ASIAN-PACIFIC NATURAL GAS MARKET : AUSTRALIA

Introduction to world oil and gas market

Week 11

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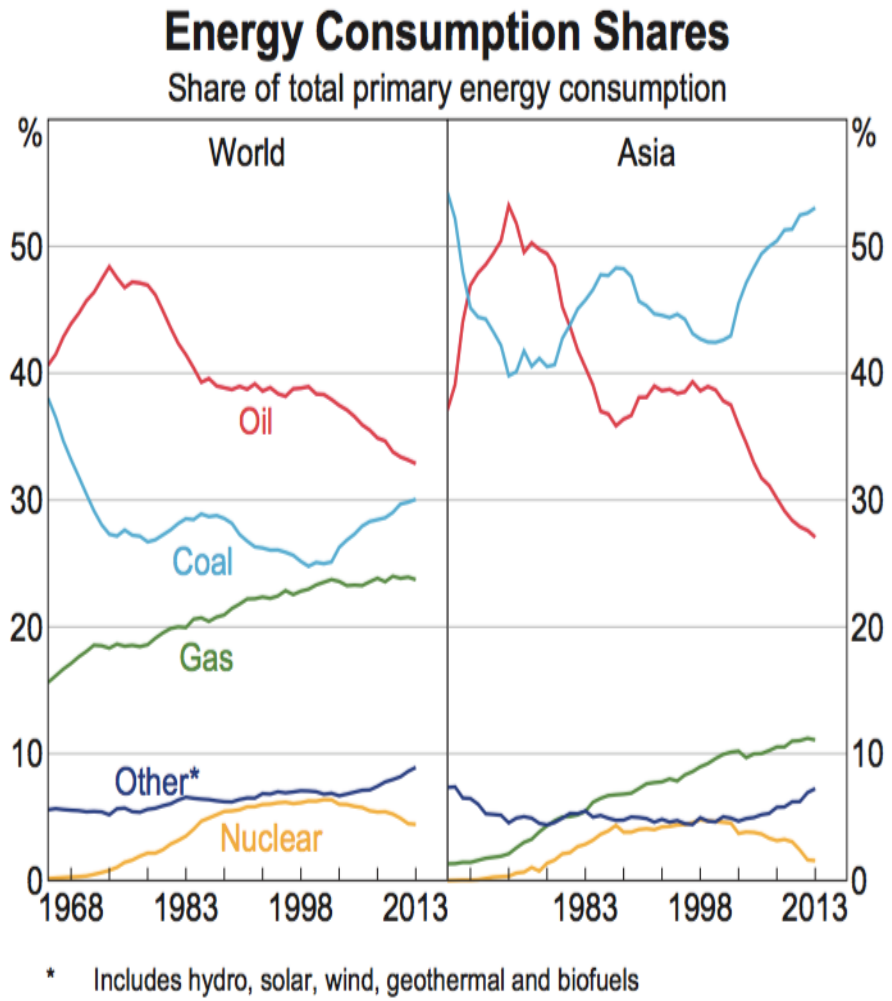
Asian-Pacific: A gr



(Source: BP Statistics 2014)

(Source: Giignl Annual Report 2016)

Basic information 2014

- Medium reserve
- Low domestic demand
- High production potential

Australia Natural Gas Production Potential (2014)

	R/P
Australia	67.6
Total Asia Pacific	28.7
Total Africa	60.3
Total Europe&Eurasia	57.9
Toal South&Central America	43.8
Total North America	12.8

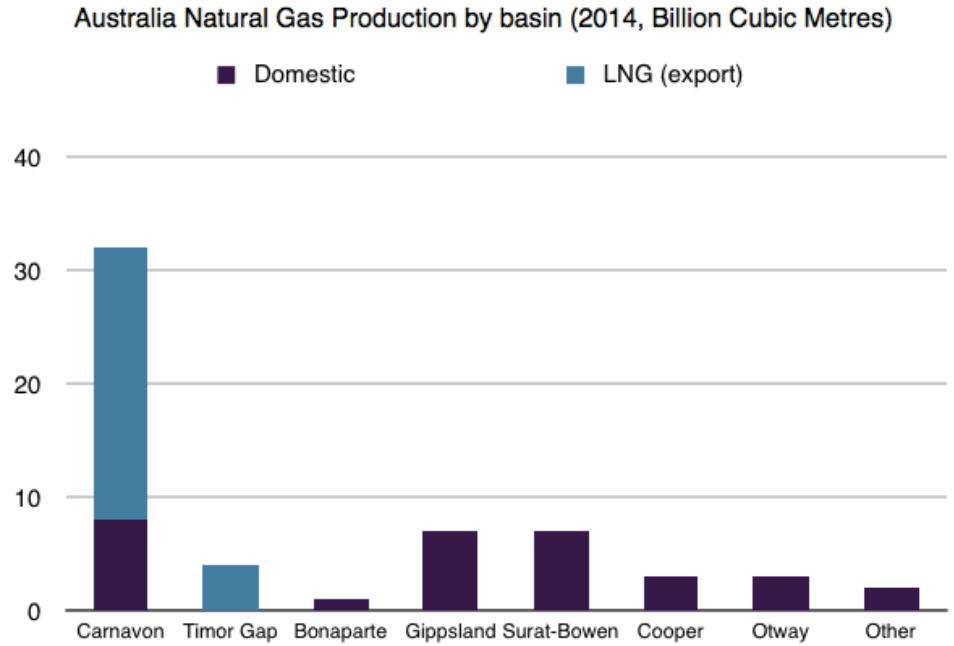
(Source: BP2014)

