

The Booming West Energy Outlook Oil and LNG

AIE Monday 23rd April, 2012 at the Parmelia Hilton

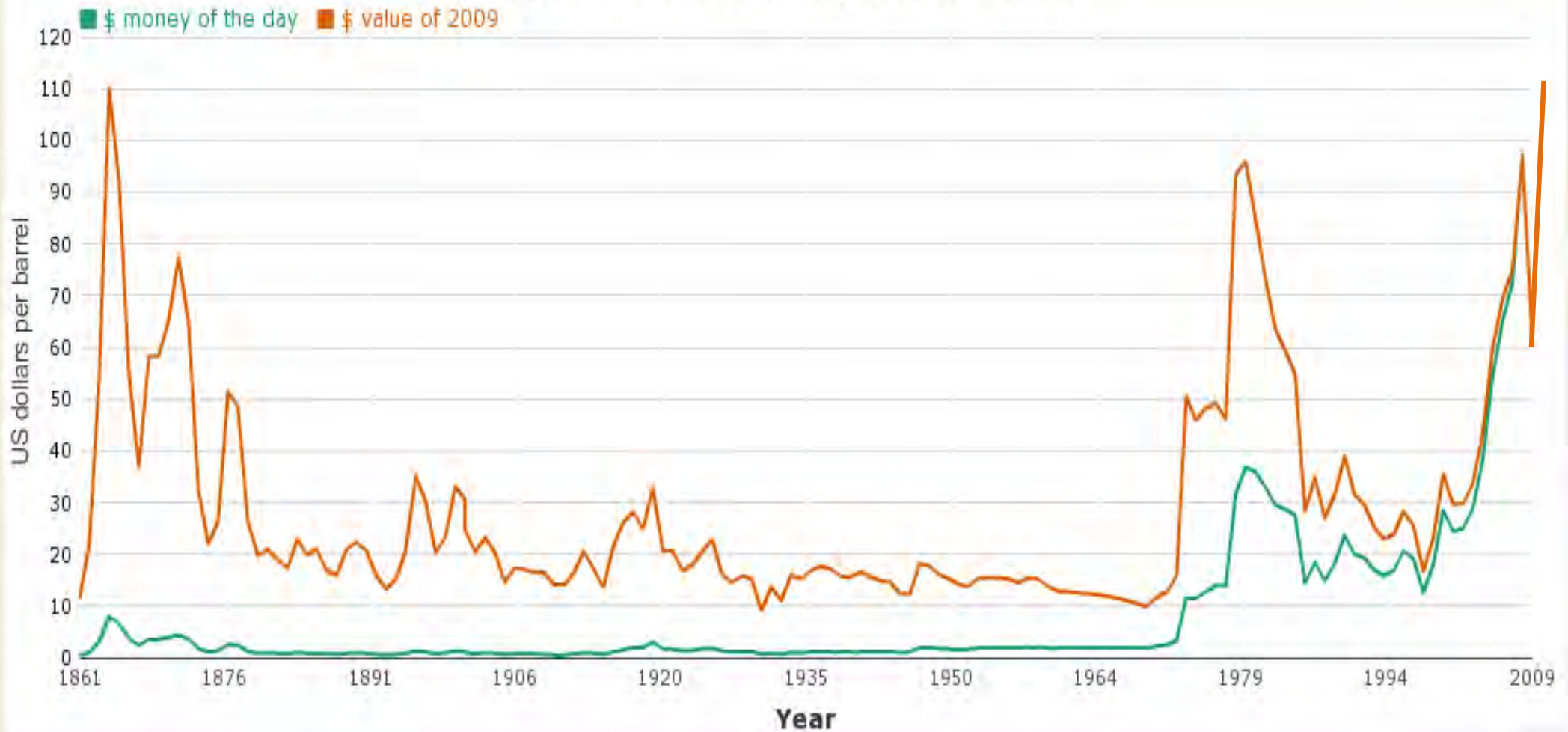
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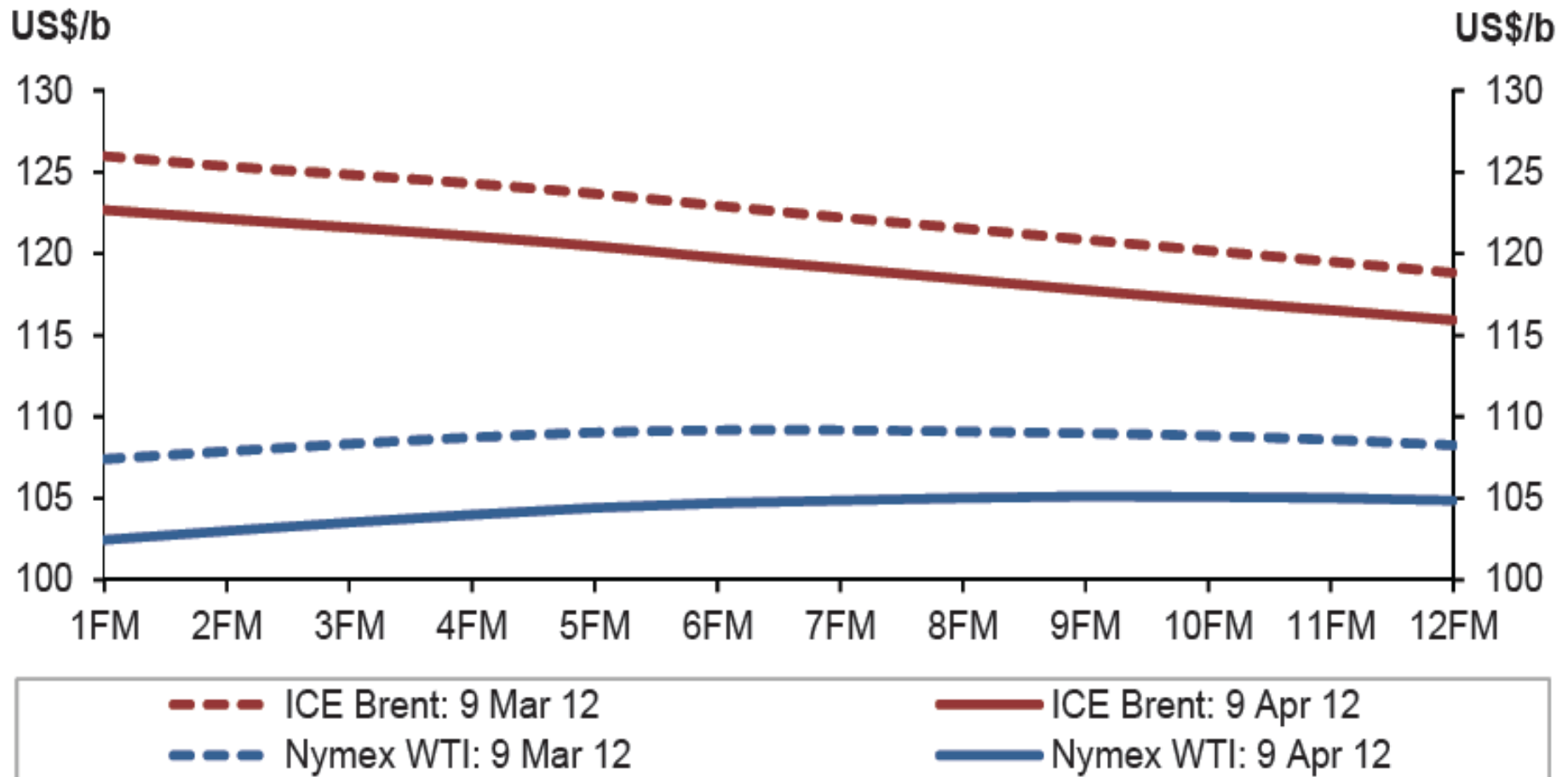
Oil Prices- 1861 to 2011

