

The Future for Gas in South East Australia

Australian Institute of Energy Melbourne Branch
Seminar “Gas in South East Australia”

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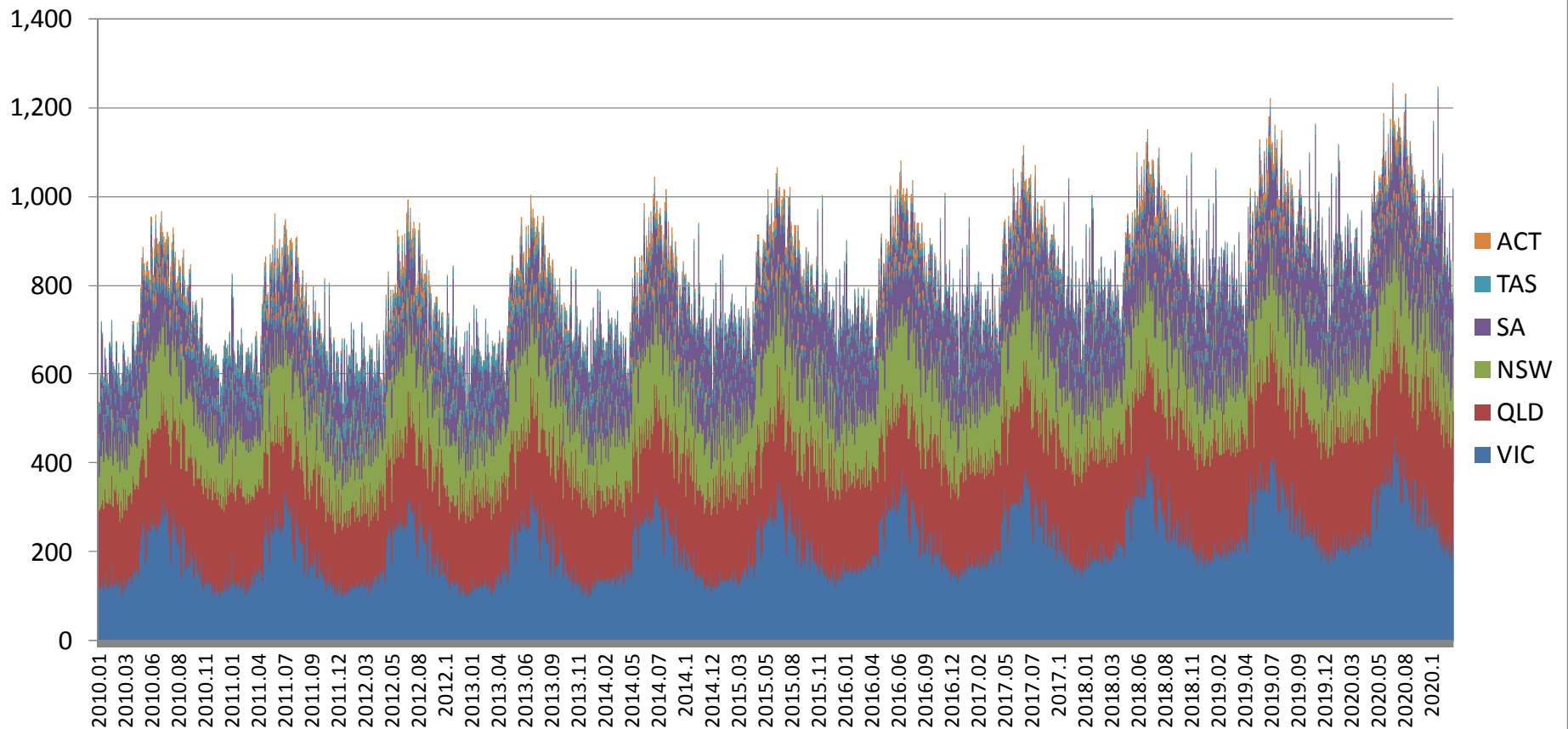
Melbourne -- 27 October 2011



ACIL Tasman
Economics Policy Strategy

Eastern Australia gas consumption: 2010 to 2020

PJ/a equivalent



Topics

- Wholesale gas market drivers
 - Carbon price
 - CSG LNG developments
 - Victorian spot prices
- Retail gas market trends
- New gas supply for Eastern Australia markets



Impacts of carbon tax on gas demand

- Carbon tax will
 - Improve economics of gas-fired generation cf coal-fired generation
 - Reduce dispatch of coal-fired plant and potentially cause retirement of coal plant and replacement by gas plant
- Impact is highly dependent on two factors:
 - Level of carbon price
 - Gas price relative to coal price
- Low to moderate carbon price unlikely to drive major shift in generation patterns
 - Direct intervention to change generation mix becomes more likely (e.g. brown coal buyout)
- Carbon price required to achieve significant fuel switching is inextricably linked to fuel price

