East coast gas market update

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Moomba at twilight courtesy Santos
- Energy advisory firm, providing independent energy market analysis and strategy for energy companies, energy buyers, investors and governments around Australia and around the world.

- Founded in 2005 by Graeme and Susan Bethune

- EnergyQuarterly flagship report widely used and referenced source of proprietary data and analysis.
East coast/NT gas production by basin

East coast/NT Gas production
(12 months to June 2019)

Gas production (PJ/y)

Surat-Bowen
Gippsland
Cooper
Otway
Bonaparte (Blacktip)
Amadeus
Bass
Sydney
Gunnedah
Beetaloo
Gas flows

Qld: now the major east coast gas producer. Exports LNG. Produces more than it exports as LNG. Also exports to SA/NSW (15 PJ in Q2). Qld expected to peak by mid next decade. Potential Arrow acreage development (6,700 PJ 2P).

SA: cannot meet its own gas needs. Deficit of 6 PJ (22%) in Q2. Exports to NSW but imports from Vic and Qld.

NSW: >10,000 PJ CSG resource but virtually no production. All gas imported. Proposed Santos Narrabri project.

Victoria: offshore declining, unable to meet own demand within 5 years let alone supply SA and NSW. Onshore exploration not allowed.

NT: now linked to east coast. Beetaloo contingent resource ~7,000 PJ.

WA: active onshore exploration and development, gas surplus, prices <Henry Hub.
Demand – Supply Scenario

Gas Production by Basin/Field and Demand Scenario (PJ/y)

Produced gas volume (PJ/y)

2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036

2,200 2,000 1,800 1,600 1,400 1,200 1,000 800 600 400 200

QCLNG APLNG GLNG Arrow Other Qld CSG Cooper Basin

GBJV Gas Otway Basin Bass Gas Cooper Sole-Manta Narrabri

Origin Beetaloo ENI Blacktip Petrel-Tern LNG Imports

Qld LNG Feedstock

Total Demand (Incl. NT) LNG Demand (Qld)
GPG grows with coal retirements

Sources: EnergyQuest, Dept of Environment and Energy

- May 2016: Northern Power Station closed
- March 2017: Hazelwood Power Station closed

Gas generation Y/E June (GWh)

2018/19 GPG 146 PJ
Sign posts to the future

The gas industry is in a high degree of uncertainty with serious consequences. Watch for key sign posts to the unfolding scenario’s…

- Arrow Energy gas – Surat/Southern Bowen, and northern Bowen
- Esso/BHP contract term and prices. Shadow pricing?
- LNG import impacts on infrastructure and contracting
- Bonaparte and NT
- Government interventions
- … and the unexpected
Europe – a model for the east coast?

Europe is a gas market with:

- Domestic gas production
- Long distance pipeline gas supply
- LNG imports

... is this the future for the east coast?

### 2018 Gas Volumes

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<thead>
<tr>
<th></th>
<th>BCM</th>
<th>PJ</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Pipeline ex-Europe</td>
<td>249</td>
<td>9,960</td>
<td>45%</td>
</tr>
<tr>
<td>Production</td>
<td>251</td>
<td>10,028</td>
<td>45%</td>
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<tr>
<td>LNG</td>
<td>60</td>
<td>2,392</td>
<td>11%</td>
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<tr>
<td>TOTAL</td>
<td>560</td>
<td>22,380</td>
<td>100%</td>
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</tbody>
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Source: BP Statistical Review of World Energy 2019; 1 BCM = 40 PJ
Thank you