Historical Crude Oil prices, 1861 to Present



Forward Oil Prices from the Futures Market

Graph 1.5: Nymex WTI and ICE Brent forward curve, 2012

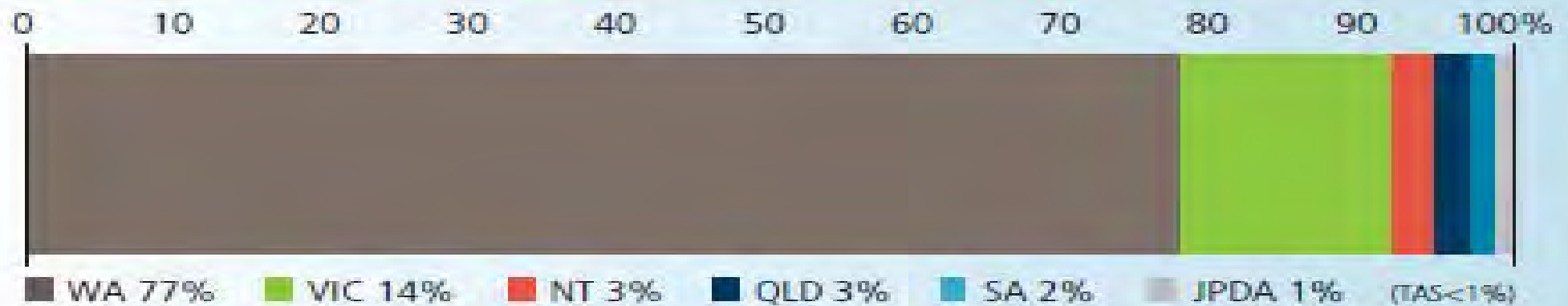


FM = future month

Source: April 2012 OPEC Newsletter

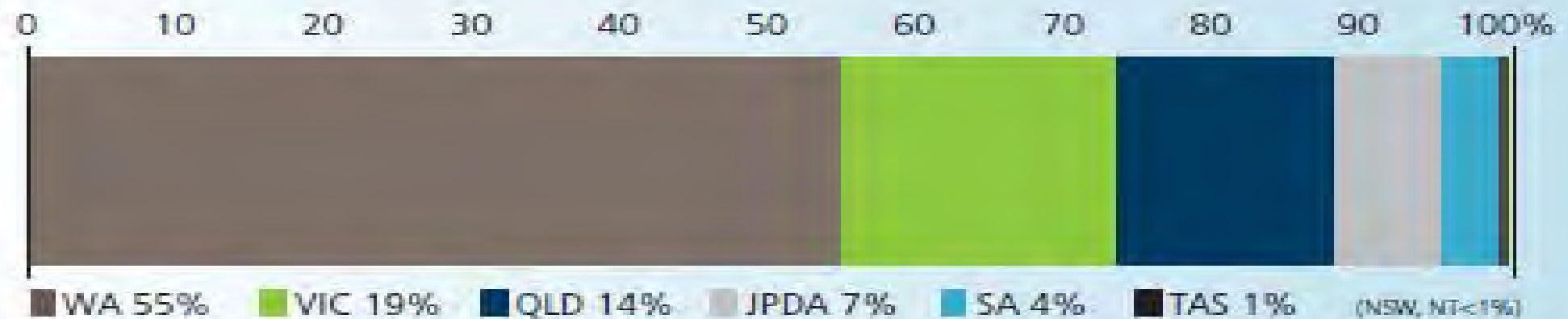
WA's contribution to Australian oil and gas production

Source of oil and condensate production 2010 (%)



Source: APPEA

Source of gas production 2010 (%)



Source: APPEA

Current Issues for Oil in WA


- Skills and Labour Shortages due to project developments
- Oil industry licence to operate being questioned by the community after accidents and misleading Fracking debate
- Do we have an indigenous replacement for diesel in remote sites?
 - LNG, CNG, and or LPG ?
 - Large scale solar or hybrid plants?
- Federal Budget Issues:
 - Is the Diesel Fuel rebate in the sights of Canberra to balance the budget?
- Refinery Closures-
 - Importing more products
 - Security of supply issues?

LNG: Price Trends, Supply - Demand

- Average price for Australian LNG exports in the quarter ended September 30, 2011 was A\$11.37/gigajoule*
- Long term (20 year) contracts between Major Gas Companies and Government or NOCs at relatively high prices now, related to oil prices:
 - Are these set in concrete or renegotiation opportunities?
 - Will prices follow oil prices or will LNG develop its own independent pricing market and will that market be affected by a world wide shale gas revolution?
- Longer term, analysts expect global LNG demand to grow:
 - 218 million mt/year in 2010 to
 - 410 million mt/year by 2020#