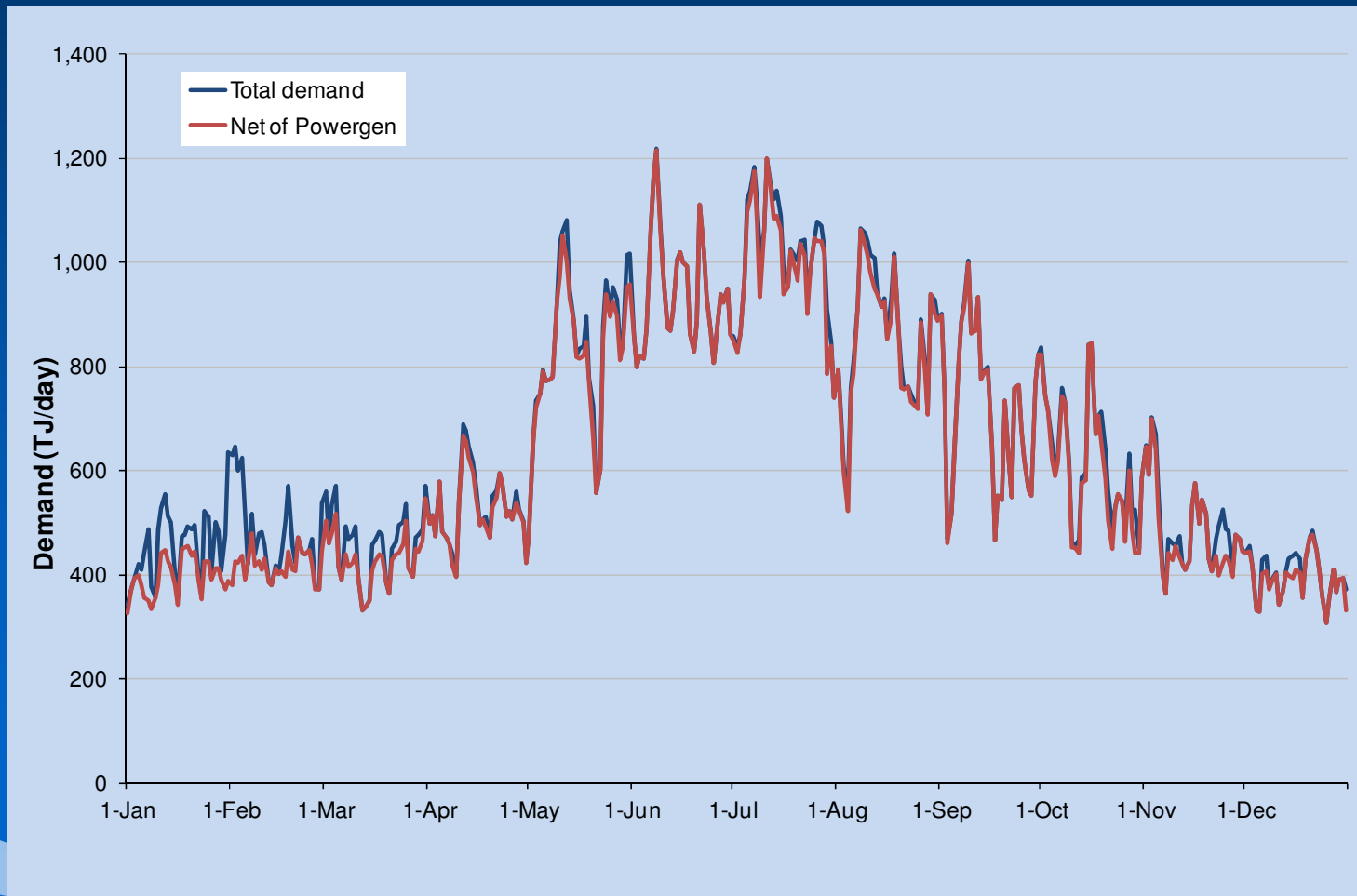


Impacts of gas prices on GPG demand

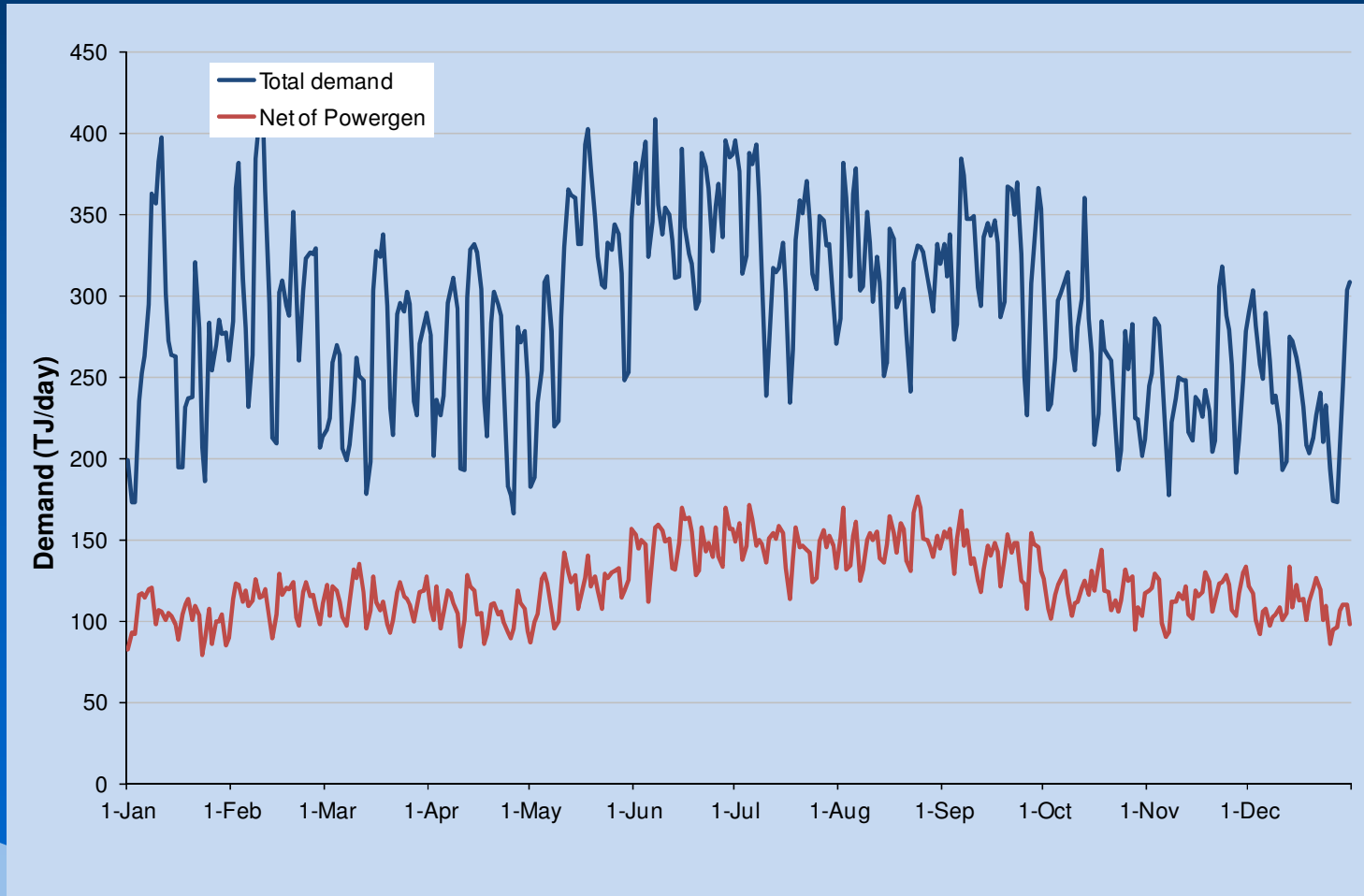
- High gas prices = less displacement of coal plant
- High gas prices + moderate carbon prices = economics of coal-fired plant still preferable to new CCGT
 - Raises serious policy issues
- Where will new entrant gas fired-plant locate?
 - Close to lowest cost fuel source: currently Queensland CSG, but LNG developments may change that
 - Close to existing high emission plant: Brown coal replacement in Victoria will drive new gas-fired powergen developments



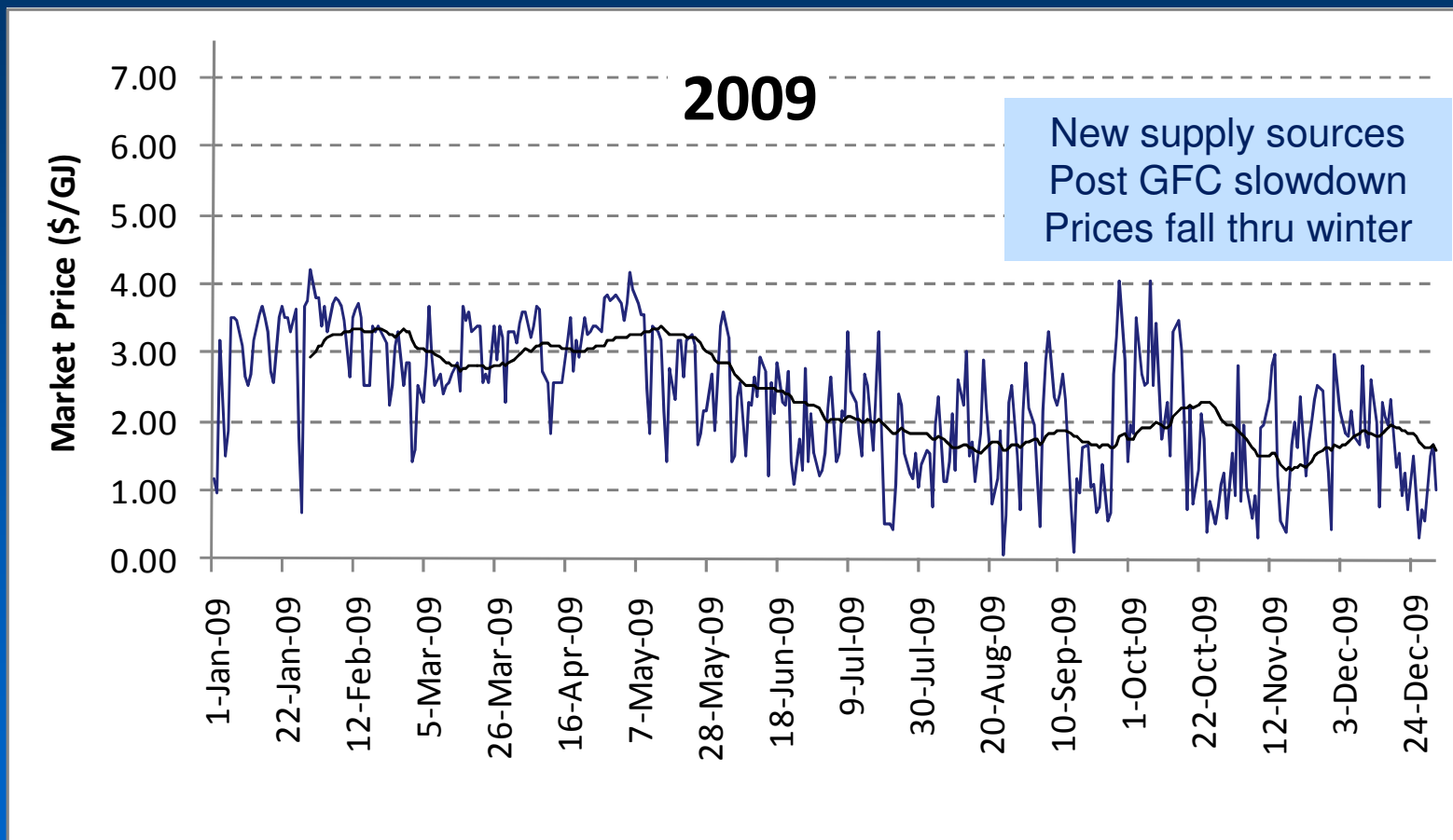
Use of gas for powergen in Victoria is currently very low ...