Australia Natural Gas Reserve (2014)

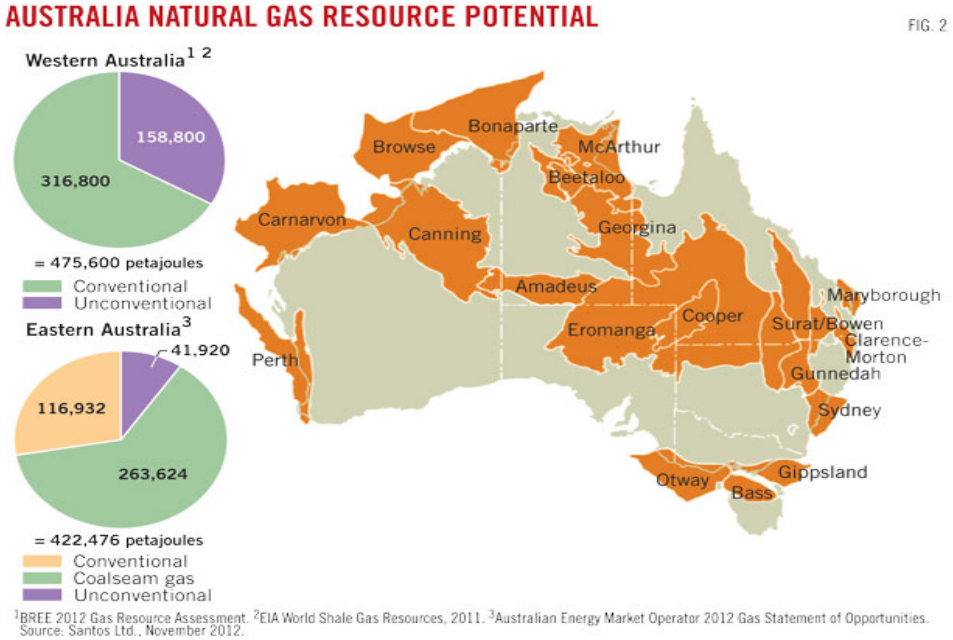
Australia in world	Total proved reserves	Total production	Total consumption
Share	2%	1.6%	0.9%
Amount (billion cubic meters)	3700	55.3	29.2

Production and market geography

- Off-shore & On-shore, conventional & unconventional (coal seam gas in Eastern)
- 90% conventional reserve in 3 western basins
- North & west for export, East for domestic use and export
- No gas hub in the west



(Source: David Ledesma, 2014)



(Source: Ronald D. Ripple 2014)

