Strategic Materials for a Low-Carbon Future: From Scarcity to Availability
2-3 November 2017 – Session Summary

Breakout 1b: Powering the future: energy storage minerals

The decarbonisation of the transport industry is resulting in a revolution in energy storage technologies. Electric vehicle demand is driving increased demand for lithium-ion batteries. What is the forecast demand for the key materials of lithium and cobalt? What is the impact on supply chain risk for end-users and can these risks be mitigated? What is the prospect for emerging battery technologies such as vanadium flow? What are the technological challenges in secondary supply?

Nick Cliffe, Innovation Lead for Advanced Materials, Manufacturing & Materials Team, Innovate UK
Hans Eric Melin, Founder, Creation Inn
Simon Moores, Managing Director, Benchmark Mineral Intelligence

Moderator: Henry Sanderson, Commodities Correspondent, Financial Times

- Forecast global demand for lithium-ion batteries is 500-800 GWh by 2025 due to a growing range and volume of applications from electric cars to renewable energy storage. That compares to a global li-ion cell output of 39 GWh in 2014.
- Battery production capacity is growing, too: 372 GWh of capacity is in the pipeline. Most (59%) of the world's lithium-ion batteries are made in China.
- Is that enough to meet demand? Perhaps not. Lithium prices keep rising – demand is outpacing supply. For lithium, cobalt and nickel, the supply bottleneck lies in processing. Two years ago, lithium made up 2% of a battery's cost base, and now it is 6%.
- There was implicit agreement amongst speakers that greater recycling and circularity in energy storage materials would increase supply and price security. However, the supply of end-of-life batteries will not be sufficient for some years. Many are shipped back to China for a second life at 60-80% function, after a first life in the West, so they are also mostly recycled there, and Chinese battery recyclers carry out product-to-product recycling (eg. take a cathode, turn it into a cathode) as this is the most economically viable route.
- Meanwhile, UK public policy is “rapidly waking up to the need to focus more on the resource efficient use of the materials that go into the batteries” (Nick Cliffe). Its publicly-funded GBP 250M Faraday Challenge aims to improve battery technology and recycling

at an industrial scale: currently, 10-50% of the battery pack is recyclable, and the target for the Faraday Challenge is to bring it up to 90%.