... compared to South Australia



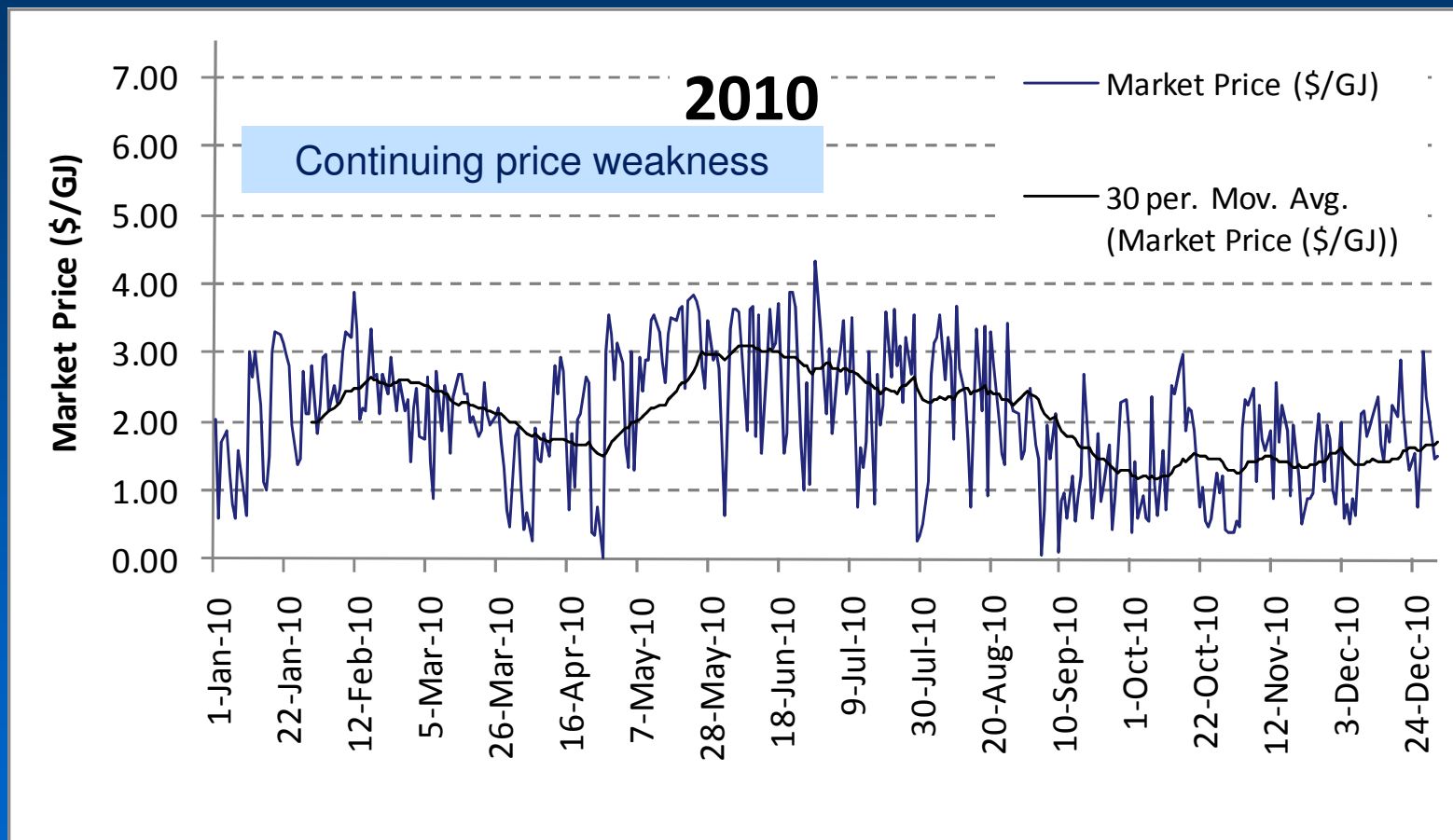
Victorian spot gas prices – 2009



Data source: AEMO



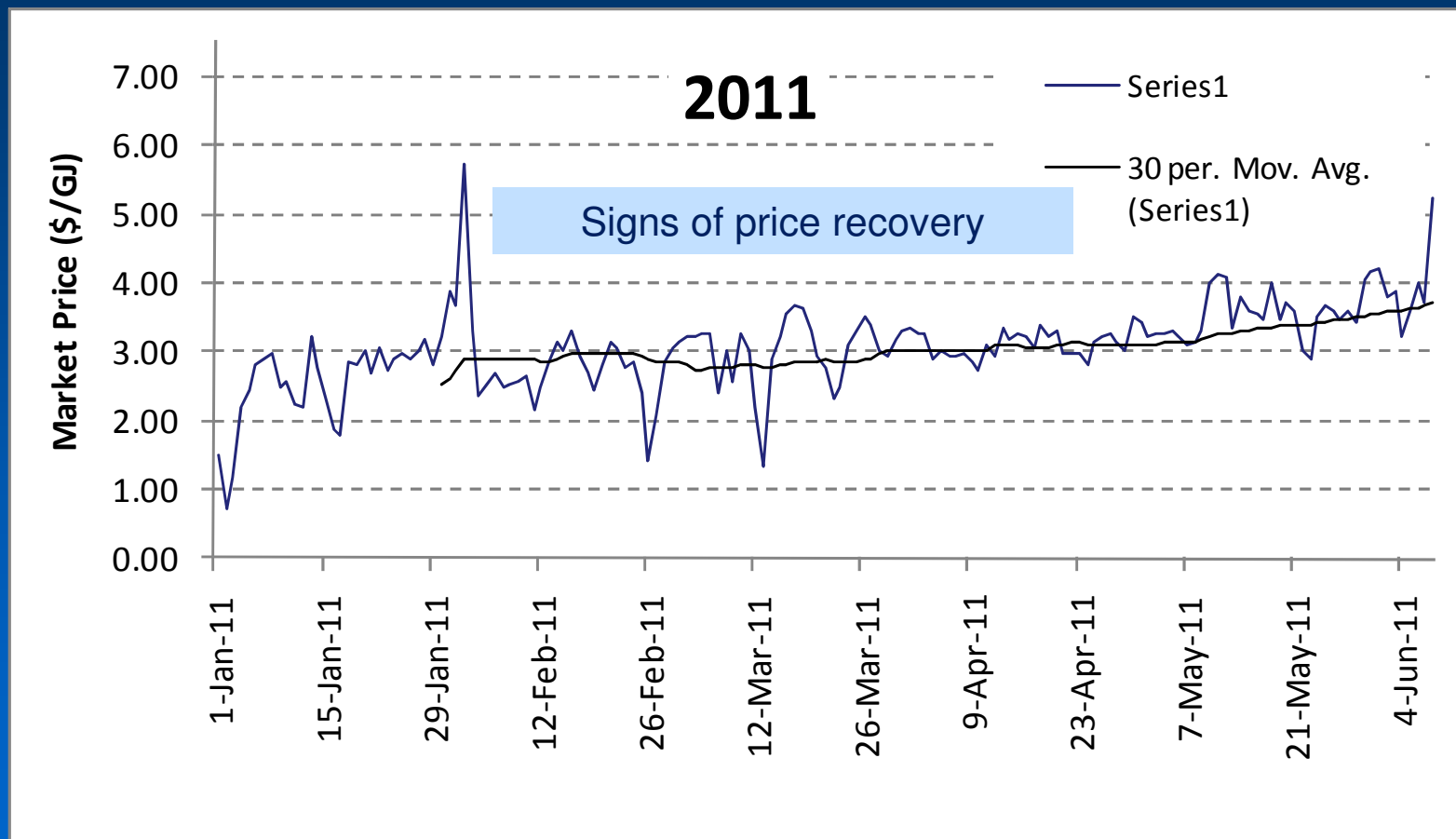
Victorian spot gas prices – 2010



Data source: AEMO

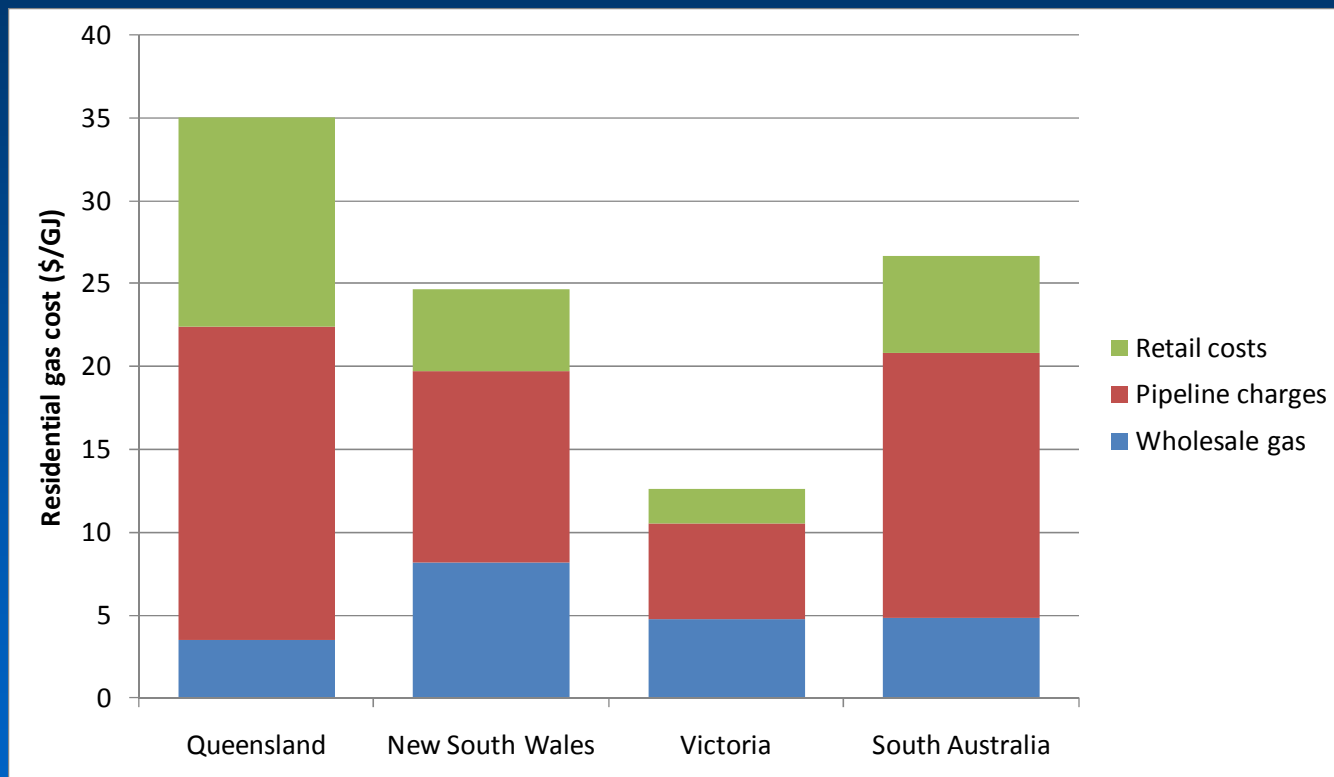


Victorian spot gas prices – 2011



Data source: AEMO

Indicative components of retail gas cost



ACIL Tasman analysis based on data presented in AER *“State of the Energy Market” 2008, 2009, 2010*



The outlook for gas distribution costs

- Gas distribution costs are set to rise significantly in real terms because of:
 - Higher financing costs for existing assets
 - Higher capital costs for new works
 - Higher operating costs (including rising labour costs)
 - Lower gas use per customer
- These drivers are affecting gas distribution costs in all jurisdictions



Why is retail gas demand falling?

- Throughout Eastern Australia, average gas consumption per retail customer is falling because of:
 - Long term trend to warmer winters
 - Impact of government policies (eg building codes, energy efficiency programs, home insulation)
 - Improved appliance efficiency standards
 - Shift to reverse cycle air-conditioning for space heating

