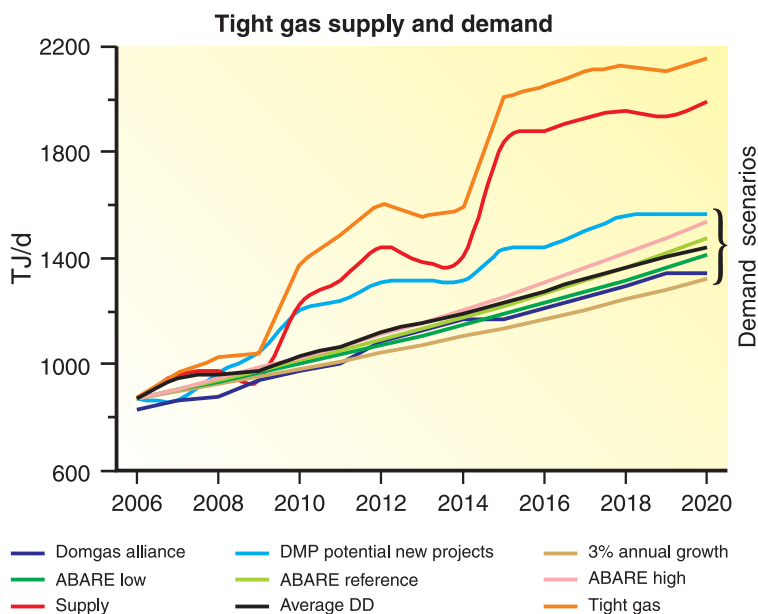




INVESTMENT OPPORTUNITIES TIGHT GAS

Unlocking tight gas in Western Australia

- Tight gas has enormous potential to deliver Western Australia an alternative energy supply.
- The Perth Basin is estimated to hold about 9 to 12 trillion cubic feet of gas, which is enough to meet Western Australia's domestic needs for up to 30 years.
- Conveniently, some of the known gas reserves in Western Australia are in areas where energy demand is the greatest.
- Tight gas reserves could alleviate supply shortfall.



EXTRACTING TIGHT GAS

Tight gas is found in rocks of very low permeability, and specialist techniques and equipment are required to extract it.

Using fracture stimulation technology, tight gas reservoir rocks can be made to fracture by applying high pressure, inducing the gas to flow into the wellbore and to the surface.

Fracture technology is now widely used in many parts of the world.



Onshore potential tight gas fields and resources

Gas field/well	Operator	Permit	Discovery year	Formation with gas flows	Gas resources potential (TCF)
Ocean Hill 1	Origin Energy	EP 320 (R4)	1991	Cattamarra Coal Measures, Cadda Fm	DST flowed gas at a rate of 709 Mcf/d (20 MM ³ /d)
Corybas 1	AWE	L 2 (R1)	2005	Irwin River Coal Measures	Not available
Senecio	AWE	L 2 (R1)	2005	Dongara Sandstone	Not available
Snottygobble 1	AWE	L 1 (R1)	2006	Dongara Sandstone	Not available
Whicher Range	Calenergy Resources	EP 408 (R2)	1968	Willespie Fm	2-5 Tcf (57-141 MMm ³)
Warro	Latent Petroleum	EP 407 (R1) EP 321 (R4)	1977	Yarragadee Fm, Cadda Fm, Cattamarra Coal Measures	5 Tcf (141 MMm ³)
West Erregulla	Warrego Energy	EP 469	1990	Basal sand of the Kockatea Shale, Dongara Sandstone	1 Tcf (28 MMm ³)



THE VALUE OF TIGHT GAS

The economic viability of tight gas has in the past been affected by low gas prices, and expensive field development and technology costs.

Increases in domestic gas prices, improvements in stimulation technology and the need for energy diversity and security have increased the potential for tight gas to be commercially extracted.

The Western Australian Government has also reduced the royalties rate for tight gas producers from 10% to 5%. The Government has recognized that start-up and operational costs for tight gas producers are very different from other petroleum producers.



Courtesy AWE



Courtesy AWE



TECHNICAL AND ECONOMIC CONSIDERATIONS

- Availability of technology in Western Australia (e.g. well stimulation, coiled tubing and underbalance drilling equipment)
- Cost of mobilizing equipment to Western Australia: a large number of projects/wells is required in order to push down average cost
- Drilling and well stimulation
- Coordination to achieve economies of scale



Courtesy Latent Petroleum



Courtesy Latent Petroleum
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