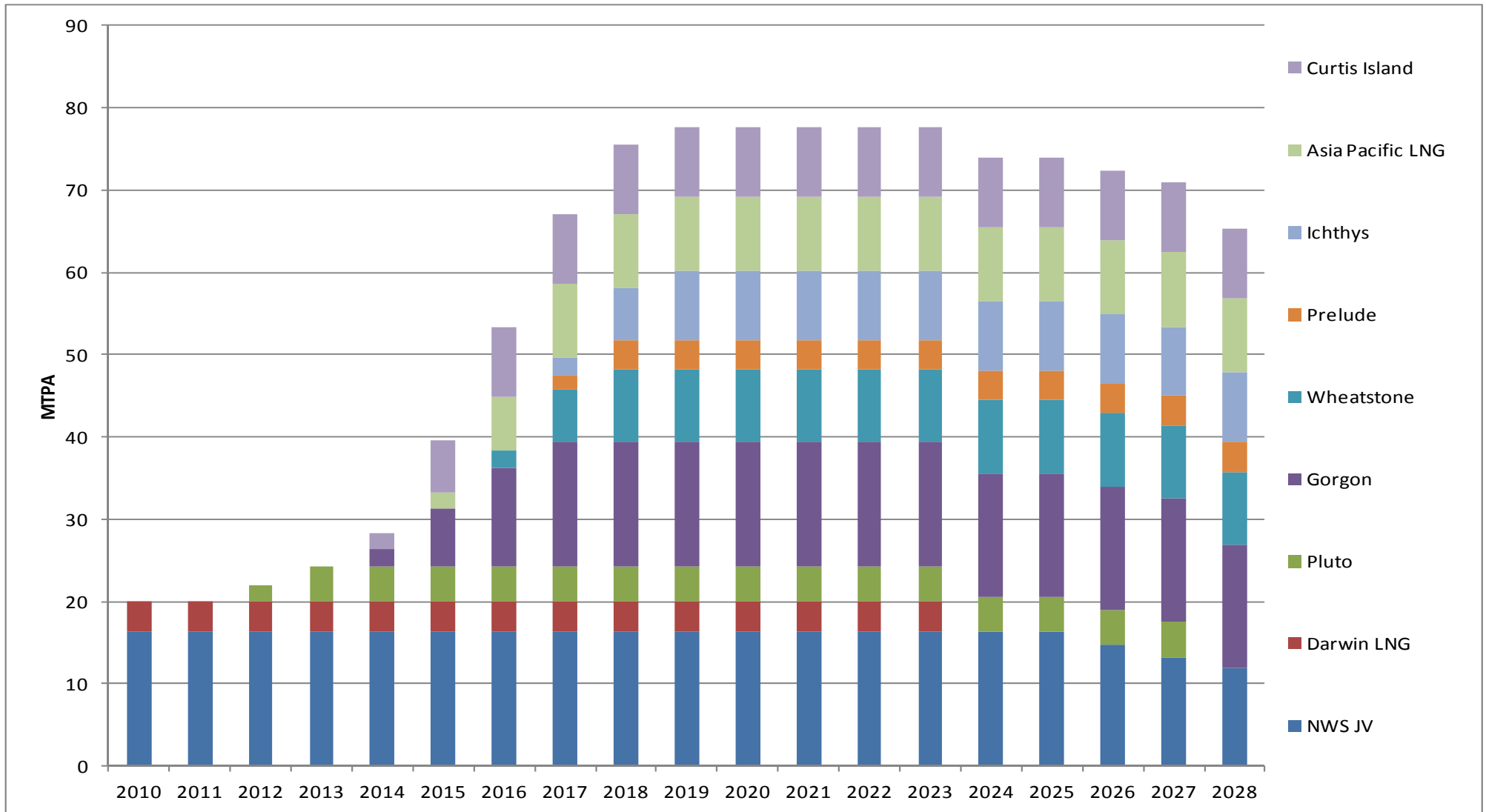
LNG Projects Australia and PNG

PROJECT	CAP. (mtpa)	OPERATOR	PARTNERS	EXPECTED APPROVAL	FIRST LNG	FIELDS	PLANT
Western Australia							
Bonaparte	2	GDF Suez	GDF Suez, Santos	2014	2018	Petrel, Tern, Frigate	Floating LNG
Browse	12	Woodside	Woodside, BP, Shell, Chevron, BHP Billiton	nyd	nyd	Brecknock, Calliance, Torosa	James Price Point
Gorgon Trains 1-3	15	Chevron	Chevron, ExxonMobil, Shell, Osaka Gas, Tokyo Gas, Chubu Electric	Approved	2014	Gorgon, Io-Jansz	Barrow Island
Gorgon Train 4	5	Chevron	Chevron, ExxonMobil, Shell	nyd	nyd	nyd	Barrow Island
North West Shelf	16.3	Woodside	Woodside, BHP Billiton, BP, Chevron, Shell, Japan Australia LNG, CNOOC.	Producing	1989	North Rankin, Perseus, Goodwyn, Angel, Echo-Yodel, Tidepole, Searipple, Cossak, Wanaea, Lambert, Hermes	Burrup
Pilbara	8	ExxonMobil	ExxonMobil, BHP Billiton	nyd	nyd	Scarborough	nyd
Pluto Train 1	4.3	Woodside	Woodside, Kansai Electric, Tokyo Gas	Producing	2012	Pluto, Xena	Burrup
Pluto Expansion	4.3	Woodside	Woodside	nyd	nyd	nyd	Burrup
Prelude	3.6	Shell	Shell	Approved	2017	Prelude, Concerto, Cruz	Floating LNG
Timor Sea		PTTEP Australasia		2014	nyd	Oliver, Cash-Maple	Floating LNG
Wheatstone	8.9	Chevron	Chevron, Apache, Kufpec, Shell	Approved	2016	Wheatstone, Iago, Julimar, Brunello	Ashburton North
Northern Territory							
Darwin	3.5	ConocoPhillips	ConocoPhillips, ENI, Santos, Inpex, Tokyo Timor Sea Resources	Producing	2006	Bayu-Undan	Wickham Point
