

AUSTRALIA

Overcoming major challenges

However, against this trend there is good news that Australia has now reached the status of the largest LNG exporter in the world, following the delivery of first gas from Wheatstone on the North West Shelf. Moreover, industry's participation in the annual acreage release round has remained robust. In terms of converting open acreage into exploration permits the overall subdued trend has seen incremental improvement.

Increasing LNG production

Australia's export volumes of LNG from the North West Shelf expanded with the first cargo from the 15.6mn t/y capacity Gorgon development delivered in March 2017 and first production from the 8.9mn t/y Wheatstone project in October 2017. Finding additional gas resources to provide long-term support for these projects are high priority programmes in the Northern Carnarvon Basin, which also offers opportunities to discover commercial quantities of oil in its inboard region.

The Browse Basin, hosting an estimated 40tn cf (43 PJ) of natural gas, will be Australia's next producing hydrocarbon province when the Ichthys and Prelude gas fields commence production in 2018.

The Inpex-operated Ichthys gas and condensate field will commence production in March 2018. The project, linked via an 890-km long pipeline to processing plants in Darwin, will produce 8.9mn t/y of LNG and 1.6mn t/y of LPG. In addition, more than 100,000 b/d of condensate will be produced from a floating production, storage and offloading (FPSO) facility.

Ichthys' next-door neighbour, Shell's floating LNG facility at Prelude, is the largest of its kind ever built. It recently arrived on location and is being prepared to come onstream in 1H2018. The project is capable of producing at least 5.3mn t/y of liquids – comprising 3.6mn t/y of LNG, 1.3mn t/y of condensate and 0.4mn t/y of LPG. These projects represent the onset of future gas production in the basin, which contains other large accumulations ready to be brought online.

The central and inboard parts of the Browse Basin contain a liquid petroleum system that is responsible for the accumulations at Caswell, Cornea and Gwydion. In

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Prelude FLNG leaving the Samsung Heavy Industries shipyard in Geje, South Korea, on 29 June 2017
Photo: Shell

Although Australia is facing a number of E&P challenges, it recently became the world's largest LNG exporter.

Tom Bernecker, Geoscience Australia, reports.

Several big news items from Australia have hit the media during the last 12 months, many of which appear to have painted a rather grim outlook for the oil and gas industry. Not only is exploration activity at sustained low levels, partly related to the overall downturn in global oil prices, but the industry has also been negatively affected by the regulators' collective decision to implement new moratoria on the exploration of unconventional hydrocarbon resources.

a major regional petroleum geological study, Geoscience Australia has updated the stratigraphic framework of the hydrocarbon-bearing Cretaceous and Jurassic super-sequences and carried out petroleum system modelling. The results demonstrate the presence of four petroleum systems, of which one is supported by Cretaceous marine source rocks that are capable of producing some liquid hydrocarbons.

Evaluating high risk opportunities

During the current low level of exploration activity, BP's decision last year to abandon its commitment to drill in the Bight Basin came as a shock to many. Compounding this impact was Chevron's recent announcement to pull out of the Bight Basin for commercial reasons. Despite declaring that it firmly believed in the prospectivity of the region – a sentiment that is being echoed by numerous experts – the risk profile to drill complex deepwater wells was deemed too large to fit Chevron's portfolio of forward work programmes. This leaves only Statoil as a permit holder, with a commitment to drill two exploration wells in the primary term. Other operators in the Bight Basin include Santos, Murphy Oil, Karoon, Bight Petroleum and JX Nippon, all of whom are committed to data acquisition and geological studies. One well is planned to be drilled in the secondary licence term.

Despite the challenges of undertaking projects with a high risk profile, explorers are attracted to Australia because of the vast untapped resource potential both on- and offshore. Many of the offshore basins, especially in the deeper water regions, have not been covered by modern seismic surveys. Some areas, such as the greater Roebuck Basin and adjacent Beagle Sub-basin are now firmly on the industry's radar. The Phoenix South-1, ST1 oil discovery made in 2013 has resulted in additional drilling success and attracted the attention of Polarcus, who recently acquired the Capreolus seismic survey – the largest regional 3D data set in the southern hemisphere – over the under-explored Beagle and Bedout sub-basins. The data will be used to identify further prospects in this emerging hydrocarbon province between the Browse and Northern Carnarvon basins.

Australia's onshore frontier basins also offer many opportunities for exploration success. High on the list are those

basins that hold the potential for shale gas, tight gas, basin-centred gas and shale oil. These include the Cooper Basin (South Australia, Queensland), and the Canning Basin and onshore Perth Basin (Western Australia). There is special focus on the McArthur Basin in the Northern Territory where Origin demonstrated oil flow during an 11-stage horizontal fracking test the day before the regional government implemented a moratorium on further exploration for unconventional hydrocarbons. The moratorium involves the review of exploration activities and associated risks, especially in the context of groundwater contamination.

While the moratorium is in place, Geoscience Australia has acquired new data as part of a government funded initiative called 'Exploring for the Future'. This programme, funded with A\$100.4mn (\$77mn) over four years, is aimed to evaluate groundwater, mineral and energy resources in northern Australia, which covers the onshore part northward of the Tropic of Capricorn.

As part of the programme's energy component, 1,100 line kilometres of deep crustal seismic reflection data was completed in the region between the southern McArthur Basin and the Mt Isa western succession, crossing the South Nicholson Basin. The hydrocarbon potential here is related to Proterozoic sediments from which one of the oldest oils on the planet (Jamison-1) was recovered. Early survey results indicate the presence of several depocentres, one of which is in a previously unknown sedimentary basin. Data processing continues and the final set will be made publicly available by mid-2018. Future seismic data acquisition is planned for the Kidson Sub-basin in the southern Canning Basin, another onshore frontier.

The 2017 offshore acreage release

In May 2017, the Australian government released 22 new offshore petroleum exploration areas. The majority of the areas are located along the North West Shelf, spanning the Westralian Superbasin from the Bonaparte Basin in the north-east to the Northern Carnarvon Basin in the south-west. New areas have been released in offshore south-eastern Australia, with emerging opportunities being provided in the Otway, Bass and Gippsland basins. Two large areas in the northern Perth Basin, an offshore

frontier, complete the 2017 Acreage Release. All release areas are supported by industry nominations and one new cash bid area has been offered in the Dampier Sub-basin of the Northern Carnarvon Basin.

Geoscience Australia continues to support industry activities by acquiring, interpreting and integrating pre-competitive data sets that are made freely available as part of the agency's regional petroleum geological studies. A new regional 2D seismic survey was acquired in the Houtman Sub-basin of the Perth Basin, forming the basis of the latest prospectivity study carried out by Geoscience Australia. The results of the study were presented in the technical programme of the recent 2017 APPEA conference. A wealth of seismic and well data, submitted under the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGSA) have been made available through the National Offshore Petroleum Information Management System (NOPIMS). Additional data sets are accessible through Geoscience Australia's data repository.

The Australian government encourages investment, from domestic and international companies, for the exploration and production of the nation's oil and gas resources. This is not only carried out by providing ready access to data but also by reviewing current processes that cover the entire gamut of offshore exploration from the nomination for new areas, to the award of exploration and production licences. Such reviews will identify ways to improve the regulatory aspect of the various activities and is being undertaken as part of open consultation and communication. ●

Further information about the 2017 acreage release can be obtained from www.petroleum-acreage.gov.au, with access to offshore petroleum data found at www.ga.gov.au/nopims