

COMPLY OR COLLAPSE: THE DILEMMA FACING THE LITHIUM-ION BATTERY INDUSTRY

By

Adrian Griffin

Future Technology Trust, Australia

Presenter and Corresponding Author

Adrian Griffin

ABSTRACT

Lithium-ion batteries occupy pole position in terms of the world's transition to green energy, including e-mobility alternatives to traditional transport options. This position is buoyed by the immediacy of the need for carbon neutrality, long lead times for the development of alternative technologies and the immense scale of investment in current and committed infrastructure involved, which in turn requires a satisfactory return on capital. Today, these drivers appear paramount in initiating the changes required to achieve net-zero, but what factors detract from such adjustments? Which are most likely to influence the evolution of the lithium-ion battery supply chain and, indeed, battery chemistries of the future – and can the current industry compromise and/or evolve to meet future demand?

A profusion of legislation/policies in the European Union, the United States, China, India and other major jurisdictions will profoundly impact the ways in which supply chains for lithium-ion batteries – and what comprises them – are managed. ESG legislation and reporting already influence the availability of credit, as well as perceived financial risk. Embedded within this plethora of actual and potential regulation are lifecycle analyses, calculations of carbon footprint and the need for sustainability.

Examination of the lithium-ion battery lifecycle highlights two areas of vulnerability in terms of the industry's survival. They are:

- the sustainability of raw material inputs (primarily 'battery metals'), and
- battery recycling rates and efficiencies.

Both areas are the focus of much debate, some related to restrictions in the trading of goods lacking appropriate ESG credentials. The electric vehicle (e-mobility) industry in particular will be subject to the imposition of 'battery passports', designed to track battery lifecycles and ensure regulatory compliance. Markets for non-compliant batteries will be severely restricted.

Meanwhile, raw materials are already susceptible to supply chain deficits, carbon footprint assessments and ESG credibility. The *US National Blueprint for Lithium Batteries 2021-2030* encourages widespread substitution of nickel and cobalt in lithium-ion batteries by 2030 to assuage such restrictions. Difficulties in marketing products produced from Australian, and perhaps other, spodumene, may also arise, due to the currently poor sustainability (recovery) profile of this material, resulting from the inability of downstream processing to handle fine spodumene feed. This poor resource utilisation (the alienation of fine spodumene during current processing practices) could drive a change to other battery chemistries (sodium-ion batteries?) or more sustainable sources of lithium, including direct lithium extraction from brines.

Although the issues raised above are certainly complex, two promising technologies are already tackling the issue of converting fine spodumene into lithium chemicals, to improve resource recovery and utilisation and provide a pathway to greater sustainability and ESG amenability.

This paper outlines some of the compliance issues that will affect the lithium-ion battery supply chain and ways in which the industry can not only comply with legislative requirements but also improve its financial performance. Technologies that enhance efficiency and reduce reliance on new raw material inputs will be crucial to that.

Keywords: ESG, legislation, sustainability, lithium, battery