Ichthys	8.4	INPEX	Inpex, Total, Osaka Gas, Tokyo Gas, Toho Gas	Approved	2017	Ichthys	Darwin
Sunrise	4	Woodside	Woodside, ConocoPhillips, Shell, Osaka Gas	nyd	nyd	Sunrise	Floating LNG
Queensland							
Arrow	9.2	Arrow Energy (Shell-PetroChina)	Shell, PetroChina	2013	2017	Arrow Surat and Bowen fields	Curtis Island
Australia Pacific LNG Train 1	4.5	Origin Energy/Conoco Phillips	ConocoPhillips, Origin Energy, Sinopec	Approved	2015	APLNG Surat fields	Curtis Island
Australia Pacific LNG Train 2	4.5	Origin Energy/Conoco Phillips	ConocoPhillips, Origin Energy, Sinopec	2012	2016	APLNG Surat fields	Curtis Island
Fisherman's Landing LNG	3	LNG Ltd	LNG Ltd	nyd	nyd	nyd	Gladstone
Gladstone LNG	7.8	Santos	Santos, Petronas, Total, Kogas	Approved	2015	GLNG Bowen and Surat fields, Cooper Basin	Curtis Island
Queensland Curtis LNG Trains 1-2	8.5	BG	BG, CNOOC, Tokyo Gas	Approved	2014	OGC Surat fields	Curtis Island
Queensland Curtis LNG Train 3	4.25	BG	BG	2012	nyd	nyd	Curtis Island
Papua New Guinea							
Gulf LNG	3	InterOil	InterOil, Pacific LNG, EWC	nyd	nyd	Elk, Antelope	Gulf Province PNG
InterOil-Flex	2	InterOil	InterOil, Flex	nyd	nyd	Elk, Antelope	Floating LNG
PNG LNG Trains 1-2	6.6	ExxonMobil	ExxonMobil, Oil Search, NPCP, Santos, JX Nippon, MRDC, Petromin	Approved	2014	Hides, Juha, Angore, Kutubu, Agogo, Moran, Gobe Main	Port Moresby
PNG LNG Train 3	3.3	ExxonMobil	nyd	2013	nyd	nyd	Port Moresby



