



## ORAL PRESENTATION

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**Day 3: 9<sup>th</sup> March 2023**

### **Session 11: AUSTRALIA**

**Co-Chair: Conrad Todd, Triangle Energy**

**Co-Chair: Simon Molyneux, Molyneux Advisors**

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13:45	Assessing the Energy Resources Potential in Underexplored Regions: Eastern-Central Australian Examples	Barry Bradshaw	Geoscience Australia
14:10	The Perth Basin and the Transformation of Strike Energy.	Andrew Farley	Strike Energy
14:35	Characteristics of the Perth Basin Kingia play and an Assessment of Remaining Potential	Ian Cockerill	Beach Energy
15:00	Review of Trapping in the Cretaceous Barrow Group in the Exmouth Sub Basin	Titus Murray	Southern Highlands Structural Geology



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# Assessing the Energy Resources Potential in Underexplored Regions: Eastern-Central Australian Examples

**Barry Bradshaw**<sup>1</sup>, Tom Bernecker<sup>1</sup>, Jeremy Iwanec<sup>1</sup>, Keith Bradey<sup>1</sup>, David Lund<sup>1</sup> and Mike Szczepaniak<sup>1</sup>

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Assessing the energy resources potential in underexplored regions is challenged by poor data coverage and data vintage. Yet, understanding the untapped resource potential will fundamentally support the planning and implementation of future energy supply strategies, especially in the context of accelerating the decarbonisation of industrialised economies.

In concordance with global efforts to achieve net-zero emission targets by 2050, the Australian Government is committed to accelerating the decarbonisation of its economy. Supporting the aim to rapidly decrease greenhouse gas emissions, Geoscience Australia's resource assessment work is being expanded outside the traditional hydrocarbon commodities (crude oil, natural gas, unconventional hydrocarbons) to include the subsurface storage potential for both carbon-dioxide and hydrogen as well as groundwater resources that can support the production of green hydrogen.

Many of the previously explored basins that were deemed to be either non-prospective, or only marginally prospective with respect to hydrocarbons, may have a significant groundwater and geological storage potential. By utilising a spatially enabled, play-based exploration approach for all sediment hosted energy resources, Geoscience Australia is identifying new low carbon fairways for future energy exploration and production. This talk will outline the applied workflow and present first results from underexplored basins in the eastern-central Australia region.

## SPEAKER BIOGRAPHY

Dr Barry Bradshaw is a Geoscientist with 32 years of experience undertaking regional geological and geophysical studies and play-based resource assessments for conventional and unconventional hydrocarbon resources, geological storage projects, and sediment-hosted mineral deposits in Australia. Barry is currently employed as the Energy Resources and Advice activity leader at Geoscience Australia, and has previously worked as a Principal Geologist at CGSS consultants, Senior Research Scientist at AGSO/Geoscience Australia, and Research Scientist at Texas A&M University (USA). Barry graduated from the University of Sydney in 1988, and completed a PhD in Earth Sciences at the University of Waikato (New Zealand) in 1991.



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# The Perth Basin and the Transformation of Strike Energy

Andrew Farley<sup>1</sup>

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Following AWE's success at Waitsia, Strike entered the Perth Basin in early 2018 with a farmin to EP 469 West Erregulla. The sentiment around town was that the West Erregulla was too deep for a conventional gas reservoir, being "too hot, too deep, high CO<sub>2</sub> and with no porosity and no permeability". 18 months later, Strike discovered conventional gas charged Kingia sandstone reservoir in West Erregulla 2 at a depth of 4800mMD pushing the play >1000m deeper than previous wells. Porosity and permeability preservation mechanisms have been a focus of study, being a combination of mineralogy, depositional environment and early charge. With West Erregulla discovered, a successful appraisal campaign was executed, and in parallel Strike turned its attention to other permits acquired through the takeover of UIL Energy. 3D seismic was acquired at the Walyering field and successful exploration and appraisal wells were drilled and tested. Permits covering South Erregulla were granted, then within 12 months a 2D seismic survey was completed and a successful exploration well drilled. After 7 successful wells in 3 years, Strike now holds the largest combined 2P/2C position in the Perth Basin.