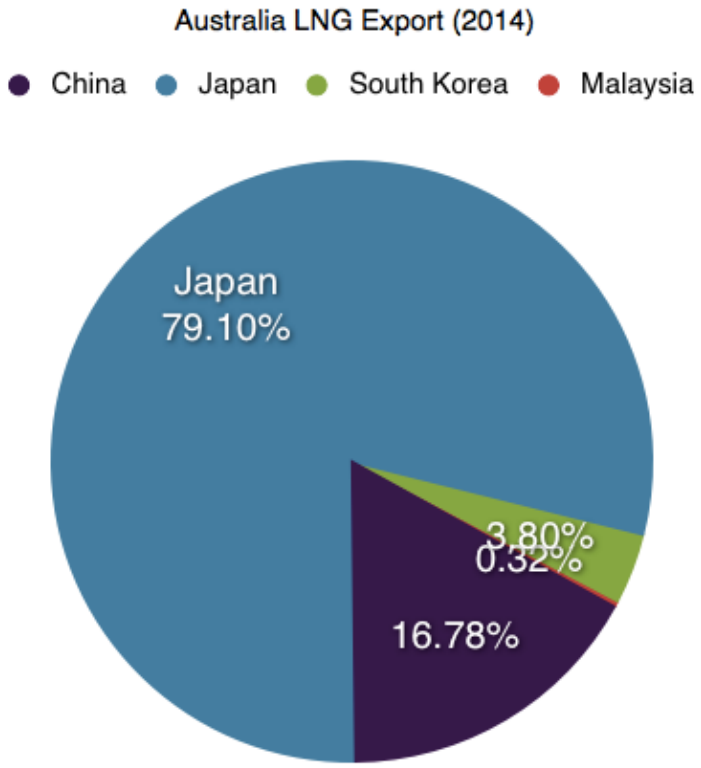
Gas producers

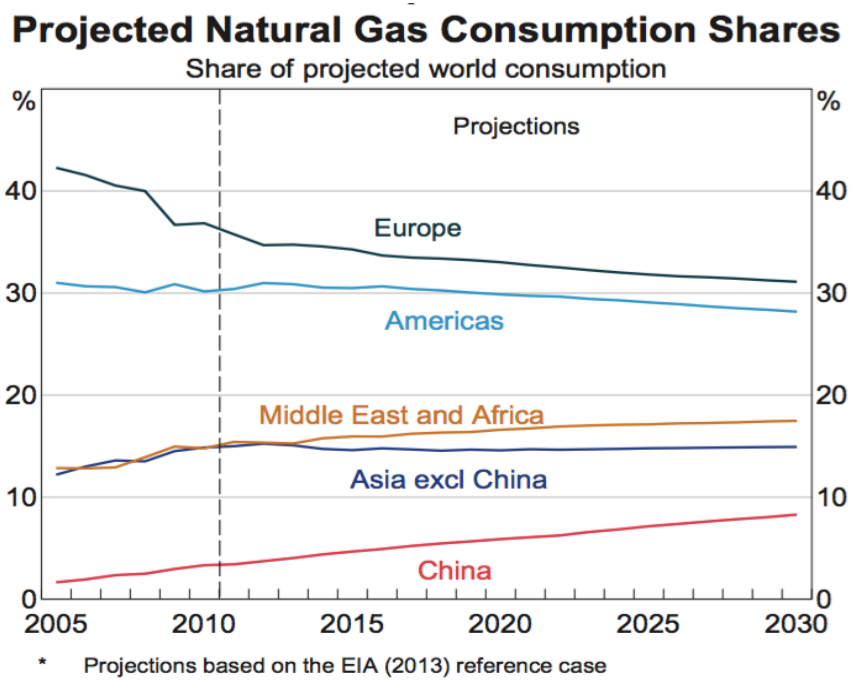
- Highly privatized & complex gas industry
- International Majors: BP,Chevron, Shell
- Australian Majors: Santos, Woodside, Origin Energy
- Juniors: Small cap companies with little market or production share

- Major companies dominate every segment of industry.
- Several companies invest in one project

Export destination

- Japan, Korea, sharp decrease (2014-2015, -5%)
- China --- potential market (2014-2015, 1%)

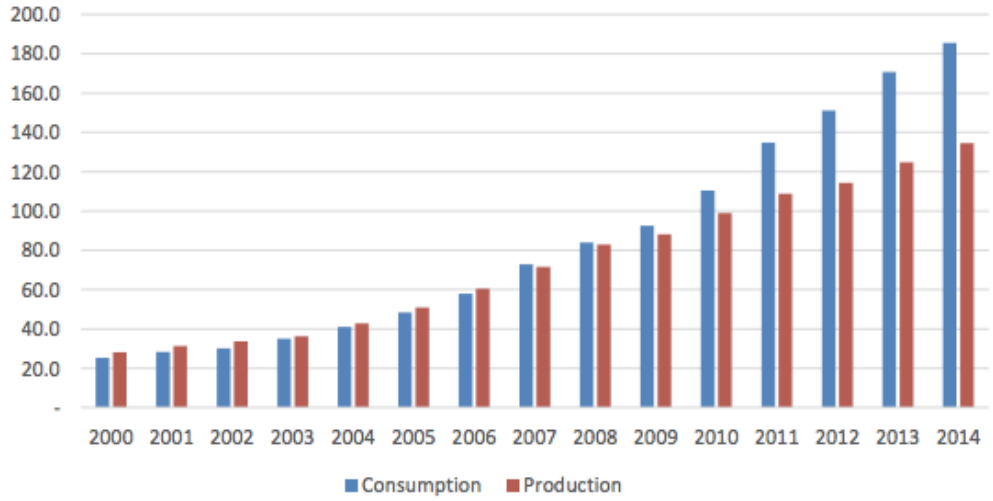




(Source: EIA 2013, RBA)

China natural gas consumption

Gas consumption and production (bcm, 2000-2014)