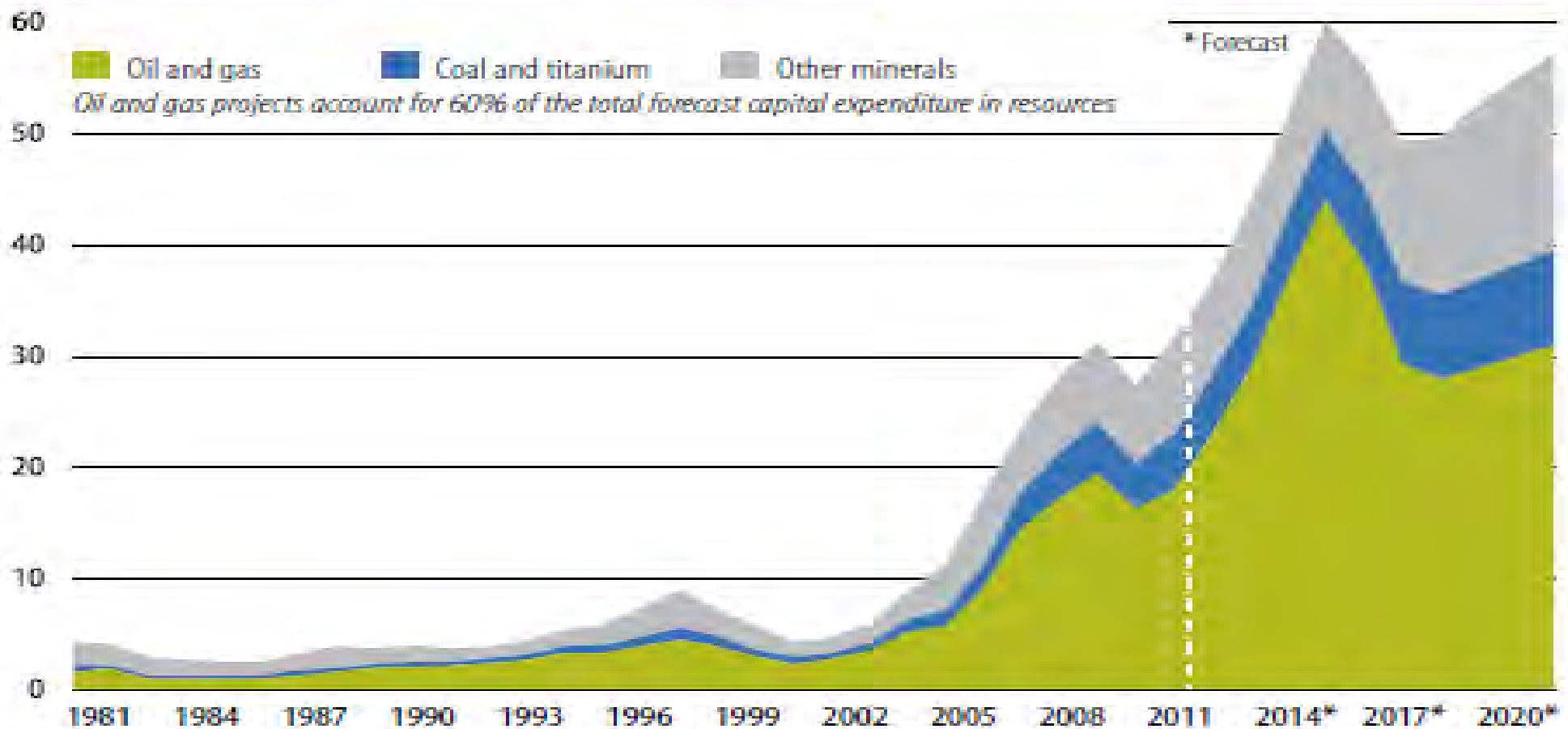
Reflect Large gas reserve position, but they will not all get built.

