

Basin Evaluation: A Tool to Help Assess the Petroleum Prospectivity of Australia's Offshore Frontiers

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Australia is vastly under-explored, with a large number of frontier basins comprising diverse geology. From an Australian Government perspective, there is a need to evaluate the petroleum prospectivity of these basins, to ensure informed and strategic decisions can be made to maintain security of energy supplies. For this reason, Geoscience Australia has evaluated the petroleum prospectivity of Australia's offshore frontiers using a new methodology. The evaluation enhances Geoscience Australia's ability to provide advice to Government, identifies the key factors of high uncertainty in each frontier that are currently impacting upon perceptions of prospectivity, and high-grades areas for future data acquisition and research.

The new basin evaluation methodology is based upon standard prospect risking models, but modified to answer the question: "what is the relative likelihood of an economic petroleum field being present in this frontier?" rather than risking individual prospects. The basic ranking unit is the play level, which is risked for both geology and economics. Two versions of the geologic risking have been developed, involving eleven weighted risk factors, or four weighted groups of risk factors, respectively. Economic risking is mainly based upon functions of minimum economic field size versus expected field size distributions at each play level. Delphi meetings assess each risk factor, guided by a standardised indicative risk for each particular geologic or economic circumstance.

A key component of each frontier evaluation is a knowledge rating – poorly known regions normally have higher risk factors for geology, and economic risking can be highly speculative. For these reasons, ranking between frontiers is only valid for regions with a similar knowledge rating. The evaluation methodology is designed to be easily modifiable, so that variations to weightings, risk factors assessed, and indicative risks can be made to reflect the preferences of the user.