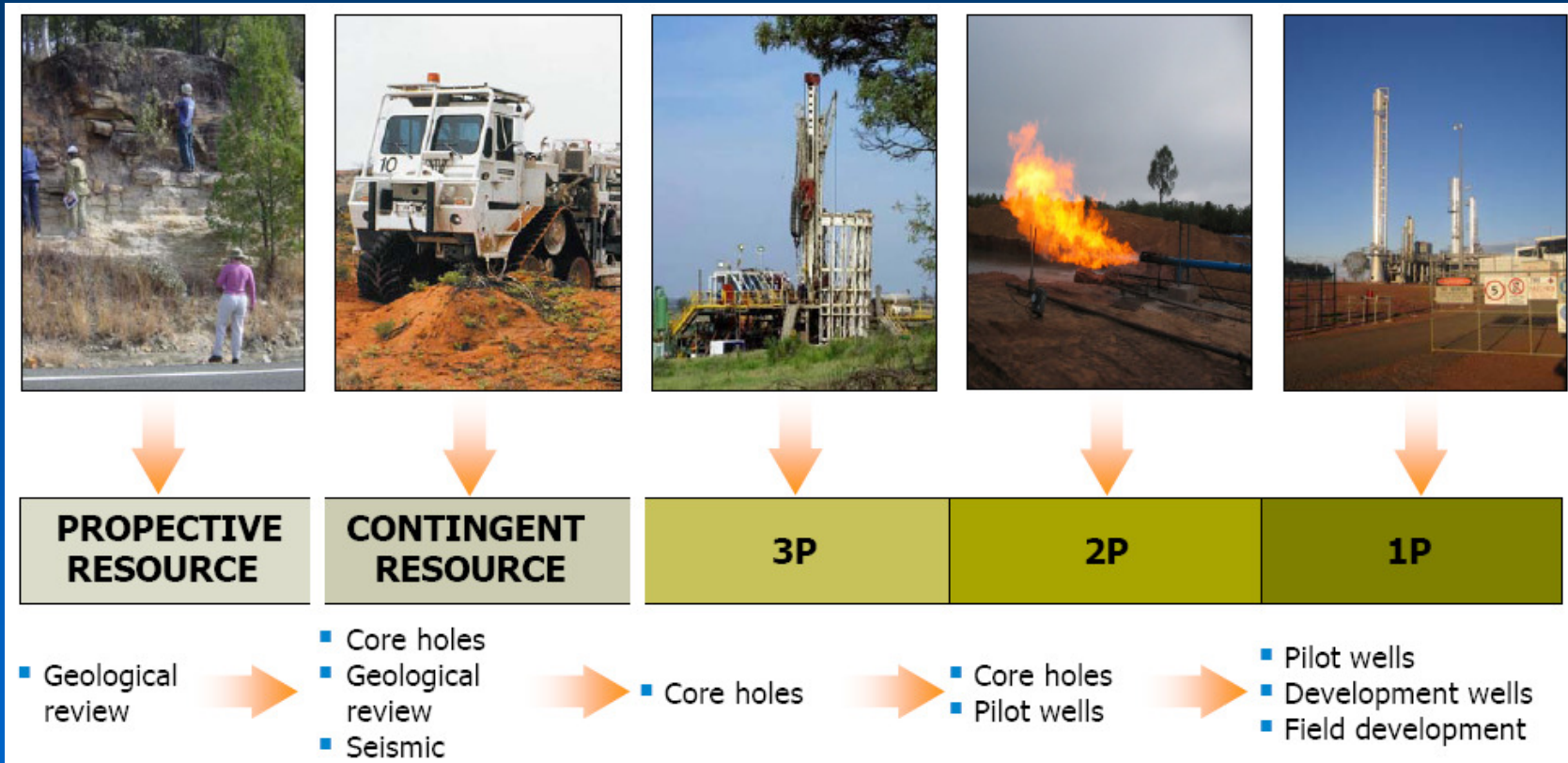


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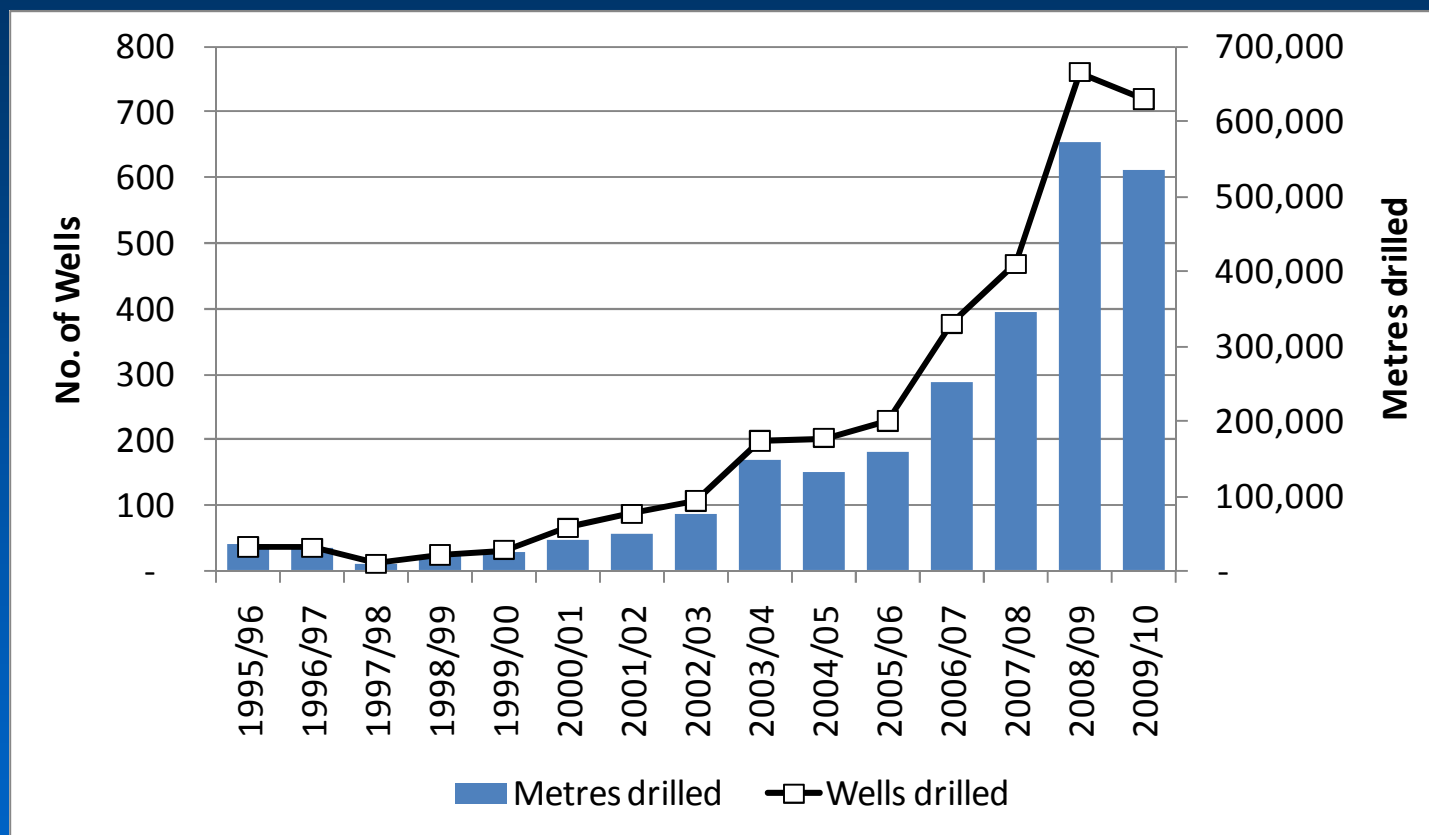
The CSG exploration and demonstration process



Source: Santos

- Finding and proving up CSG resources involves a systematic process of geological appraisal, with drilling (core holes and open holes) a key part
- Gathering more data allows increasing confidence in resource definition

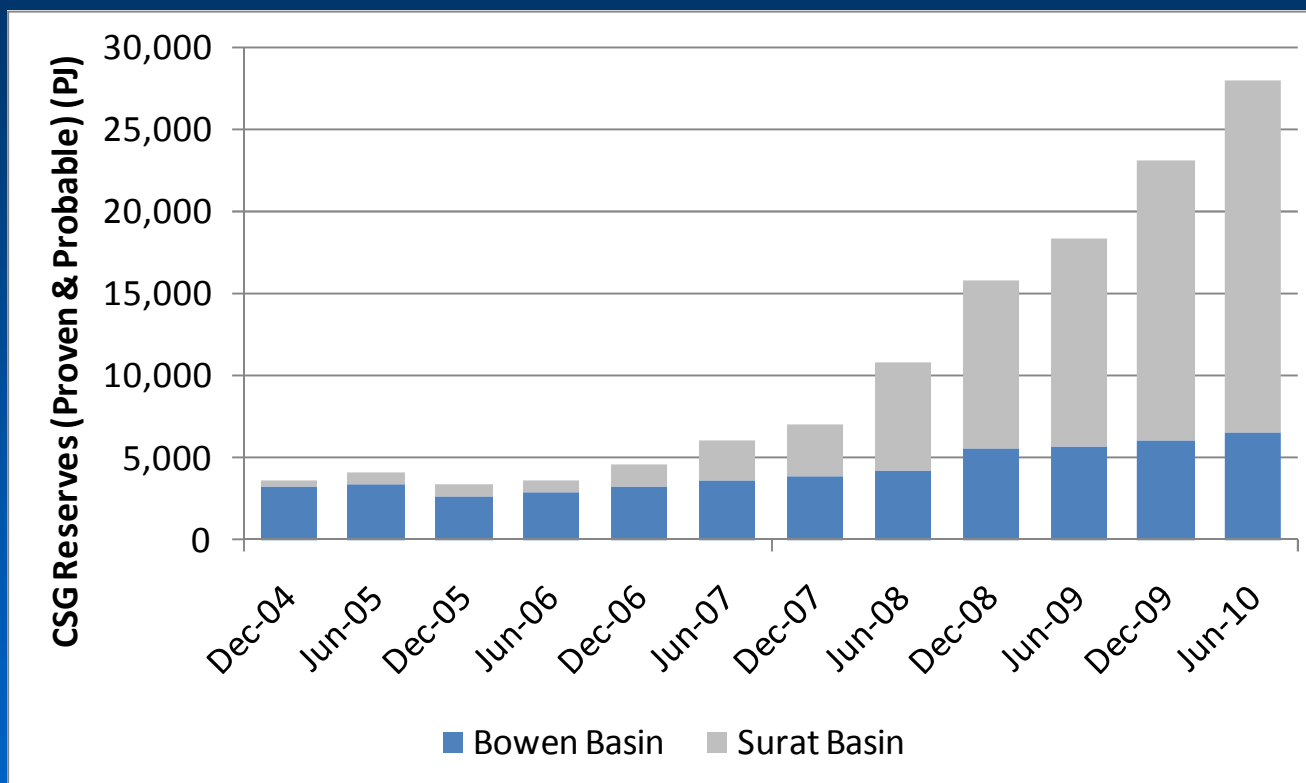
Queensland CSG Drilling History



Data from Queensland Department of Employment, Economic Development & Innovation, Mines & Energy