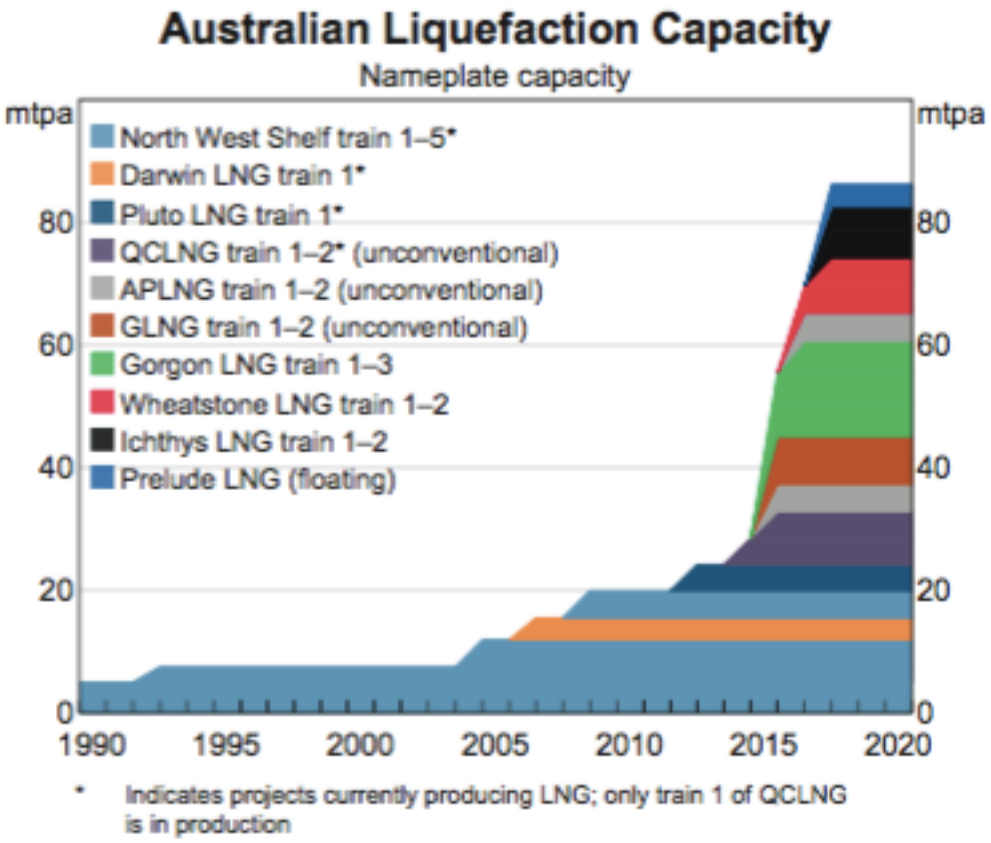
By 2020, natural gas shares over 10% in domestic energy consumption mix
40-50% will rely on import.

China's current investment in Australia LNG project

China Australia LNG cooperation

Company	Project	Share	Type	Capacity (10t/a)
CNPC	Arrow Energy LNG	50%	Coal seam gas	800
	Fishman's Landing LNG	2.17%	Coal seam gas	300
	Browse LNG	8.33% + 20%	Conventional gas	1200
CNOOC	Queensland Curtis LNG	25%	Coal seam gas	850
	North west shelf project	5.3%	Conventional gas	1630
SINOPEC	Australia Pacific LNG	25%	Coal seam gas	900

Ongoing LNG project: 2009-2012 FID plethora



(Source: Department of Industry (DOI); RBA)

- 7 LNG projects
- 54% of global liquefaction capacity under construction
- 12% GDP investment

- Estimated to be done by 2018/19
- Extra LNG production capacity 62 mtpa (Total 87)
- By 2020, world largest LNG exporter

- Another 20 projects with 78 mtpa capacity under consideration (but may not be proved)
- Why?

Advantage & Disadvantage: cost-plus

- Relatively short-distance to market
- No choker point along voyage
- No climate issue (stable supply)

Distance to LNG market by major producers

	Distance to Japan (NM)	Freight cost ($/MMBtu)
US Gulf	9220	3.5
Australia NW Shelf	3700	1.1
Australia Gladstone	3770	1.1
W Coast Canada	3934	1.1
East Africa	7740	2.2
East Russian (Sakhalin)	904	0.3

(Source: David Ledesma assumptions and analysis)

Advantage & Disadvantage: cost-plus

- High labor cost and domestic labor shortage
- High proportion of Offshore gas & Coal seam gas: high extraction & liquefaction cost & environment concern
- Companies in competition --- duplicated investment (in pipelines) & gas shortage