Firm Australian LNG Production



Expenditures for Gas are Massive

CAPITAL EXPENDITURE IN NEW RESOURCES PROJECTS IN AUSTRALIA (US\$ billion)



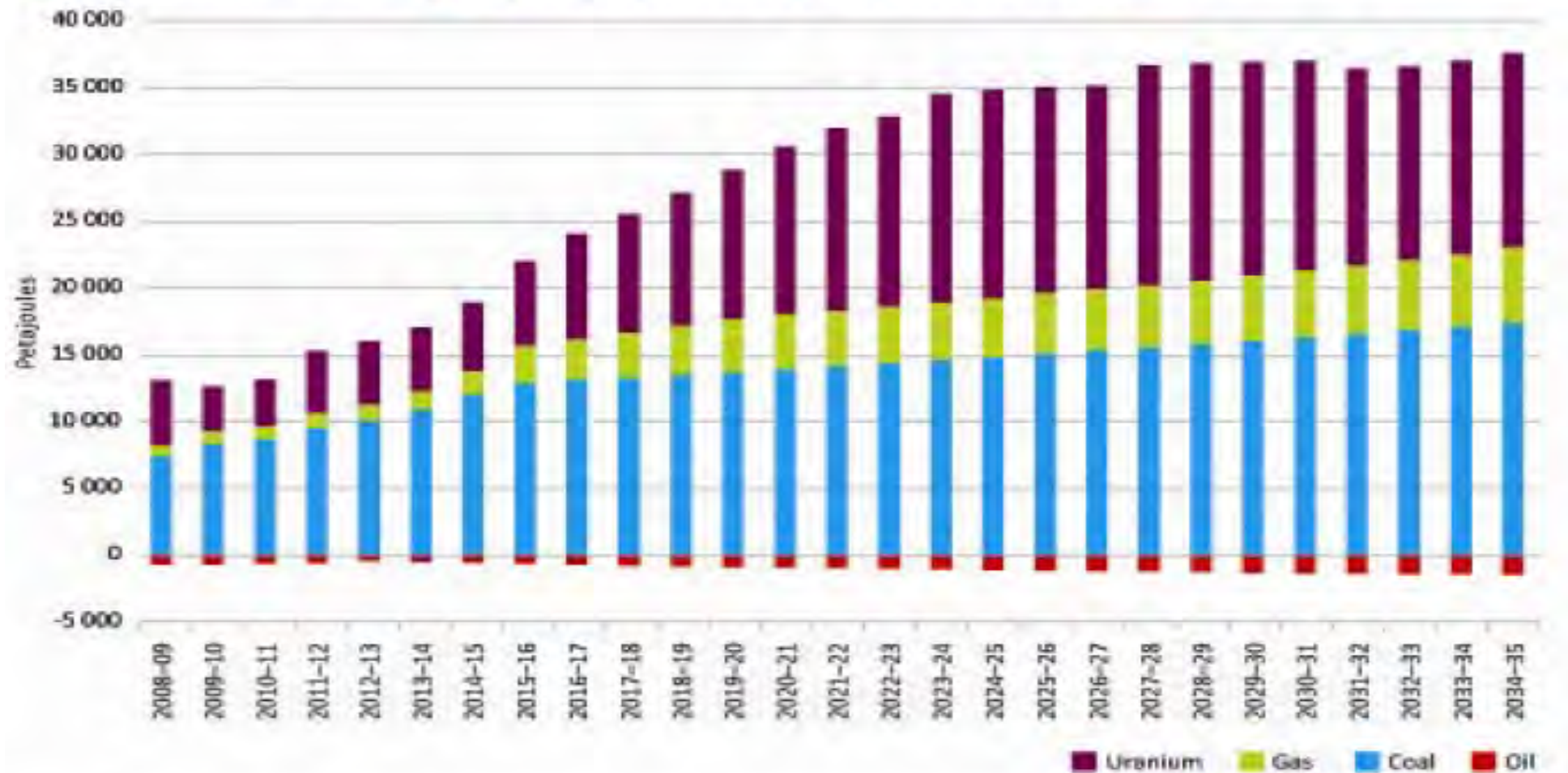
Sources: Compiled by McKinsey & Company from ABARES/
BREE; ABS; Company websites and press releases; Global Insight
database, Global Insight team analysis.

