

National-Scale Critical Mineral and Strategic Material Potential Assessments to Support Decision-Making in the Net Zero Transition

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With the projected increase in demand for critical minerals and strategic materials required to meet net zero objectives by 2050, a series of national-scale mineral potential assessments are being delivered as part of the Resourcing Australia's Prosperity initiative at Geoscience Australia. In addition to providing an evidence-base for supporting government decision-making, these precompetitive assessments aim to support the discovery of deposits that host critical minerals and strategic materials by reducing the exploration search space and promoting increased exploration investment. The mineral potential assessments integrate both new and legacy geoscience data and aim to delineate prospective belts or districts where favourable geological, geophysical, and geochemical criteria that represent evidence of relevant mineral systems processes are present. To date, assessments for nickel-copper-platinum group element, sediment-hosted base metal, carbonatite-related rare earth element, and iron oxide-copper-gold mineral systems have been undertaken at a national-scale by Geoscience Australia as part of previous programs, with additional mineral systems currently being assessed. The methodology used in each assessment is reviewed on a case-by-case basis due to the widely varying availability of known deposits and occurrences that can be used to train data-driven models using statistics or machine learning for each mineral system. Using a mineral systems-based approach as a basis, the Resourcing Australia's Prosperity initiative aims to deliver a series of commodity potential maps for all of Australia's critical minerals and strategic materials over the 35-year duration of the initiative. An example of how this may be achieved for copper will be presented, with an interim map highlighting Australia's copper potential based on the mineral systems modelled to date.