

WORKING DOCUMENT

Critical success factors for onshore unconventional gas: USA vs Australia



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1 Critical success factors for onshore, unconventional gas: USA vs. Australia

| Simple comparison discussion: Critical success factors for onshore, unconventional gas. USA vs. Australia | | | | |
|---|---|--|--|---|
| Critical Success Factors, CSF | Key elements of CSF | USA | Australia | Commentary - much of this is fixable for Aust. |
| Unconventional Hydrocarbon Geology (note that most US shale plays do not work) | Significant unconventional natural gas endowment | Yes | Yes | A significant endowment is there, but the challenges are not the same as for the USA. We will need different technical, economic, policy and market solutions. Many of Australia's natural resources are not as inherently prospective or as technically 'easy' or as mature as those in the US. This does not mean they are 'impossible'. But, we have not had a competitive investment environment to best incentivise private investment in these challenging resources. We need to tailor the policy settings to the geology and maturity of the areas We need to play (incentivise) exploration "catch-up" AND Australia-specific R&D "catch-up". R&D tax measures need to be properly operationalised and Exploration credits (which can be 'passed on') are also needed - especially in some challenged areas. |
| | World-class <u>conventional</u> provinces and very rich, mature (marine) oil source rocks | Several basins | No | |
| | Light oil and wet gas (not just dry gas CBM) | Several basins | Uncertain - needs more exploration and R&D | |
| | Generally extensional stress regimes (i.e. can be successfully stimulated with current practices) | Yes | No (needs more Australian field trial based R&D) | |
| | Naturally overpressure shales (these flow at commercial rates after hydraulic stimulation – normally pressured don't) | Yes - several | Uncertain - needs more exploration and R&D | |
| Levels of pre-investment (exploration and R&D) | Extensive public investment in R&D | Yes since the late 1970s especially Department of Energy (DoE) | No (minor and fragmented, not strategic) | |
| | Very large number of well and company trials (and failures) | Yes, since the early 1980s (e.g. very many junior companies failed and many large companies invested and withdrew) | No (except in Qld CSG/CBM) | |
| | Exploration maturity: very large numbers of conventional exploration wells in almost all basins | Yes, extensive in all areas. Active exploration since 1st half of 20th Century | No (first discovery 1960s, comparatively under-explored basins and many are very remote) | |

| Simple comparison discussion: Critical success factors for onshore, unconventional gas. USA vs. Australia | | | | |
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| Critical Success Factors, CSF | Key elements of CSF | USA | Australia | Commentary - much of this is fixable for Aust. |
| Access and number of private equity investors | Size and diversity of investor base. | Very large, active and deep domestic private equity market. Includes large numbers of "smaller" investors, historically willing to take upstream risk. | Minor, small scale (reliance on overseas investors e.g. China) Very small investor population. Companies must compete with overseas opportunities. | We need to compete for foreign equity investment (incl. in exploration). Competition and competitiveness needs to consider a combination of risk, cost and return. We compete for funding with more mature, more prospective opportunities overseas. We try to do this with similar non-technical costs (fiscal settings) to those in the US (and increasing sovereign risk re. access and timeframes). |
| Policy stimulation (especially for unconventional) | Federal government specific incentivisation. <i>(some US examples - mainly arising out of 1970s oil embargoes and domestic oil security concerns)</i> | 1978 <i>Natural Gas Policy Act</i> (gas price deregulation) | No - (States control access and Royalties. Federal gov control taxes and some environmental rules) | The USA have a long-term strategy focus on supply. The US got focussed and serious after the 1970s "oil embargo" and kept up substantial, financial and fiscal support for a long period of time. We are playing energy-resource policy "catch-up". There are real opportunities to stimulate gas resource investment (especially, but not only, unconventional ones). We need investment stimulus measures tailored to the nature of our challenging areas. |
| | | 1980 <i>Crude Oil Windfall Profit Tax Act</i> (tax reduction, exemption and financial subsidies for unconventional) | | |
| | | 1992 <i>Energy Policy Act</i> (more subsidies) | | |
| | | 2005 <i>Energy Policy Act</i> (subsidised unconventional O&G) | | |
| State and local governments | | State level policy stimulus (mostly fiscal measures to favour more drilling and production of unconventional) | No (e.g. moratoria) (some stimulus for gas-power in Qld mid 2000). | Streamlining (not relaxing standards) of approvals processes at State and National level can have significant benefits. |
| | | Land access policies perceived to be simpler and so quicker (ownership?) | Important bipartisan approach in QLD for CSG in late 2000s | |
| | | | | |