Current Issues for LNG

- Capital and Skills and Labour Shortages, and
- Cost Impacts
- Duplication of redundancy-plant capacity and regional support infrastructure in greenfield plants -> inefficient use of capital
- LNG V Domgas
 - Reserves allocations, e.g. WA 15% reservation policy and application
 - Transparent Pricing- LNG Netbacks pricing?
 - Higher Domgas price impact on local industry
- Shale Gas Discovery Impact on LNG prices?
 - Export controls – National Interest issues e.g. USA
- Taxation, including 'carbon tax'

Australian Energy Exports by Fuel

Figure 3.7: Australian energy export projections by fuel, 2008–09 to 2034–35



Note: Data includes uranium.

Source: Derived from BREE, *Australian energy projections to 2034–35*, BREE, Canberra, 2011.

Other Reference Material

- 'Gaslands' The Movie Facts:
 - <http://cogcc.state.co.us/library/GASLANDDOC.pdf>
 - <http://www.energyindepth.org>
- **Tight Oil and Shale Oil**
 - <http://www.terraexploration.com/index-3.html>
 - This website is quite good for explaining the different types of oil and gas including tite / shale oil
- **Fracking**
 - <http://wa-onshoregas.info/>
 - **1947:** First well receives hydraulic fracturing treatment to stimulate natural gas development (Grant County, Kan.).
 - First Frac in WA over 40 years ago