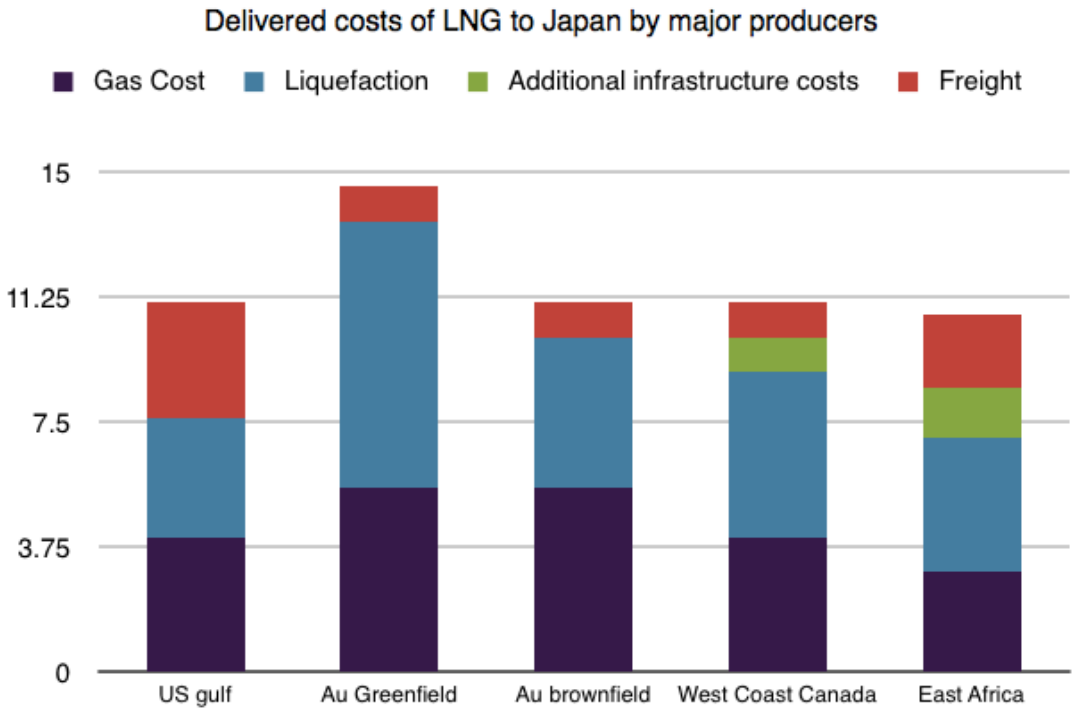
Level of advantage to Asian market by major producers

	Gas Reserves	Project Economics and development status	Sales of LNG	Distance to Market	Government & Geopolitical Factors	Sponsors	Ability to finance
Australia Brownfield	Medium	Medium	Medium	High/ Medium	Medium	High	High
Australia Greenfield	Medium	Low	Low	High/ Medium	Medium	High	Medium
US Gulf	High	High	High	Low	Medium	Medium	Medium
West Canada	Medium	Medium	Low	High/ Medium	Medium	Medium	Medium
East Africa	High	Low/Medium	Medium	Medium	Low/Medium	Medium	Low/ Medium
Russia East	Medium	Low/Medium	Medium	High	Low/Medium	Low/ Medium	Low/ Medium

(Source: David Ledesma assumptions and analysis)