Simple comparison discussion: Critical success factors for onshore, unconventional gas. USA vs. Australia

| Critical Success Factors, CSF | Key elements of CSF | USA | Australia | Commentary - much of this is fixable for Aust. |
|----------------------------------|---|---|---|---|
| Enabling industrial ecosystem | Size and diversity of operator base | Very large number of large medium and small operators | Handful of major and junior players | <p>An economy of 24 million cannot match 328 million for supply chain or number of companies. We need to play a different game.</p> <p>This is a continuous challenge e.g.</p> <ul style="list-style-type: none"> the rig count in the USA in Jan 2019 was 969: in Australia it was 50x less at 19 - <i>Baker Hughes</i>) the number of frac spreads was 401 in March 2019 – <i>RigZone</i>: in Australia it is estimated to be 80x less at ~5) <p>There may be opportunities to ease import complexities and more joint planning between operators. However, this can only come with increased demand i.e. investment attractiveness</p> |
| | Size and diversity of oil field service company base | Very large technically advanced and competitive oil field services industry (not just the big guys) | Very limited to the big "three" OFSCs and a small no. of rig and seismic contractors | |
| | Equipment and infrastructure for exploration and development | Very large existing upstream operational base work-load (1000's rig count and 100's frac fleet) – sometimes stacked but always there | Very low rig count (<20) and very low number of frac units (<5) | |
| Pipelines and plumbing to market | Extensive, relatively quick to tie in pipeline system (hence quick to generate sales) | Large and extensive pipeline system (relatively quick to tie-in and to gas sales). (Note that much of the gas is associated with oil and as of 2020 a significant amount is again being flared) | Limited - especially for Contingent and Prospective Resources | <p>There are opportunities to help "plumb in" significant resources in the short term. Government co-investment more likely to play a key role.</p> <p>Longer term, uniquely in the OECD we still have, very under-explored basins and these are remote. As well as improved, more competitive exploration and R&D policy settings, pipeline and infrastructure policy "signals" which indicate that co-investment would be considered favourably, would further support investment.</p> |
| | Market size and connectedness (buyers, suppliers, distributors) | Very large number of suppliers and buyers for domestic gas markets with established and financially 'liquid' trading HUB for oil and gas | Very small - too small to justify scale-economies for unconventional (export is critical) | |
| | Gas storage for seasonal adjustment and supply "smoothing" | Significant gas storage business which manages (and benefits from) large seasonal variation | Minor | |

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| Critical Success Factors, CSF | Key elements of CSF | USA | Australia | Commentary - much of this is fixable for Aust. |
| Concluding remarks | <p>There are few if any sound analogies between the US and Australia re. the onshore and unconventional gas industries. Major differences exist in all critical success factors that lay behind US success. Australia will need <i>different</i> technical, economic, policy and market solutions. The geological opportunity is significantly different. Gas is largely a bi-product of a quest for light oil. Australia is the only OECD and major producing country with remote and immature (from an exploration perspective) basins. Levels of pre-investment in R&D and extensive exploration spend (and failures) are orders of magnitude and decades apart between the two countries. Access to at-risk, equity capital is also streets apart. The long, US history of strategic government, energy resource policy settings, especially those aimed at stimulating investment in unconvensionals is absent in Australia. Given historic activity levels, the Australian industrial ecosystem cannot hope to generate the wide scale and diversity of operators and service companies (and associated competitive tension) which innovated, failed and eventually made production rates commercial and underwrote a vast amount of capital equipment - and later drove costs rapidly down. The pipeline infrastructure and opportunities in the US bear few similarities to the Australian setting. The size of the US market (number of players and inter-connectedness) its liquidity and storage availability, now coupled with a massive over-supply of 'associated gas', give it a unique flavour not matched anywhere - and is in no way a guide for how an Australian setting could work.</p> | | | |

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