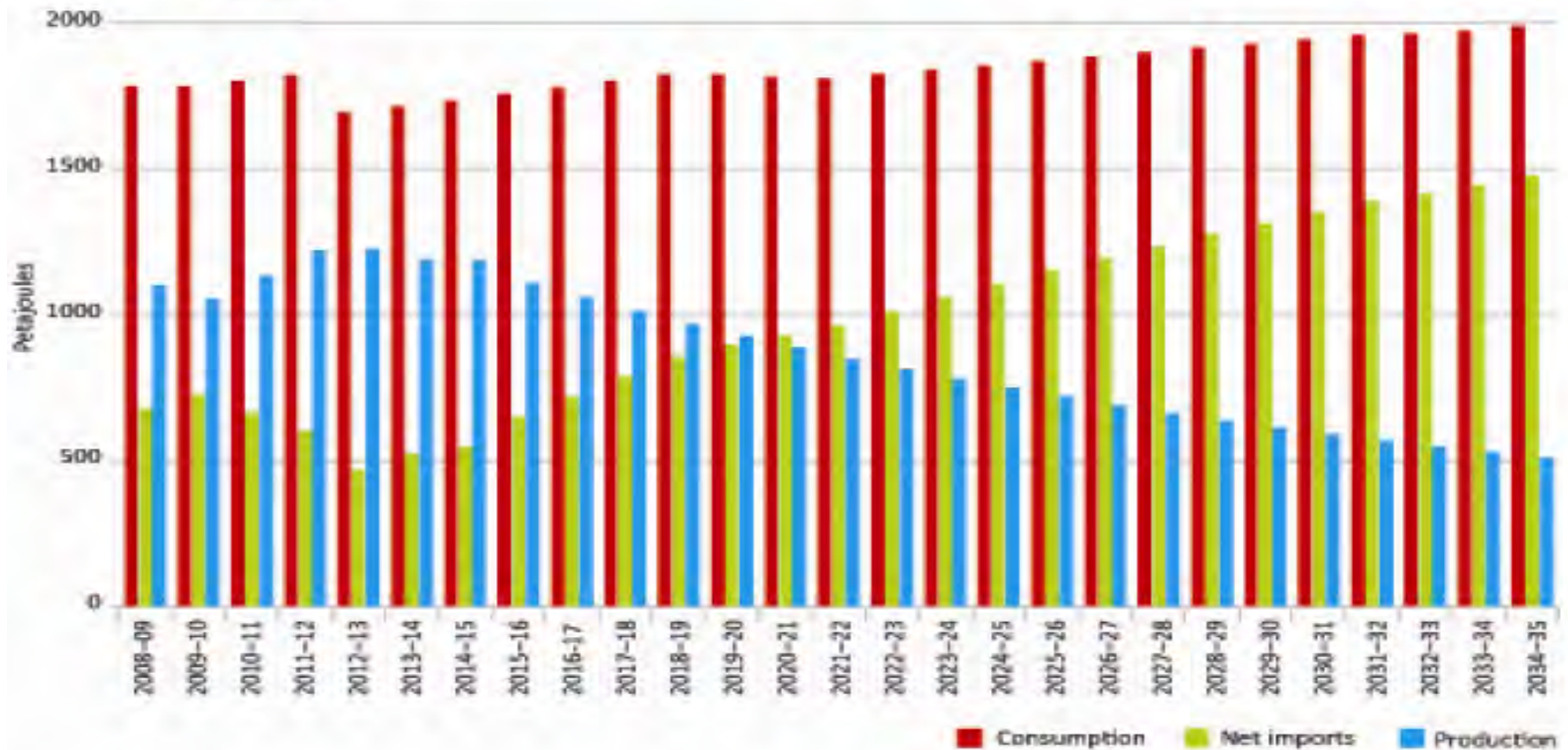
Oil Supply and Demand Pressures



SOURCE: BLOOMBERG/TTMTOH

Australian Oil Imports and Exports

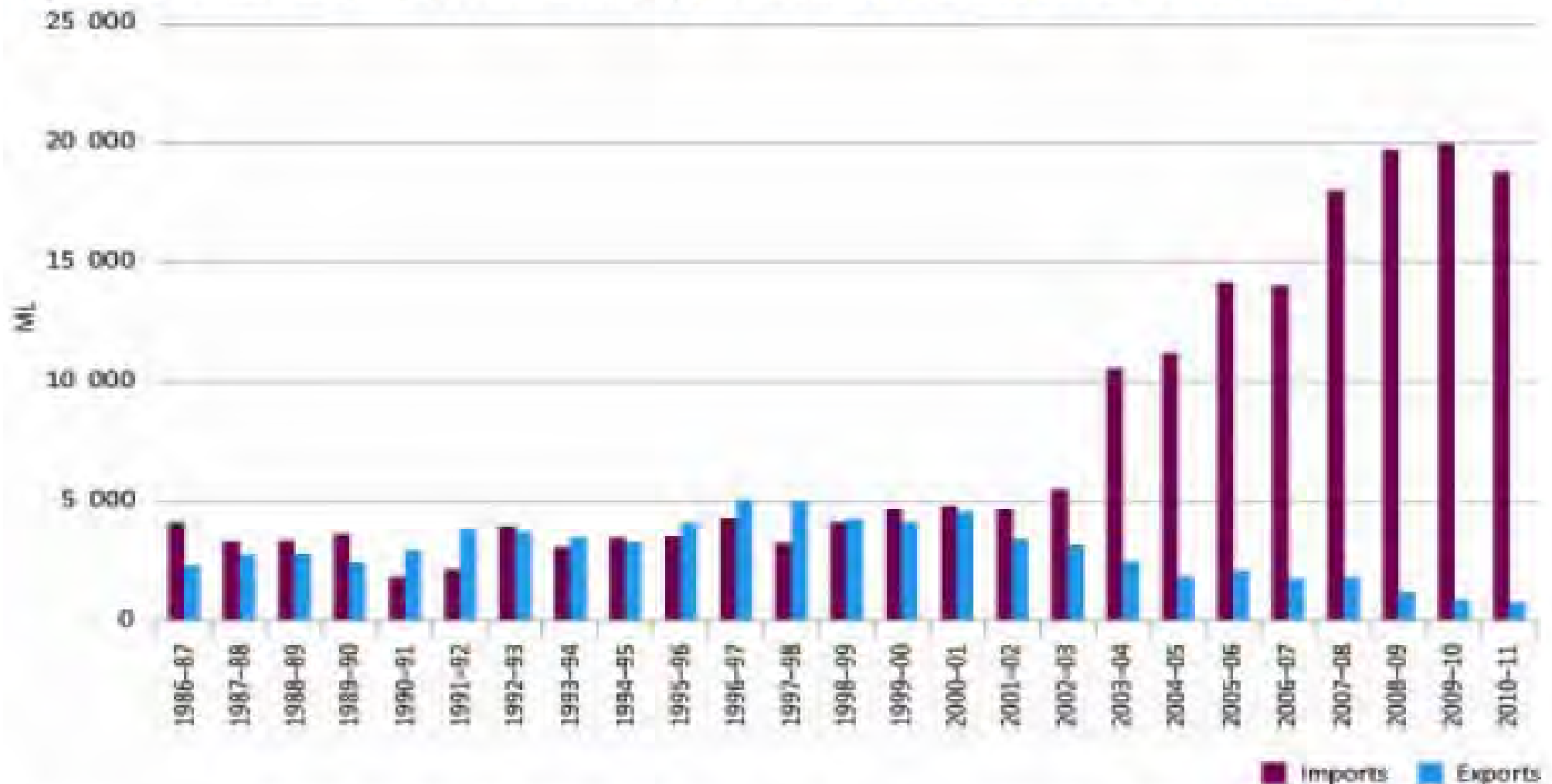
Figure 6A.3: Primary oil production, imports and total primary energy consumption, 2008–09 to 2034–35



Source: BREE, *Australian energy projections to 2034–35*, BREE, Canberra, 2011.

Refined Products- Diesel and Petrol

Figure 2.4: Australian trade in refined petroleum products, 1986–87 to 2010–11



Source: BREE, *Resources and energy statistics 2011*, BREE, Canberra, November 2011, p. 110.