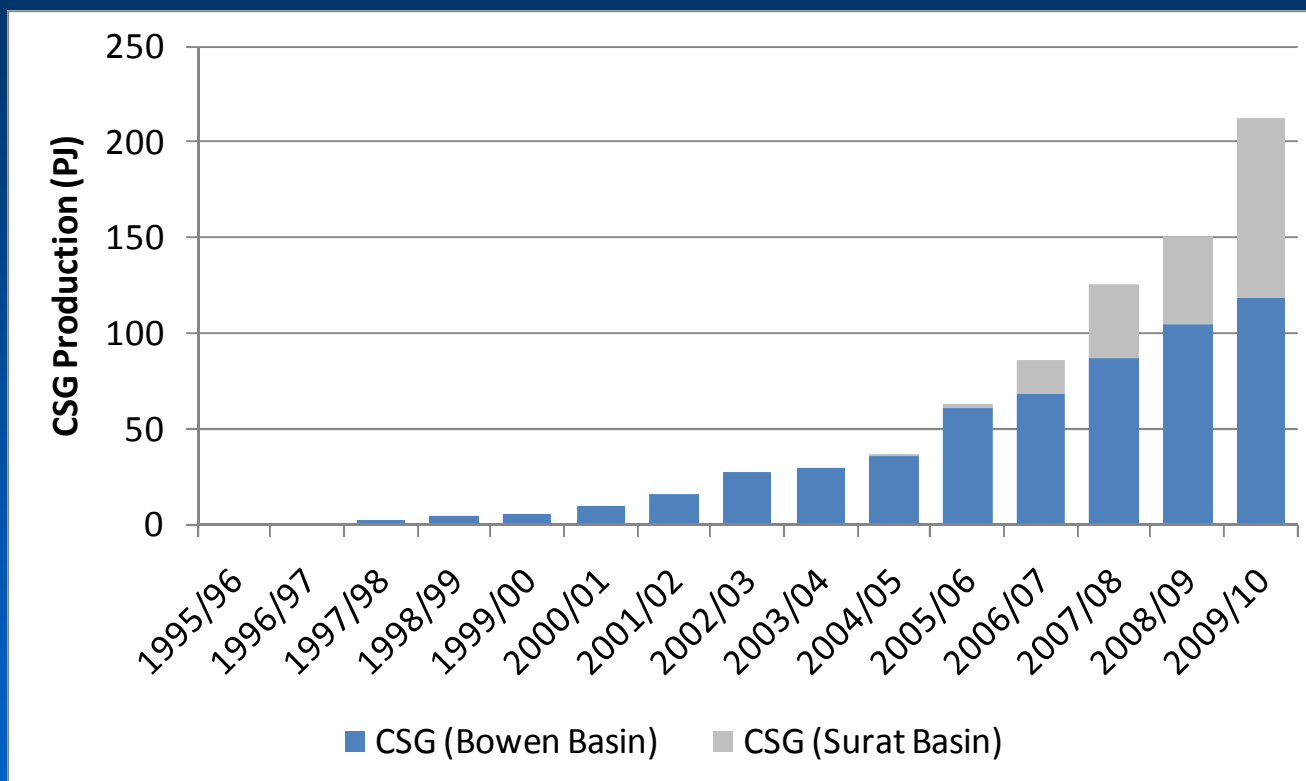
Queensland CSG Reserves



Data from Queensland Department of Employment, Economic Development & Innovation, Mines & Energy



Queensland CSG Production



Data from Queensland Department of Employment, Economic Development & Innovation, Mines & Energy

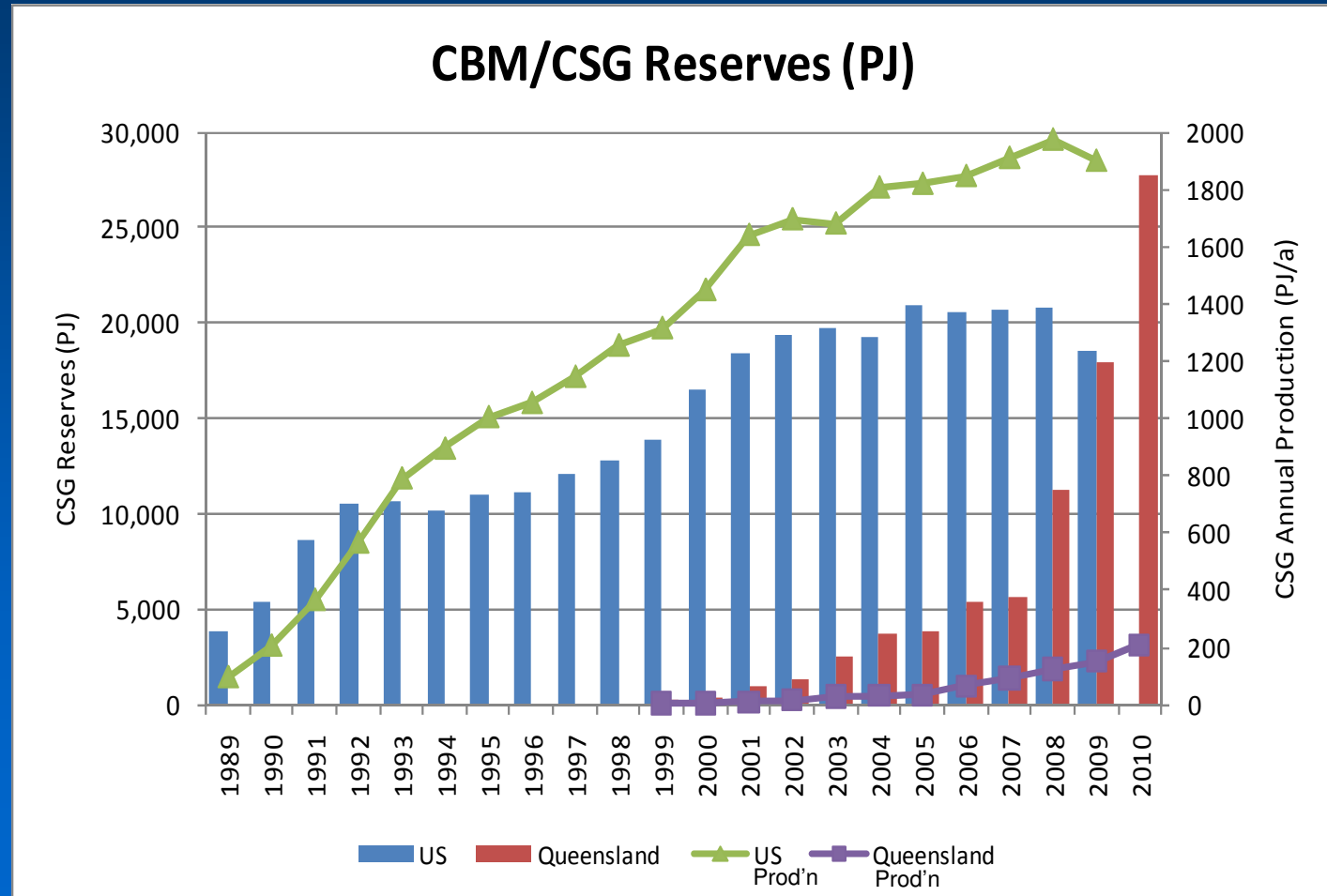


Comparison of US CBM and Qld CSG Reserves and Production

Reserves/
production
cover

US = 9.8
years

Qld = 132
years



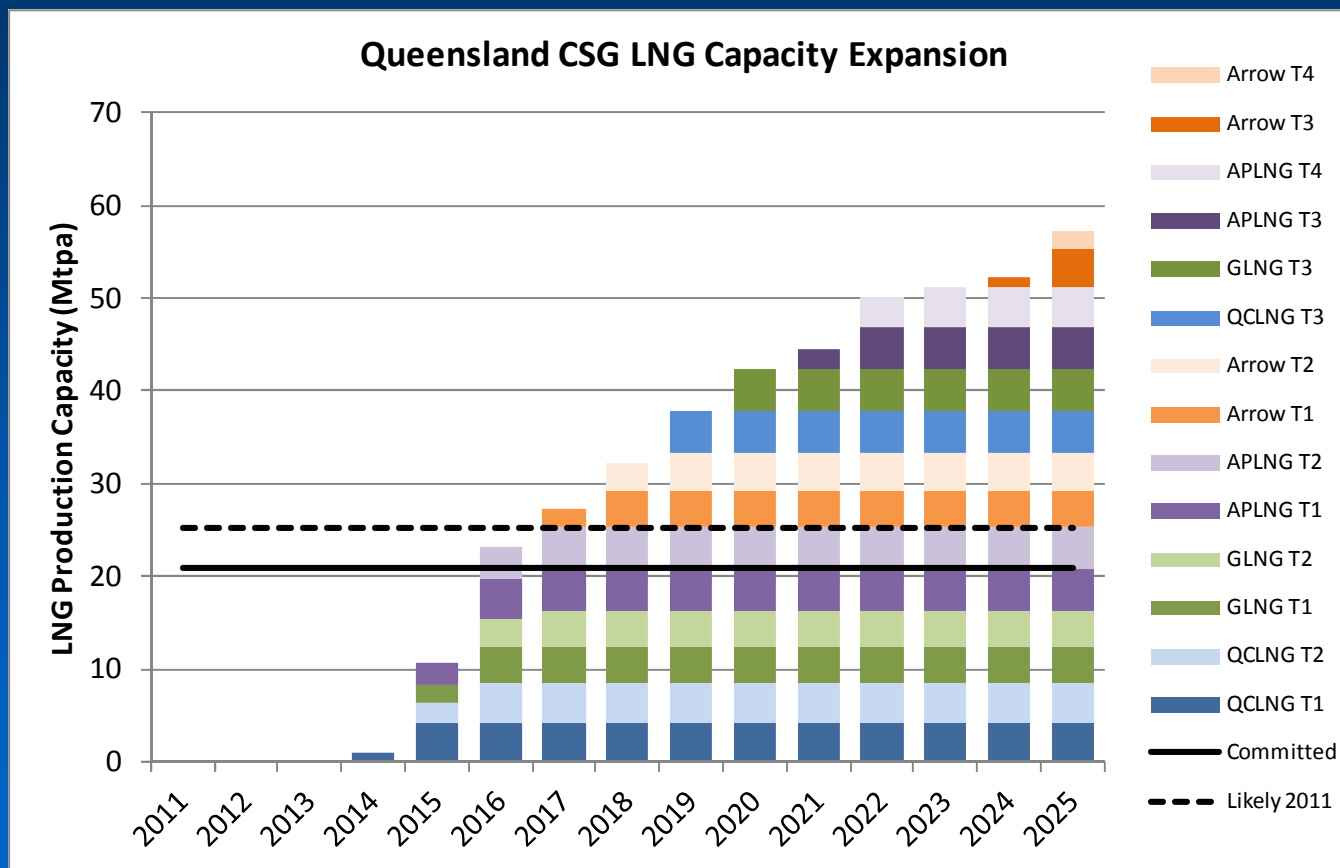
Source: EIA U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves; stated to be "proven" reserves. ACIL Tasman compilation of public domain data on 2P CSG reserves in Queensland