Project economics: Brownfield vs. Greenfield

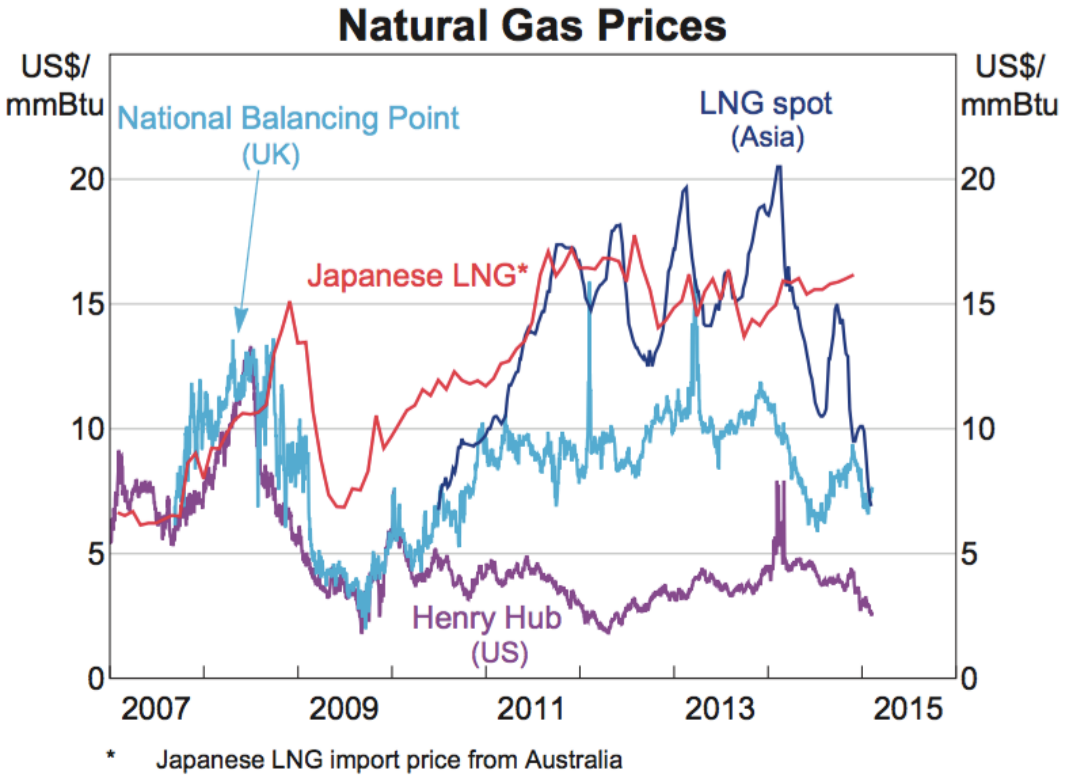
- Brownfield: Unsustainable but cost-favored
- Greenfield: Long-last but high cost
- Brownfield 60% vs. greenfield 15% vs. FLNG 24%
- 15% domestic sell policy restriction



(Source: David Ledesma assumptions and analysis)

Changing Pricing mechanism: market power shift

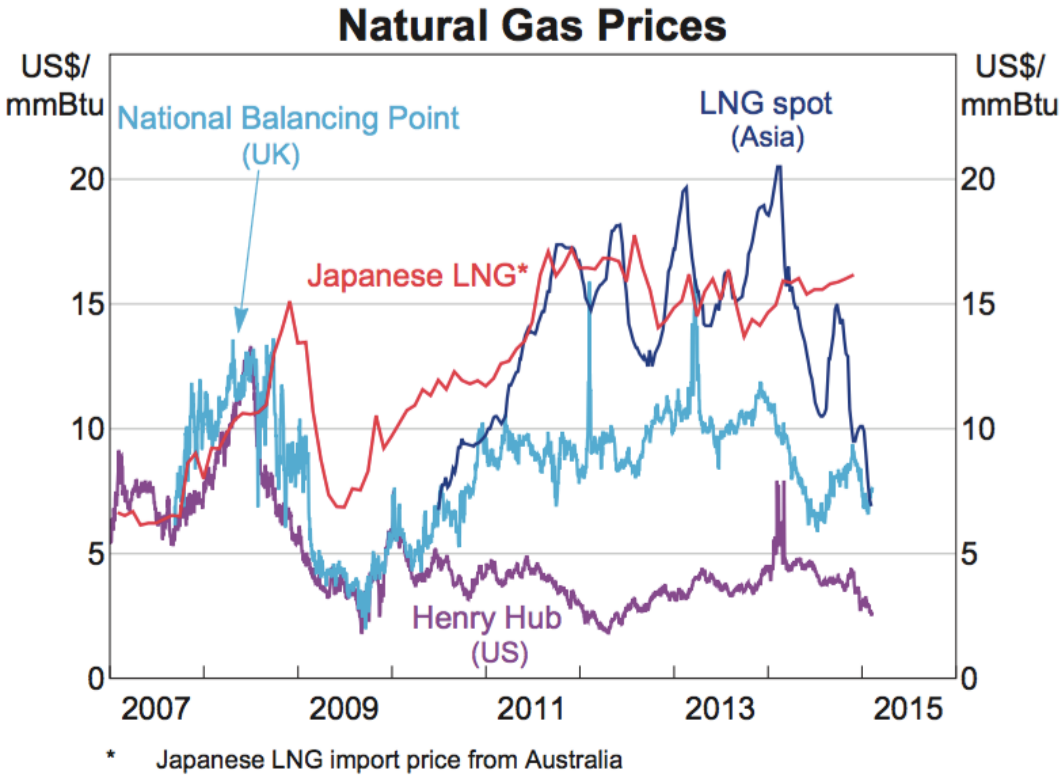
- Gentle demand growth
- Soaring supply
- Glut: market power fron producer to consumer.
- Consumers have choice, producers don't



Changing pricing mechanism: exporters race

- Australia: LTC oil indexation price LNG
- US: Henry Hub price LNG
- Russia: Pipeline NG
- Canada LNG
- Central Asia Pipeline NG

