
Australia
PETROLEUM

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2018 Fraser Institute Survey

South Australia:
- ranked 20\textsuperscript{th} out of 80 jurisdictions.
- 5\textsuperscript{th} best non-North American jurisdiction.

Policy areas:
- 5\textsuperscript{th} Geological databases.
- 6\textsuperscript{th} Trade Barriers.
- 14\textsuperscript{th} Low cost of regulatory compliance.
- 14\textsuperscript{th} Legal system processes.
- 15\textsuperscript{th} Security.

“This jurisdiction is proactive with companies at the exploration stage, which is positive for investors.”
State of play in SA

- SA and Qld Cooper-Eromanga basins remain Australia’s largest onshore oil and gas producer.
- Moomba is an important gas hub for the SE Australian market.
- Current PELAs shown in blue.
- Acreage releases via work program bidding in SA - Cooper & Otway releases planned this year (grey).
- Over-the-counter applications elsewhere, max area 10,000 sqkm (2.471 million acres).
- PELAs (pink) - overlapping applications can be made but first PELA has priority for determination followed by successive applications.
Upcoming Cooper Basin acreage release

- Work program bidding based on 5 year exploration work program –
  - Application fee AUD4,444 (~USD3181)
  - Scoring method & winning bids published.
  - Evidence of financial and technical capacity.

**Petroleum tenements**
- Exploration
- Production
- Exploration application
- Retention
- Vacant acreage

**Petroleum pipelines**
- Gas
- Gas and liquids
- Oil

**Discoveries 2002–18**
- Oil
- Gas
- Resource play

Discoveries
- Gas play trend
- Vacant acreage
- National Park – no petroleum access
Upcoming acreage drops

- PELs are granted for 2 or 3 five year terms.
- Acreage drop at end of each term excludes production or retention licence areas:
  - 50% for 2 term PELs
  - 33.3% for 3 term PELs
- Over the next few years, a number of PELs will be subject to normal end of 5 year term relinquishments.
- Future bid rounds will occur.
- License details can be downloaded or viewed via online License Register: [http://www.energymining.sa.gov.au/petroleum/licensing_and_land_access/registers](http://www.energymining.sa.gov.au/petroleum/licensing_and_land_access/registers)
Cooper Basin Oil & Gas

**OIL**
- Discoveries continue on the Western Flank oil play trend
- 3D seismic - structural & stratigraphic traps (‘hose on nose’)
- Excellent sandstone reservoirs, proven Permian source rocks
- ~ 50% success finding average 2.5 mmbo recoverable

**GAS**

**Conventional Gas Plays**
- Structural and structure-stratigraphic traps, sandstone reservoirs, coal and shale source (6.5 TCF produced)

**Unconventional Dry to Wet Gas Plays**
- Deep self-sourcing coal – world’s deepest CSM
- Mixed reservoirs with coal and shale source
- Tight sandstone reservoirs
Warburton Basin

- **Warburton Basin**
- **Age**: Cambro-Ordovician
- **SA area**: 45 000 km² (17 370 sq miles) in Cooper Basin region
- **Depth to target zone**: 1400 - >3600 m
- **Thickness**: >1800m
- **Hydrocarbon shows**: >30 oil & >60 gas shows beneath SW Cooper Basin
- **First commercial discovery**: 1990 oil (Sturt 6), 1990 gas (Moolalla 1).
- **Basin type**: Polyphase foreland, rift/sag
- **Depositional setting**: Carbonite/siliciclastic shelf, slope & basin above volcanics
- **Reservoirs**: Fractured dolomite, volcanics, sandstone
- **Source rocks**: Currently no known indigenous source; possible marine source rocks. Downdip Cooper Basin source rocks
- **Recent discoveries**: Senex report Gemba 1 has discovered a new Warburton play in Dec 2018

**Warburton Basin**

- **Original target of 1950s exploration, only lightly explored since Cooper gas discovered in 1963**
- **Underlies Cooper Basin**
- **Ordovician black marine shale – Larapintine Petroleum System**
- **Migration pathways from downdip Cooper source kitchens – oil and gas shows & flows from a variety of reservoirs**
Otway Basin

Jurassic – Late Cretaceous rift basin


Caroline 1 produced 14 bcf CO₂ (1968-2016) & ~60 bbl heavy oil/yr.

Sawpit 1 recovered oil on test.

Beach Haselgrove 3 gas discovery in 2017 – co-funded with SA Govt $6m PACE Gas grant.

Beach energy planning new Katnook gas processing plant, co-funded by $6m Federal Govt grant, total project ~$23 million

Otway acreage release:

2,111 km² (521,639 acres) vacant acreage.

Release proposed for later this year.

Work program bidding.
Plan to ACcelerate Exploration (PACE) Gas at a Glance

23 applications from 15 companies; 9 projects target unrisked 217 PJ with **1,957 PJ follow-up potential.** A$271m from industry + $48m SA Government PACE grants

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<th>Project Description</th>
<th>Outcome</th>
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<td>A$5.82m – Senex/Santos Cooper Basin PE and Vanessa pipelines</td>
<td>gas to market</td>
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<td>A$6.00m – Beach Energy Otway Basin Haselgrove #3 exploration</td>
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<tr>
<td>A$6.00m – Santos/Beach Cooper Basin underbalanced drilling</td>
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<td>A$6.00m – Santos/Beach Cooper Basin Moomba heat recovery</td>
<td>install Q1 2019</td>
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<tr>
<td>A$6.89m – Senex Energy Cooper Basin Gemba 1 exploration</td>
<td>discovery,</td>
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<td></td>
<td>8mmscf/day gas flow</td>
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<td>A$5.26m – Beach/Cooper Otway Basin Dombey 1 exploration</td>
<td>drill Q1 2019</td>
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<tr>
<td>A$4.95m – Vintage/Rawson Otway Basin Nangwarry exploration</td>
<td>drill Q1 2019</td>
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Outcomes so far:
- 4 to 5 TJ/day already producing in the Cooper Basin (more expected); and
- Expect to see gas production resume in the Sa Otway Basin by end 2019
Roundtable for Oil & Gas in SA

Designed to inform industry strategies, government policies, and regulations to facilitate oil & gas projects in ways that SA communities welcome.

>2,200 members, >1,000 organisations & ~30 individuals.

Working Groups renewed by Roundtable in Nov 2018:
1 Legislation/Regulation
2 Water
3 Infrastructure
4 Service sector and supply chain
5 Productivity (e.g. operations, completions, decommissioning & rehab, EOR)
6 Knowledge management
7 Other issues

New members are welcome

Key events 2014-18

- Grouped PRLs 2014
- PRL fees reduced 2015
- The Act fees pay for co-regulation 2015
- Cooper Basin Aboriginal participation forum 2015
- Call for PACE Gas grants 2016
- APPEA opens SA Office 2016
- Oil price collapse drives productivity gains

Forecast for 2019–20:

- Royalties for regions implemented
- Offshore Bight exploration
- Acreage releases in Cooper and Otway basins
- Q1-2 Otway drilling, new gas plant construction
- More Cooper-Eromanga discoveries
- Further productivity gains
South Australia’s door is open.

Rated most attractive petroleum jurisdiction in Australia by Fraser Institute

Bight Basin attracting billions in exploration investment

Cooper Basin remains Australia’s largest onshore oil and gas province

A framework placing local companies into a global supply chain

Australia’s first roadmap for unconventional gas projects

Oil and gas roundtable with hundreds of members working to address priorities