Queensland LNG proposals

- 4 active CSG-based LNG projects at Gladstone
 - BG/QGC: 4.25 mtpa train*2 -- NOW COMMITTED
 - Santos/Petronas/Total/KOGAS: 3.9mtpa trains *2 -- NOW COMMITTED
 - Origin/ConocoPhillips/Sinopec: 3.5 mtpa train * 2 to 4 – TRAIN 1 COMMITTED – TRAIN 2 FID 2011?
 - Arrow LNG (Shell Australia/PetroChina): 3.5 to 4 mtpa trains *2 to 4 – EIS PENDING; FIRST GAS 2016-17
- Potentially almost 60 mtpa LNG
 - 60 mtpa LNG = 3,600 PJ/a (approx 3,400 bcf) inc. gas used in production, compression, transportation & processing
- Around 5 times current East Australia domestic market of 730 PJ/a



Proposed Queensland CSG LNG developments



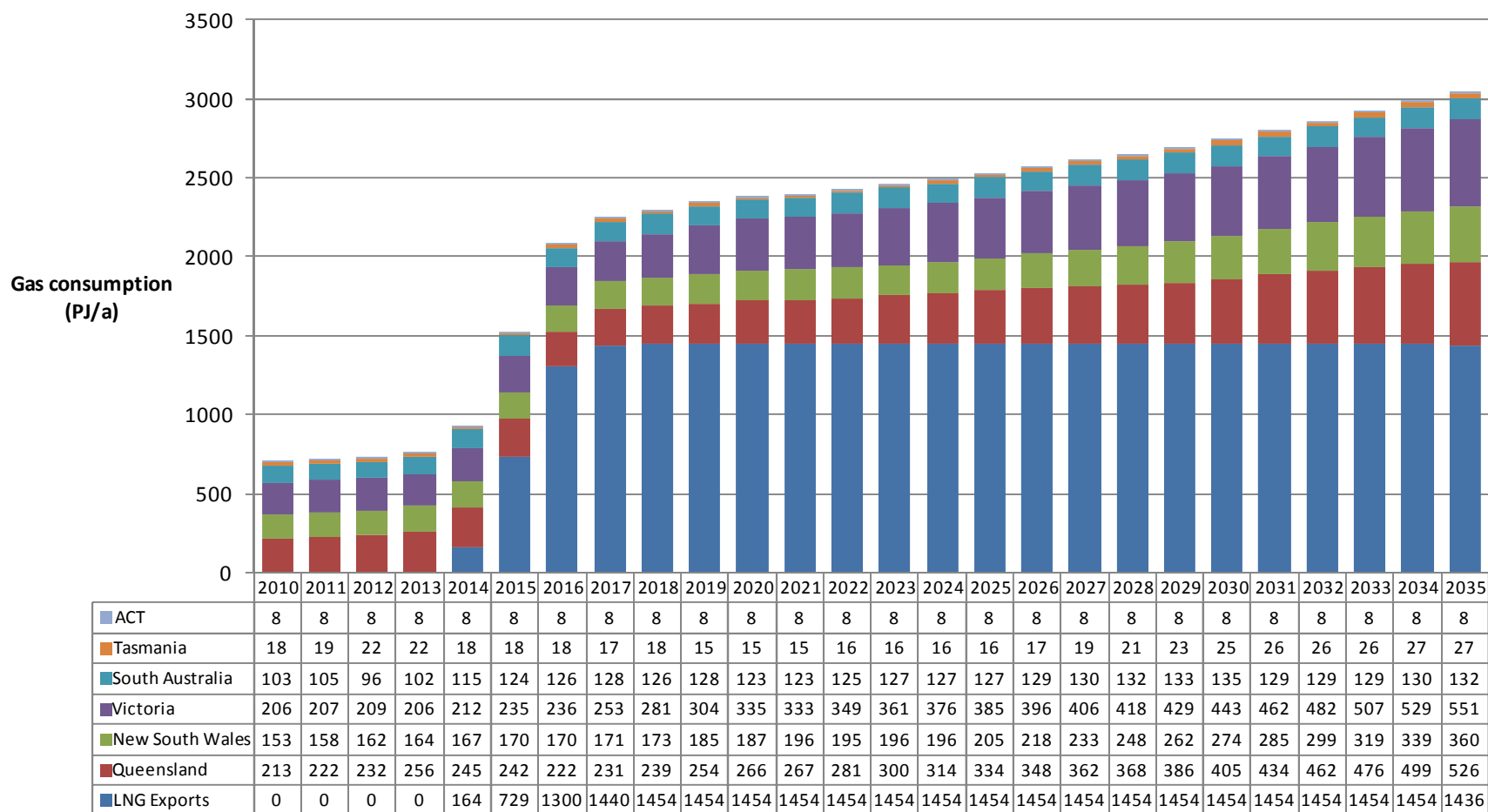
Source: ACIL Tasman compilation of public domain data

CSG LNG exports – supply & price implications

- Short term (to 2014): ramp-up gas/reserves dedication
 - Short term/as available low cost gas
 - Longer term contracts hard to get
- Longer term (post 2014):
 - Very large feed gas requirement potentially diverts cheap CSG from domestic markets
 - Exposure to international energy pricing: will this cause Eastern Australian gas prices to move to “international parity”?
 - Key issue: how does CSG production perform post LNG commitment



Impact on gas consumption



Source: ACIL Tasman gas market modelling



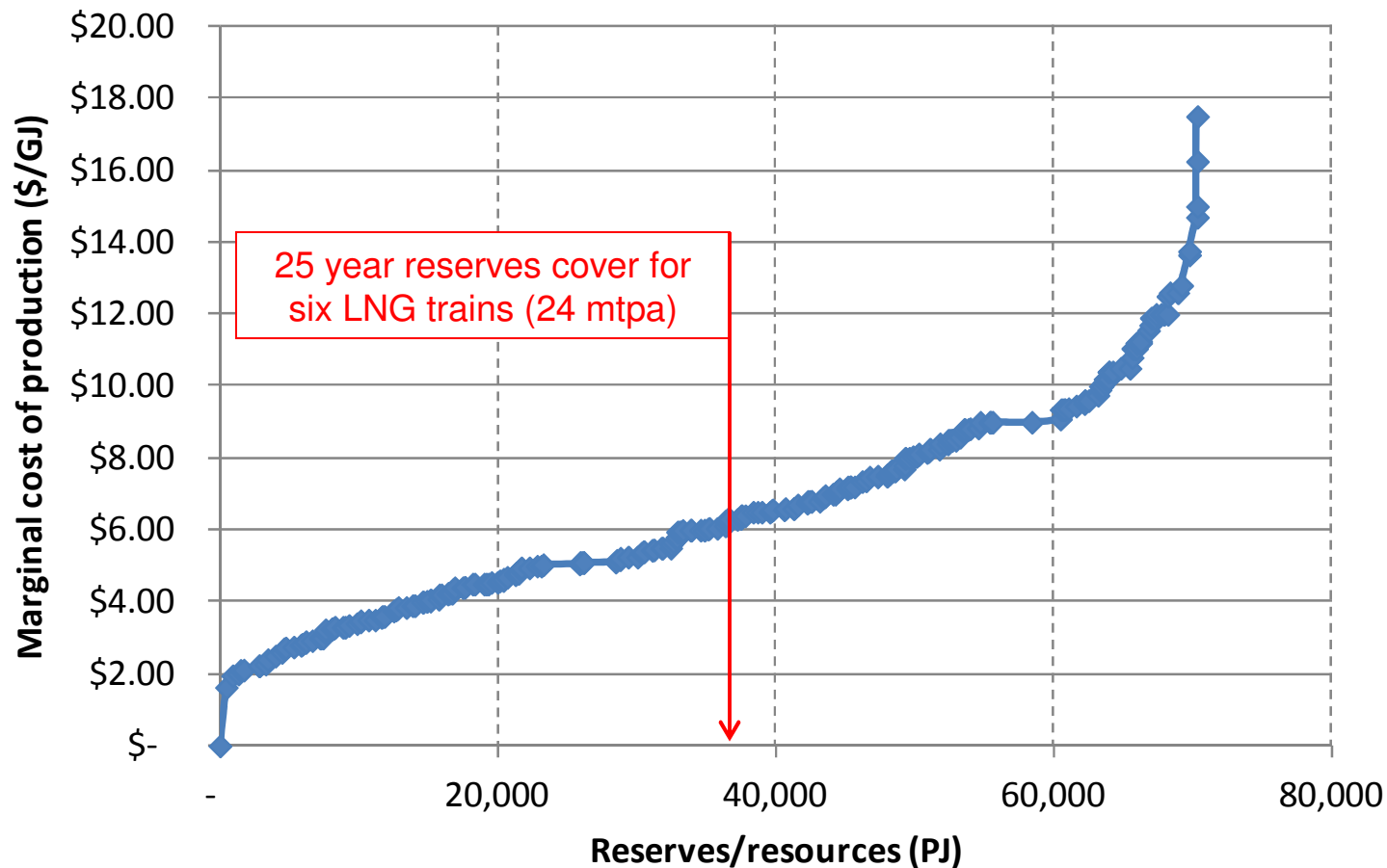
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Economic Policy Analysis

