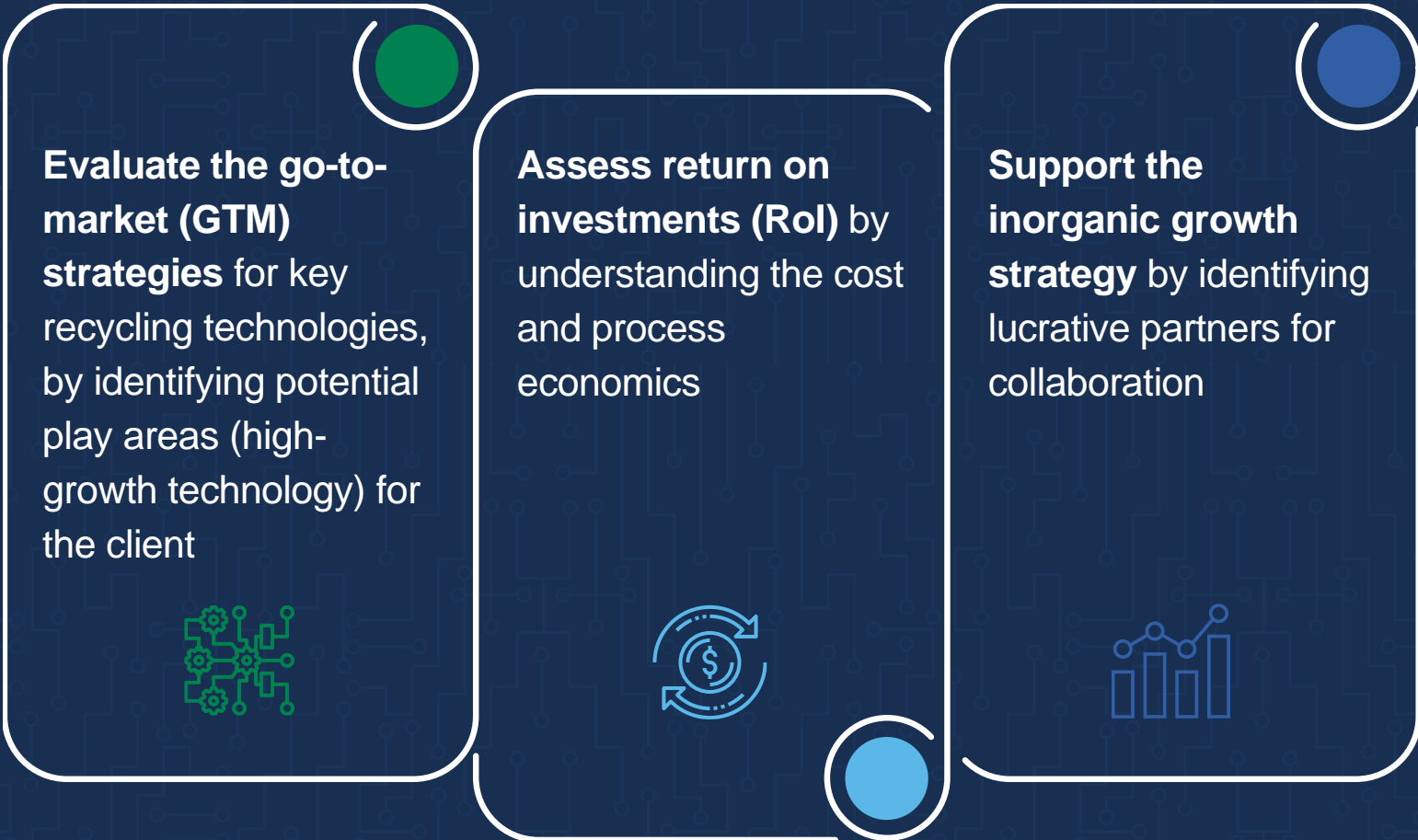


Cost Analysis and Process Economics

- Battery recycling economics of prevalent battery recycling technologies
- Value chain cost build-up
- Factors impacting cost of Li-ion battery recycling



Using this methodology and powered by the Evalueserve mind+machine™ needs-tailored process, the team was successful in delivering the following for the client, which comes under the Equip element of the GREEN Framework:



Business Impact

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Evalueserve is a leading analytics partner to Fortune500 companies. Powered by mind+machine™, Evalueserve combines insights emerging from data and research with the efficiency of digital tools and platforms to design impactful solutions. A global team of 4,000+ experts collaborates with clients across 15+ industries.

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