## SPEAKER BIOGRAPHY

Andrew Farley graduated from the University of Newcastle (Australia) in 2002 with a BSc. in Geology. He has 20 years of experience working with onshore oil and gas operators on exploration and development projects in all 5 mainland states of Australia. Prior to joining Strike Energy in 2012, Andrew worked with AGL Energy in Sydney. Andrew has held a number of technical positions at Strike Energy, becoming Exploration Manager in September 2019. Andrew has led the subsurface team during the design and execution of the company's Exploration and Development projects, most notably the West Erregulla, South Erregulla and Walyering fields in the Perth Basin. Andrew is a member of SPE, PESA, SEAPEX and the Australian Geothermal Association.



## ORAL PRESENTATION

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# Characteristics of the Perth Basin Kingia Play and an Assessment of Remaining Potential

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Since the serendipitous discovery of Waitsia in 2014, the Perth Basin has emerged as one of the most talked about basins in the Asia-Pacific region. Follow-up discoveries at West Erregulla, Beharra Springs Deep, South Erregulla and Lockyer Deep have extended the proven play across the basin and deepened the known effective reservoir floor. This presentation will review characteristics of the Kingia play including trap styles, reservoir characteristics, and play fairway analysis.

### SPEAKER BIOGRAPHY

Ian has over 25 years of experience as a geoscientist with a successful record of value creation through oil and gas discoveries, new venture development, and asset / corporate promotion. He has a background in geological and geophysical interpretation with experience in conventional and unconventional exploration and development projects worldwide. Ian has worked in technical and management positions for Hunt Oil, Apache Energy and RISC Advisory; and executive positions for Transerv Energy, Verona Energy and TSV Montney. Ian is currently General Manager for Exploration and Subsurface WA & New Ventures for Beach Energy where he is responsible for Beach's extensive operated and non-operated position in the Perth Basin.



## ORAL PRESENTATION

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### Review of Fault Seal in the Exmouth Sub Basin, North West Australia

Titus Murray<sup>1</sup> and William Power<sup>2</sup>

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The Exmouth sub-Basin is part of the Northern Carnarvon Basin of shore North West Australia and is a prolific mature basin with a wide range of oil and gas accumulations. This region was extensively explored during the late 1990s and early 2000s with many excellent academic publications. Many of the traps are combination fault and sub-crop seals. Additionally, there are aspects of depositional stratigraphic sealing. With a range of trapping and compartmentalising mechanisms, it is vital to consider a range of trapping uncertainties. This paper reviews the historical literature to refine the trapping and sealing mechanisms for various fields, including Vincent, Enfield, Pyrenees-Macadone, Van Gough and Griffin. We test the revised seal models with a range of regional dry wells to better understand the limitations of the datasets and algorithms. A clear-eyed review of trapping can help refine risks for explorers to develop new play concepts in mature basins. We also aim to illustrate that a regulatory and scientific environment that provides extensive open-file historical data can fuel exploration.

#### SPEAKER BIOGRAPHY

Titus is a structural geologist with extensive experience in studying and characterising faulted and fractured reservoirs in over 30 countries. Titus aims to provide services and tools that improve oil and gas discovery. A vital part of this is the development of new algorithms to describe structures and fluid flow.

Another crucial part of his practice involves 2D and 3D Structural restorations. These projects are either;

- Offshore frontier exploration based on deep seismic data
- Onshore complex fold and thrust belts based on borehole and outcrop data.

Before setting up practice in Sydney (now Bowral), he worked for

- Midland Valley (Petroleum Experts) was a structural geological R&D group in Glasgow Scotland
- UK Nirex, the British Nuclear Waste disposal company
- Maptex is an Australian Pioneer in 3D geologic modelling for the mining industry.