Impact on prices

- Will CSG LNG force domestic gas prices to LNG netback?
 - Not necessarily: depends on marginal cost of production to supply domestic market AND level of competition in supply
 - Marginal cost of production depends on CSG supply cost curve



Queensland CSG Supply Cost Curve



CSG LNG industry – implications for Queensland gas prices

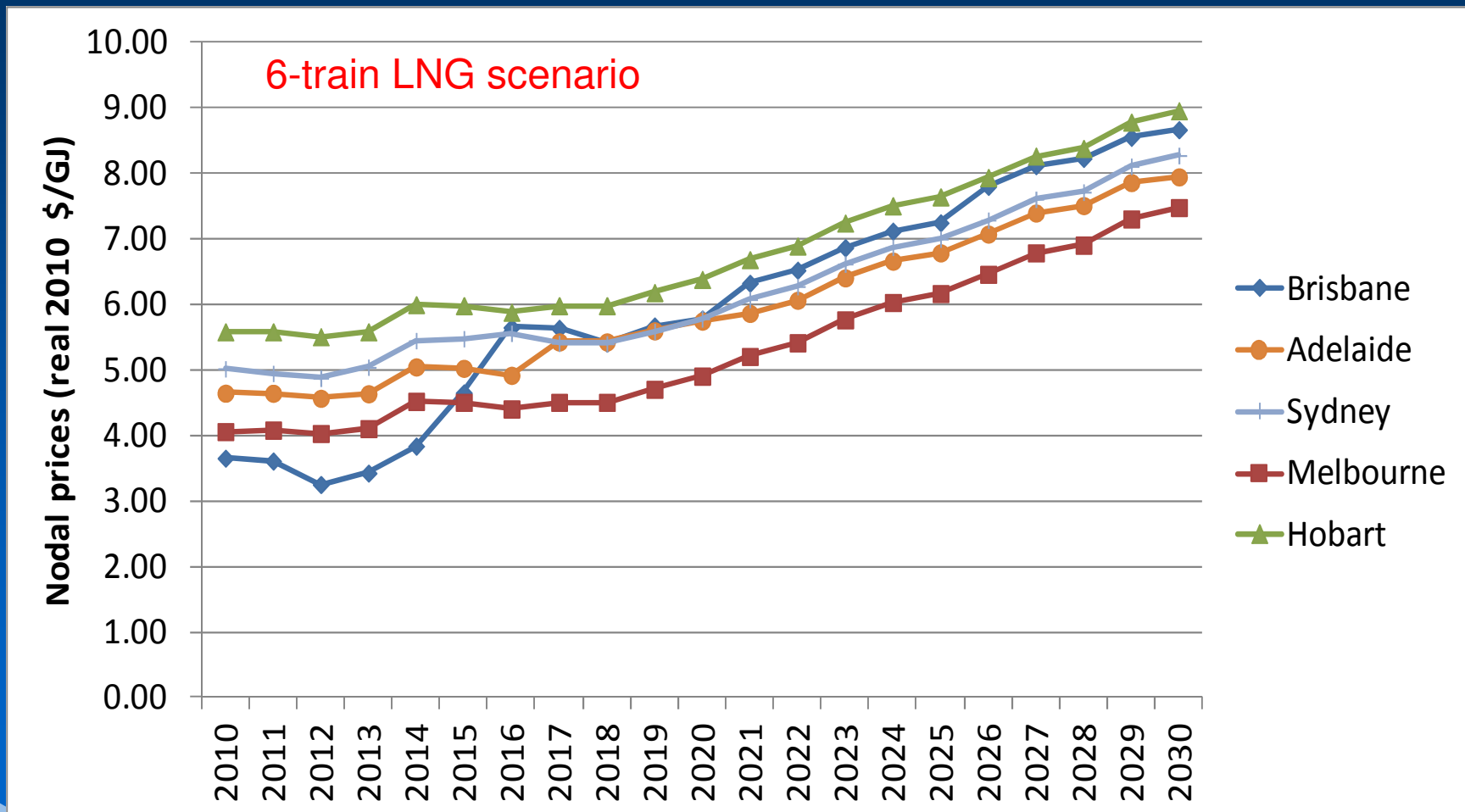
- Price risk now skewed to the upside
 - Availability of abundant low-cost marginal CSG for domestic use now increasingly unlikely
- It's not about the whole cost curve, but the sections of the cost curve controlled by individual LNG players
- If one project “sneezes” we all catch a cold:
 - No automatic flow through of “LNG netback” BUT faced with supply shortfall LNG producers will pay up to LNG spot price, adjusted for costs of feed transport and liquefaction



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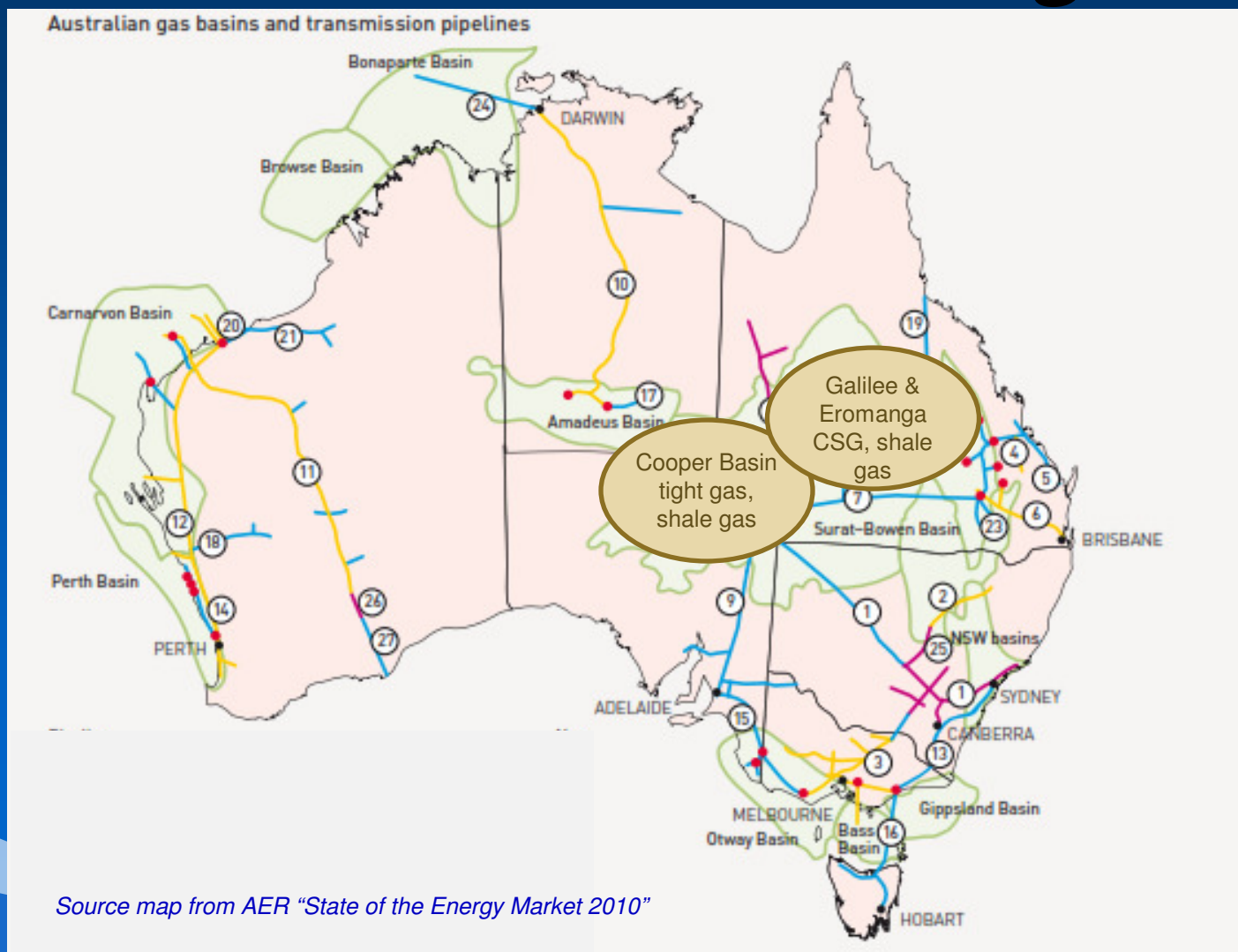
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Eastern Australia gas price projections

