



# Exploring for petroleum.

Exploration drilling at Weld Range iron deposit, Western Australia (Sinosteel Midwest Corporation Ltd)

## 03 EXPLORING FOR PETROLEUM IN AUSTRALIA A GUIDE FOR INVESTORS

### Prospectivity

Offshore Australia is globally recognised as a prime destination for hydrocarbon exploration and production. In recent years, significant petroleum discoveries have been made in Australia's offshore waters and many new development projects are proceeding rapidly to the production phase.

Despite such high levels of activity, there are still extensive areas of unexplored and under-explored sedimentary basins with hydrocarbon potential. Many opportunities exist for an active explorer to discover world class oil and gas accumulations. This potential, coupled with the skills and resources of the Australian upstream industry, means that discovered resources can be developed and monetised in an expeditious manner.

Australia already has a significant global presence in the Liquefied Natural Gas (LNG) market, and this is set to increase. The Darwin LNG facility that was commissioned in January 2006 is already set to expand its capacity, the North West Shelf Fifth Train is under construction, and the Pluto project is going ahead.

Some of the recent offshore discoveries comprise medium-sized fields which are rapidly being monetised.

The vast sedimentary basins offer significant opportunities for exploration success and there are many reasons for petroleum exploration and development companies to invest in these opportunities. These are:

- › under-explored frontier areas;
- › the regular release of new exploration acreage covering a range of regions from mature to frontier;

- › access at low cost to comprehensive, high quality geoscientific data;
- › expanding physical infrastructure, sophisticated technical and services support, and a highly educated workforce and pool of skilled petroleum professionals;
- › an internationally competitive profit-related tax system that recognises the risks of exploration;
- › proximity to markets in the growing economies of Asia and the Pacific;
- › an attractive policy and legal framework for oil and gas development, conducive to companies of all sizes;
- › security of title with the right to retain and/or develop a discovery, subject to meeting the specified terms of a retention lease or a production licence;
- › and continuing government initiatives supporting geoscientific mapping and release of pre-competitive data.

Offshore exploration began in earnest in the late 1960s and in global comparison Australia is still under-explored. Table 2 sets out Australia's estimated petroleum resources, highlighting Australia's potential as a producer of both oil and gas.

### Petroleum Resources

The potential for further large discoveries of both oil and gas remains high as demonstrated by Table 1.

Table 1: Assessments of Australia's Undiscovered Resources of Crude Oil, Gas and Condensate

	Unit	Probability		
		95%	Average	5%
Crude oil	million barrels	1577	5030	9846
Condensate	million barrels	1740	6035	11870
Gas	trillion cubic feet	33	114	228

Source: Powell, 2001 APPEA Journal.

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**Table 2: Australia's Estimated Petroleum Resources**

	Economic Demonstrated Resources <sup>1</sup>	Sub economic Demonstrated Resources <sup>2</sup>
<b>Crude Oil (million barrels)</b>	1181	249
<b>Condensate (million barrels)</b>	2137	614
<b>LPG (million barrels)</b>	1095	379
<b>Sales Gas (trillion cubic feet)</b>	110	53

<sup>1</sup> Economic Demonstrated Resources are resources judged to be economically extractable and for which the quality and quantity are computed partly from specific measurements, and partly from extrapolation for a reasonable distance on geological evidence.

<sup>2</sup> Sub-economic Demonstrated Resources are similar to Economic Demonstrated Resources in terms of certainty of occurrence and although considered to be potentially economic in the foreseeable future, these resources are judged to be sub-economic at present.

Source: Estimates as at 1 January 2009 published in the Oil and Gas Resources of Australia 2008 (in accordance with the McKelvey classification), by Geoscience Australia, Department of Resources, Energy and Tourism, 2009.

In 2005–06, Australia produced around 54% of its liquid petroleum needs in net terms and all of its gas needs (refer to Table 3 for petroleum production figures). Exports of oil and gas are valued at around A\$10.9 billion. As most oil found to date in Australia has been of a lighter grade, Australia needs to import base stock crude suitable for refining into lubricating oils, grease and bitumen.

**Table 3: Petroleum Production in Australia – Financial Year 2008–2009**

Crude Oil (million barrels)	Condensate (million barrels)	LPG (million barrels)	Natural Gas <sup>1</sup> (million cubic metres)
126.5	48.3	24.7	40109

<sup>1</sup> Commercial sales plus field and plant usage.

Source: Australian Petroleum Statistics, Issue No. 158, September 2009, published by the Department of Resources, Energy and Tourism, Canberra.