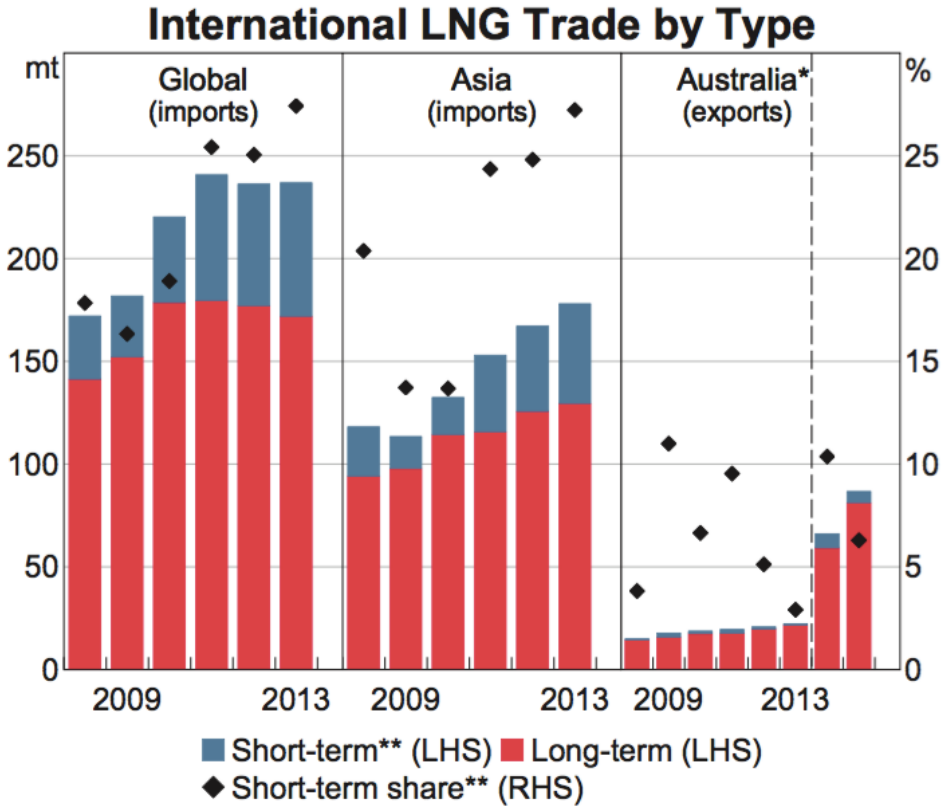
- Declining oil price --- all LNG prices are low --- who has lower cost who holds on



(Source: Thomson Reuters)

Changing Pricing mechanism : spot market formation

- Exporters and importers both want to secure themselves given the market situation (high supply, low price)
- Australia prefers long-term contract
- Importers want spot market
- Price setting: cost based --- market balance based
- Special in Asian Pacific market: Cost of LNG linked to oil price, natural gas spot price de-hook from oil price --- new challenge?



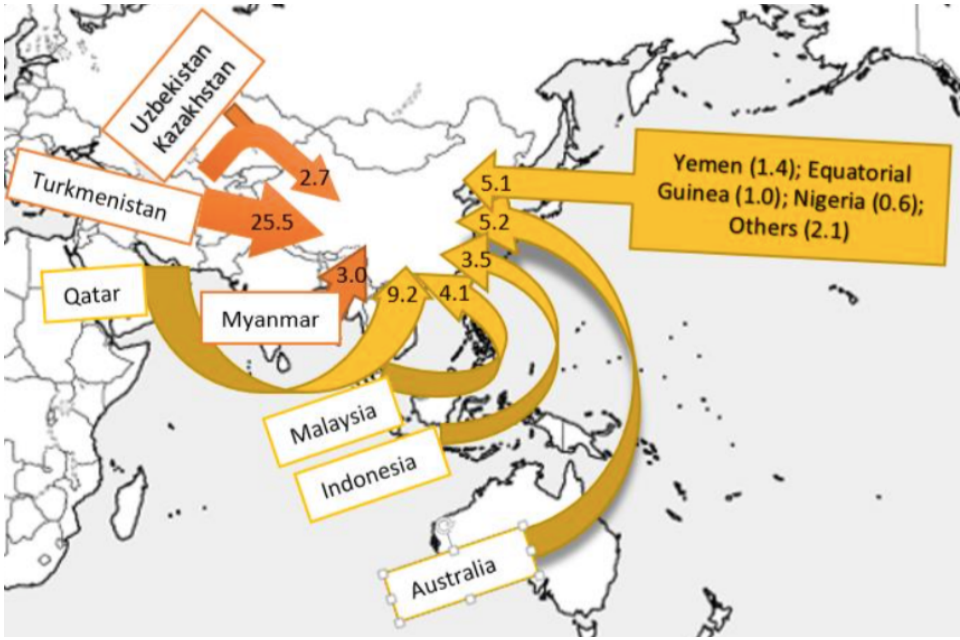
(Source: Natasha Cassidy, 2015)

'After the plunge of oil and LNG prices in Asia in the second half of 2014, the Australian LNG chapter risks becoming one of the worst investment stories of the last few decades in the oil and gas sector'

Particularly…

Australia rely on China, not China rely on Australia

- Strong reliant on China's development trajectory: Major LNG projects underway in Australia wouldn't be commercially viable in the absence of Chinese demand.



