# SEG 2023 Conference: Resourcing the Green Transition

## Global Copper Screening for the Energy Transition - a Holistic Exploration Mindset

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The Energy Transition is driven by the need to mitigate climate change through progressive global switching to lower-carbon energy sources. Copper and other critical metals will be needed in greater amounts for electrification and providing raw components. Prospecting to expand mineral portfolios increasingly requires looking deeper and beyond known occurrences. New ways of thinking about exploration must be adopted to meet growing material demands.

Working with our mining industry clients, we are taking existing applicable geological subsurface screening methods from the hydrocarbon industry and applying them within a broader mineral system approach to exploration, which often requires turning the terminology on its head. These screening methods rely upon an integrated tectono-stratigraphic framework, compiled from public domain data over the last two decades. We discuss how it can be used to understand and predict likely occurrences of various mineral systems, both igneous and sedimentary.

At a global scale, porphyry copper screening may be possible, mainly from the integration of plate tectonics as a foundation; sedimentary-hosted copper requires integration of more diverse geological data sets (from sources to sinks, tectonics, and gross depositional environments). It requires a basin-scale understanding of the combination of processes (temporal and spatial) that are required for the development of economic sediment-hosted stratiform copper deposits. This includes the presence of basin-scale faults and structures (acting as fluid conduits), favourable metal source lithologies (e.g., continental red beds and volcanic basement), and brine-generating evaporite lithologies that drive fluid circulation and mineralisation.

This highlights that, at a global scale, data can be rapidly integrated using existing geoprocessing workflows, informed by physics-based processes understood at the local scale. The results allow for efficient screening of global locations where the geological conditions were favourable, including subsurface and frontier regions, allowing explorers to then focus attention on more detailed investigations at the local level.