About 95.7% of Australia's oil and 79.3% of gas production is from offshore resources located in Bass Strait, the North West Shelf (NWS) and the Timor Sea. It is in the offshore areas that most of the undiscovered resources are thought to exist.

Over the last 20 years, the natural gas industry has grown from a relatively small base to being Australia's third primary energy source after coal and oil. The gas industry has strong growth potential, particularly the industrial, minerals processing and electricity generating sectors. Australia's exports of LNG are expected to increase substantially in the next few years. Domestic gas demand is growing and currently accounts for 20% of Australia's primary energy needs.

Australia continues to add to its large reserves of natural gas, particularly in the NWS area, where at least four major projects are seeking to take advantage of the growing world LNG demand. As a large user of natural gas, gas to liquids technology also offers Australia a potential opportunity to further commercialise its large gas reserves. Australia also has significant unconventional gas resources. Large coal seam gas (CSG) resources exist in the coal basins of Queensland and New South Wales. Tight gas accumulations are located in onshore Western Australia and South Australia, while potential shale gas resources are located in the Northern Territory.

Significant expansion and integration of Australia's domestic gas transmission and distribution network in recent years, particularly in south eastern Australia, has facilitated growth in established gas markets and introduced gas into new regional centres (see following map). This is enhancing basin-on-basin competition in the supply of gas that will be beneficial to gas consumers and encourage the development of new industries as well as increase opportunities to commercialise gas discoveries.

### Data Access

Petroleum legislation in Australia requires companies to submit data and technical reports on their exploration activities as part of their obligations following the grant of an exploration title. Under Australia's Offshore Petroleum and Greenhouse Gas Storage Act, data resulting from exploration activities in Commonwealth offshore areas are made publicly available after certain periods depending on the nature of the data, the title status of an area and whether data was acquired on a proprietary or non-exclusive basis. Basic data generally becomes available after a period of two to three years, ranging up to fifteen years for data from non-exclusive 3D seismic surveys. A five kilometre 2D grid extracted from 3D non-exclusive seismic surveys is publicly available after five years.

The bulk of data from operations on Australia's continental shelf, comprising seismic and well survey information and cores, cuttings and reports, is stored by Geoscience Australia at its Geology and Geophysics Data Repository, and in relevant State/NT repositories.

Geoscience Australia provides internet access to data through the Petroleum Information Management System (PIMS), [www.ga.gov.au/oracle/npd/](http://www.ga.gov.au/oracle/npd/) which provides online ordering for loan requests and interrogation of data holdings.

The Data Room located at Geoscience Australia's offices in Canberra was officially opened in July 2007. This facility offers free, secure access to the latest seismic and geological data supporting the current Australian Offshore Petroleum Acreage Release, and is available to all Australian and international petroleum exploration companies. A Terabyte of 2D and 3D seismic over the current Acreage Release is available for viewing on Geoframe and Kingdom workstations. Bookings to visit the Data Room can be made by visiting: [www.ga.gov.au/oceans/oar\\_DataRoomBooking.jsp](http://www.ga.gov.au/oceans/oar_DataRoomBooking.jsp) or E-mail: [biu@ga.gov.au](mailto:biu@ga.gov.au).

In addition to the Data Room, workstation data packages containing data relevant to the current Acreage Release is available at the cost of transfer. These consist of open file 2D and 3D processed work-station-ready seismic data and well information. The seismic data is available in Geoframe, Kingdom and Landmark formats. Digital well completion reports and logs for specific wells are available in original format.

**Data packages can be ordered through the Geophysical Data Repository, E-mail: [seismicpackages@ga.gov.au](mailto:seismicpackages@ga.gov.au).**

Australia is one of the best worldwide in providing petroleum exploration and production data to potential and current explorers. The Commonwealth, State and Northern Territory (NT) Governments recognise the importance of high quality geoscientific information in assessing petroleum prospectivity.

Access to petroleum exploration data has been subject to legislation since the 1950s and requires exploration data to be submitted for public release after a relatively brief confidentiality period. The Australian Governments have also undertaken major geoscience programs to support petroleum exploration to supply explorers with precompetitive geoscience information and datasets.

Australian Government funding has enabled Geoscience Australia to undertake an integrated program of seismic acquisition, geological sampling and oil-seep detection surveys over remote and untested frontier basins. This petroleum initiative will increase understanding of these areas and provide pre-competitive data and information to reduce geological uncertainties in evaluation of petroleum prospectivity.

**Details of the new pre-competitive geological and geophysical data collection work programs are available from the Geoscience Australia website, [www.ga.gov.au/about/corporate/#program](http://www.ga.gov.au/about/corporate/#program).**