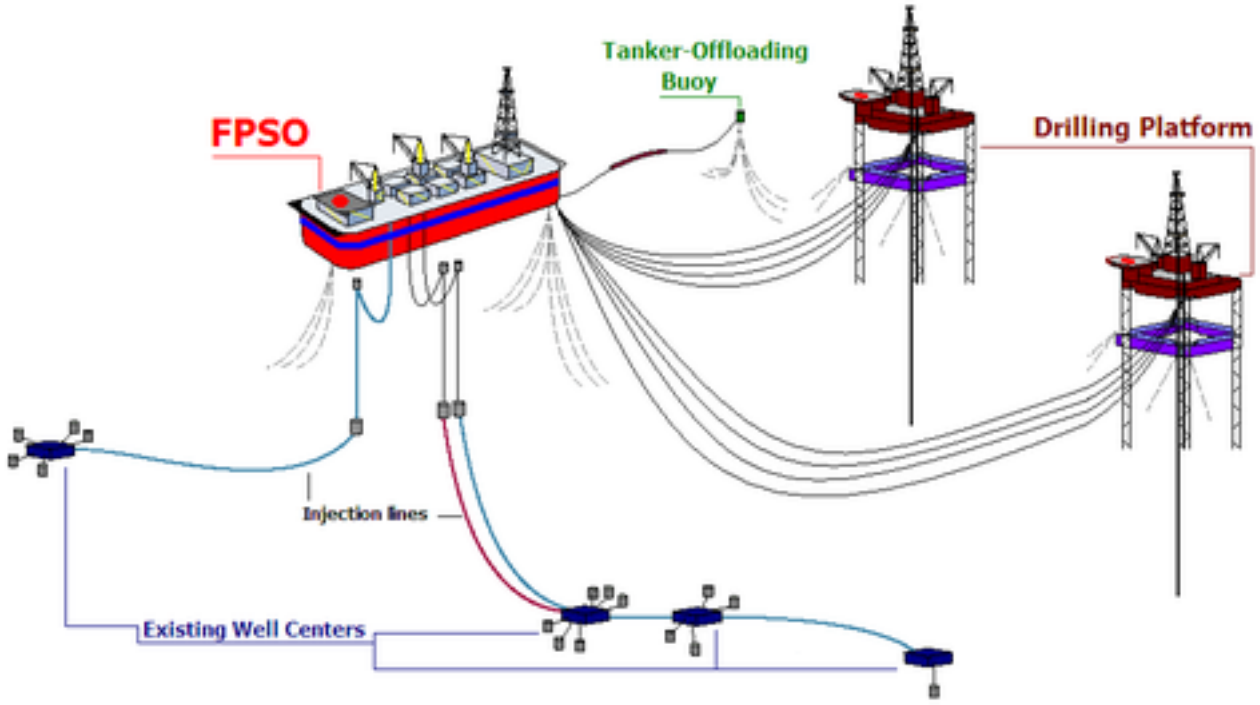
(Source: Pang 2015)

Good news

- The fundamental role of gas as a cleaner fuel;
- Demand of developing countries to generate more electricity;
- Current high dependency on non-regional gas trade in Asia market (70%);
- Weak Australia dollar gives export comparative advantage;
- Becomes a non-regional supplier (not cost-effective)?

Future options: FLNG

- Extract, liquefaction and direct export offshore --- floating projects sidestep the need for land clearing, new roads and expensive jetties and storage tanks.
- Problem: State/ federal government in power?
- Employment & Domestic supply contribution
- 15% supply restriction --- extra cost



Conclusion: Australia

- Australia has huge LNG export potential;
- With several investment projects coming into produce in 2018/19, Au will become the largest LNG exporter in the world;
- However, their production cost is relatively high;
- Complex business structure, natural gas extract site (green or brown) generates additional cost;
- Liberalization/ global integration of natural gas market may keep gas price at a low level;
- Various actors in Asian-Pacific market accelerates the formation of spot market;
- An unexpected market change, plus Au's aggressive investment plan, delays and cost overruns of investment may lead Au's LNG activity into insecure or even failure;
- Au maybe too reliant on China's potential market.

- Thanks for your attention!
  Feel free to ask questions ☺