ENERGY QUEST

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EAST COAST GAS OVERSOLD: NEW REPORT

A highly forensic review of Australia's east coast gas sector has found that estimates of commercial gas reserves to service Queensland's new Gladstone-based LNG industry and local domestic gas consumption,carrysubstantial risks that are not widely appreciated.

The review's author says this puts at risk the longer-term security of east coast gas with current investment in new supply for that market being "nowhere near sufficient".

The findings include a warning that in the absence of any Federal Government action to solve the gas supply challenges, affected states may take mattersinto their own hands, leading to the "unravelling" of the national gas market.

The revised reserves outlook is contained in the just released March quarterly review by respected independent energy consultancy, EnergyQuest. The report coincides with Australia's LNG exports hitting a monthly record of $2 billion in January this year off a 48.7% surge over 2016 to total LNG exports of 45.2 million tonnes compared to 2015.

EnergyQuestCEO, Dr Graeme Bethune, said today the consultancy hadpreviously flagged a significant east coastsupply gap of around 172 petajoules(PJ) of gas by 2020 building to 205PJ by 2025, exacerbated by easingoutput in three southern basins-Gippsland, Otway and Bass.

"As Queensland's coal seam gas (CSG) output will now dominate future total production in the east coast gas market, we undertook a detailed bottom-up analysis of this market's gas production outlook," Dr Bethune said.

"In particular, we comparedstatedProved and Probable reserves (known as 2P, gas volumes already classed to be commercial)and matched them against our own assessment of drilling statistics for 8,000 gas wells, stated reserves for 50 gas exploration permits and 250 production licences (PL) and 10 years of production data from 250 PLs along the east coast.

"Our conclusion is that CSG (which comprises 91% of stated east coast reserves) has been oversold, with potential reserves risk.

"The new Gladstone CSG to LNG industryis fed by booked 2P reserves but substantial reserves are booked in areas that have not yet demonstrated any commercial production."

Dr Bethune said this scenario was compounded by the fact that the east coast's conventional gas fields are now mature and faceincreasing output challenges.

"While there is some investment underway in new east coast gas supply, it isnowhere near sufficient and this reinforces the growing concern about gas supply security on the east coast," he said.

"It is not an issue of short-term security. With~3,500 terajoules per day of gasproduction in Queensland from numerous plants, the east coast is better protected against anyshort-term supply emergency. The concern is more for longer-term security."

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Dr Bethune said the EnergyQuest update broke down the public 2P gas reserve estimates into three categories to best determine likely accessibility and deliverability, namely:

- **Most Certain** (booked 2P reserves where commercial production has beendemonstrated**)**
- **Less Certain** (booked 2P reserves where commercial production is yet tobe demonstrated) and
- **Least Certain** (booked 2P reserves, with no commercial production data).

"We identified that much of the public analysis of the adequacy of east coast gas reserves effectivelyassumed that 2P reserves are Most Certain, even though 2P reserves are defined asbeing 50% certain. Some analysis even assumed that 3P reserves (only 10%certainty) and 2C contingent resources are MostCertain. LNG projects are generally sanctionedon 1P reserves – ie, a 90% certainty of being commercialised - rather than 2P.

"As such, we identified thatroughly half of the current stated CSG reserves base in this market is immature and outside thebest gas production areas. Much of what is currently classified "2P" carries a degree of uncertainty significantly beyondthat normally associated with 2P. In short, the east coast gas market is exposed to significant elevated reservesrisk."

Dr Bethune noted that notwithstanding the east coast's 44,000PJ of 2P gas reserves, sufficient in theoryfor 20 years, meeting that market's LNG and domestic consumption demands would depend onsuccess across all three categories of CSG, including the Least Certain 2P reserves which donot as yet have proven production history.

"The evidence is plain - east coast gas has been oversold and thereis a potential for increased market tightness or shortfall in the near-to-medium term. Thebottom-line is that pretty soon, meeting demand will rely on successful production fromCSG permits away from the "sweet spots" with no production history," Dr Bethune said.

The new EnergyQuest report noted that while there is likely to be some domestic supply from LNG projects to meet seasonaldemand peaks, it is unlikely that the projects will sign significant new domestic gascontracts in a situation where they are likely to face enough difficulty supplying their own LNGcontracts.

"Accordingly, in the absence of significant gas imports or major cheap discoveriesthat can be brought quickly to market, wholesale gas prices will ultimately be driven by the costs of new field developments. Our analysis points to price estimates forgas into Sydney of around $14 per gigajoule* from 2024– with obvious implications for affordability and demand." *(* 1 million gigajoules represent 1PJ*)

Dr Bethune said it was not surprising therefore to see debate emerging on establishing LNG import/regasification facilities in Australia with sites in SA, NSW and Victoria under consideration as alternatives to the high cost of piping gas over long distances.

A refurbished regasification plant could cost as little as US$80-120m and beavailable in less than 2 years- but any such project would most likely need long-term offtake contracts.

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EnergyQuest is an Australian-based energy consultancy specialising in market analysis and strategy. www.energyquest.com.au.

March 2017 quarterly Highlights[1]

- **Global LNG** consumption **grew by 6% in 2016,** the highest annual growth since 2011.
- For the first time, in January there were substantial numbers of US cargoes from the new **Sabine Pass project** heading to North **Asia**(Australia's major market).However, US shipments **declined significantly** in February as Asian spot pricesweakened.There is also **no sign** that **US shipments to Asia** had an **adverse impact on Australianshipments. Asian LNG imports** from the **US are not cheap.** In January Japanese importsfrom the US had an average price of US$12.63/MMBtu, well above Australian prices.
- **Australian LNG production continues to surge.** A strong final quarter boosted calendar2016 production to 45.2 million tonnes (Mt), up 48.7% year-on-year (yoy).
- Australian LNG **export revenue** is starting to grow quickly. Revenue for the **2016** calendar year was arecord **$17.9 billion**, up 9.1% yoy, making LNG**Australia's fourth most valuable export**behind iron ore, coal and international education.
- In **January,**the value of LNG exports **passed $2 billion**, another monthly record, andheading higher, notwithstanding the fall in oil prices. Australia's **current account deficit** inQ4 was the **lowest since 1980,** helped by growing LNG exports.
- **Domestic gas prices** continue to be **lower than export prices** on both east and westcoasts. With **higher LNG prices** and **flat domestic gas price realisations,**LNG prices anddomestic gas price realisations **diverged** in Q4.
- **On the east coast,**there are **substantial volumes of gas flowing to Queensland forLNG.** Pipeline flows to Queensland along the QSN Pipeline from South Australia, increasedby 24.0 PJ qoq in Q4.
- **East coast domestic gas production** fell by **8.8% yoy**to 690 PJ in 2016. The fall wassplit 50/50 between lower gas-fired power generation and lower other gas consumption.Power generation from **renewables** (wind, solar farm and solar PV) **overtook gasgeneration**.
- Production by the **Gippsland JV (GBJV)** was a **record 300.2 PJ** in 2016.
- **WA** domestic gas production **increased** by **2.5% in 2016 to a record 381.0 PJ.** This is thesecond year in a row of significant growth in WA domestic gas production. The Gorgondomestic gas plant began regular production in Q4.
- **Shell** became Australia's **largest LNG producer** in 2016 through its interests in Australia'sthree largest projects – the NWS, QCLNG and Gorgon. In Q4, Shell's dominance in LNGwas such that it also emerged as Australia's largest gas producer and **largest petroleumproducer**. Both titles were previously held by **Woodside.**
- **Australian petroleum production** increased by **21.3%** yoy in 2016 to a record level of**703.9 million barrels of oil equivalent**.
- Reflecting the fall in exploration activity, **Australian petroleum reserves fell by more thanproduction in 2016.** Proved and probable natural gas and ethane reserves fell by 1,040PJprior to production (mostly due to the write-down of **Arrow Energy** reserves in the SuratBasin). Reserves of oil and natural gas liquids fell by 33 MMbbl prior to production.
- In **PNG,**gas reserves increased by nearly three-times production.