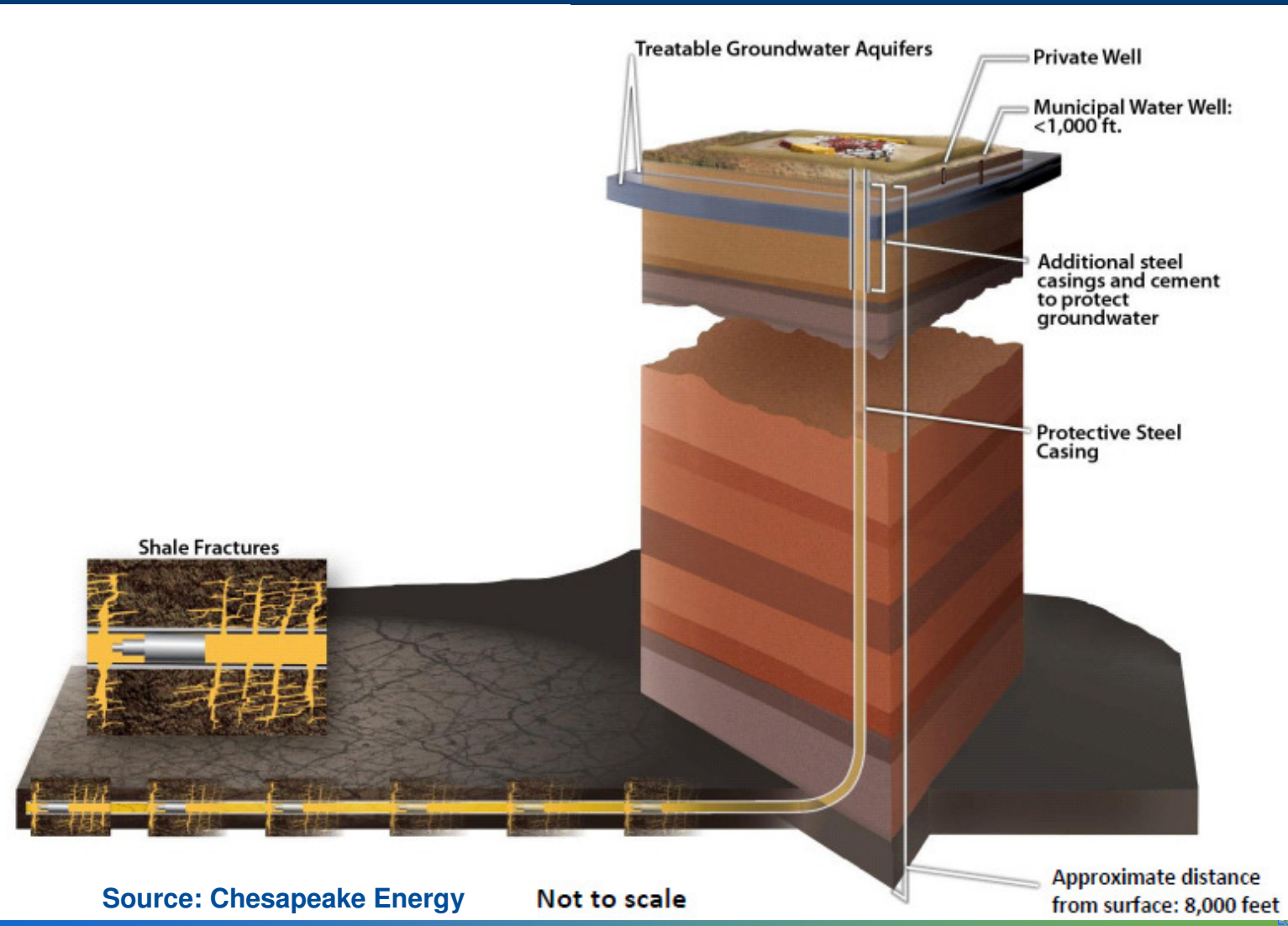


Source: ACIL Tasman *GMG Australia* modelling

Rising prices – an opportunity for unconventional gas?



Shale gas well schematic



Slide



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economic Policy Strategy

Shale gas production is technology intensive ...

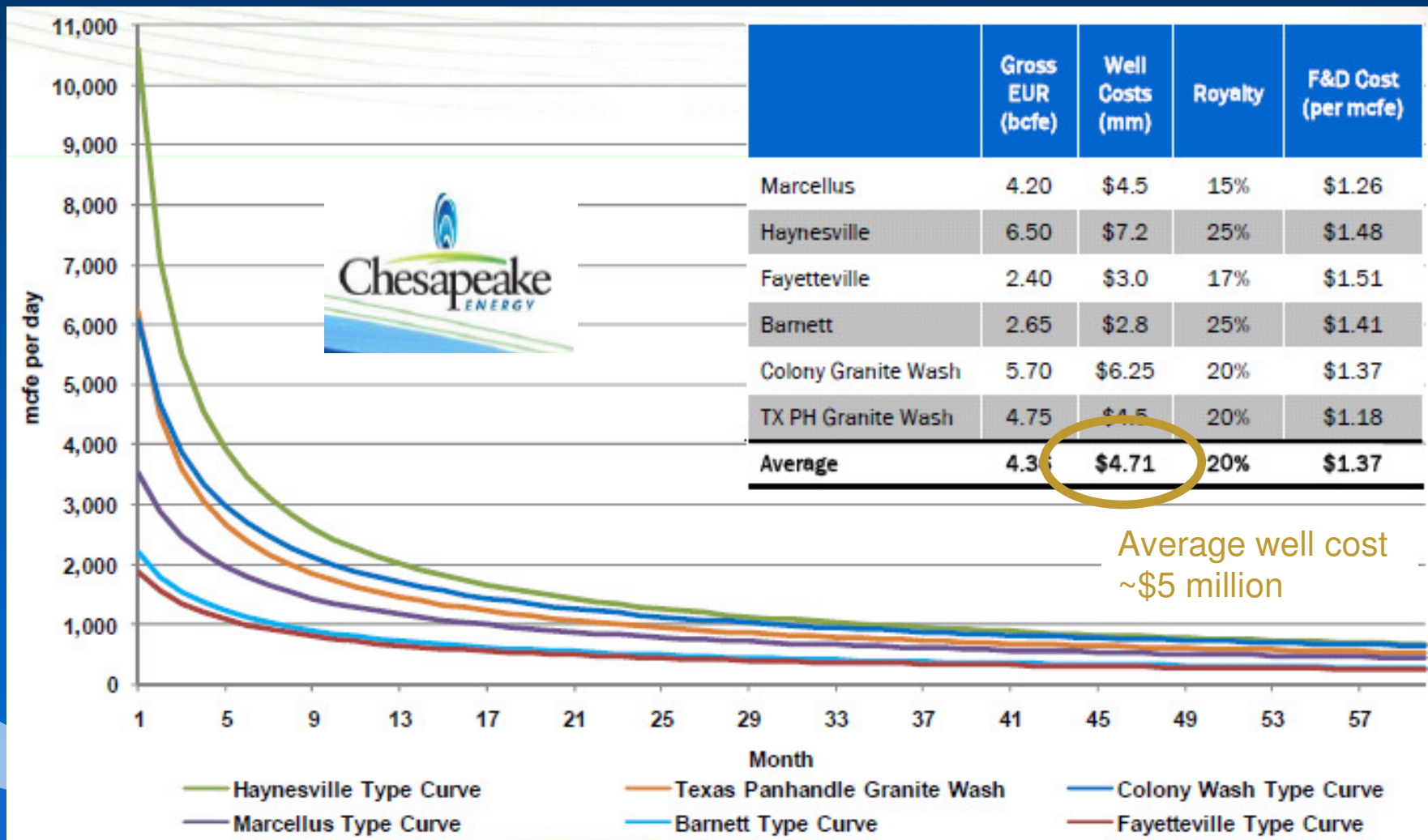
Source: Halliburton



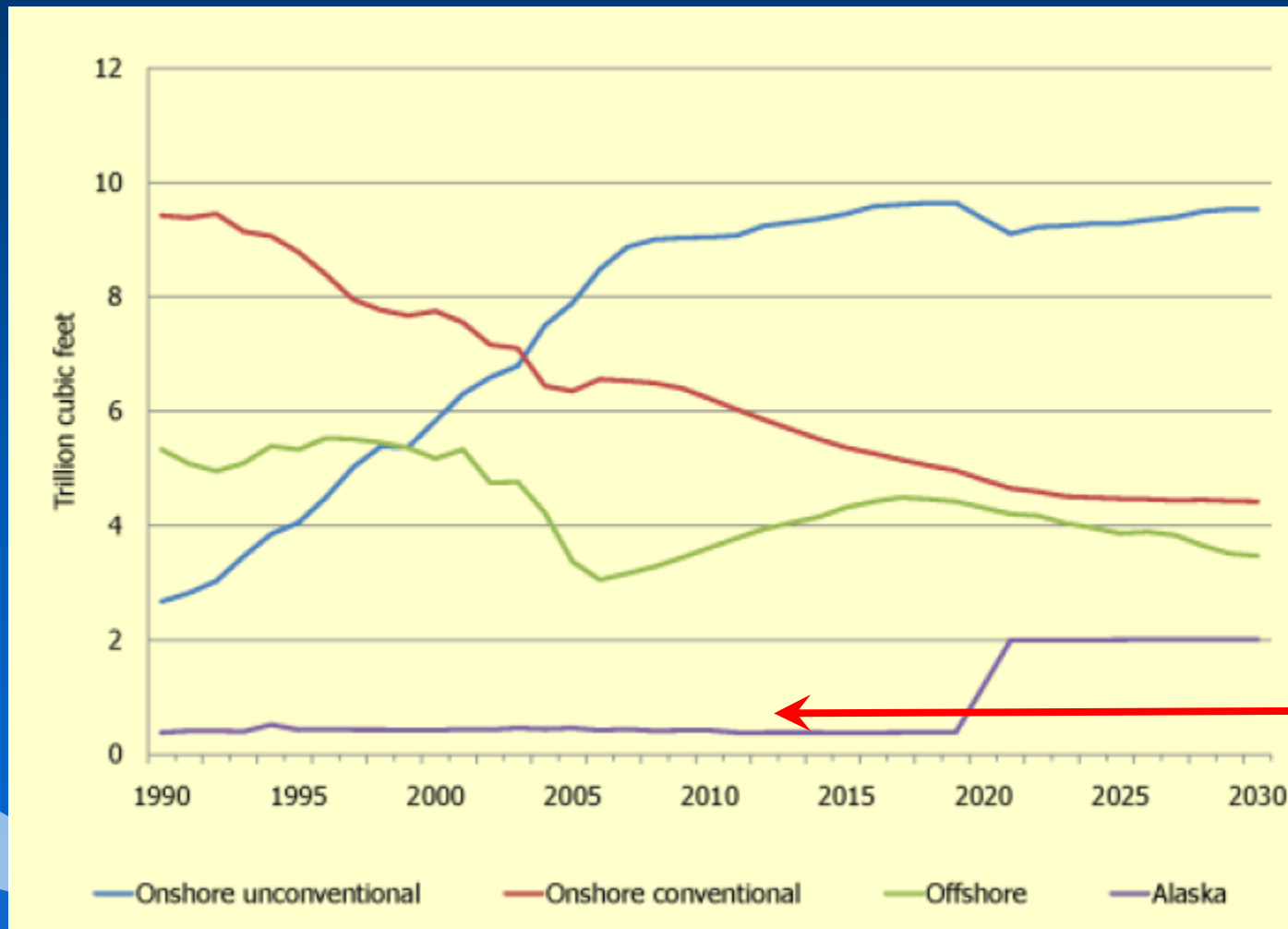
Slide 30

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Shale Gas well performance & cost

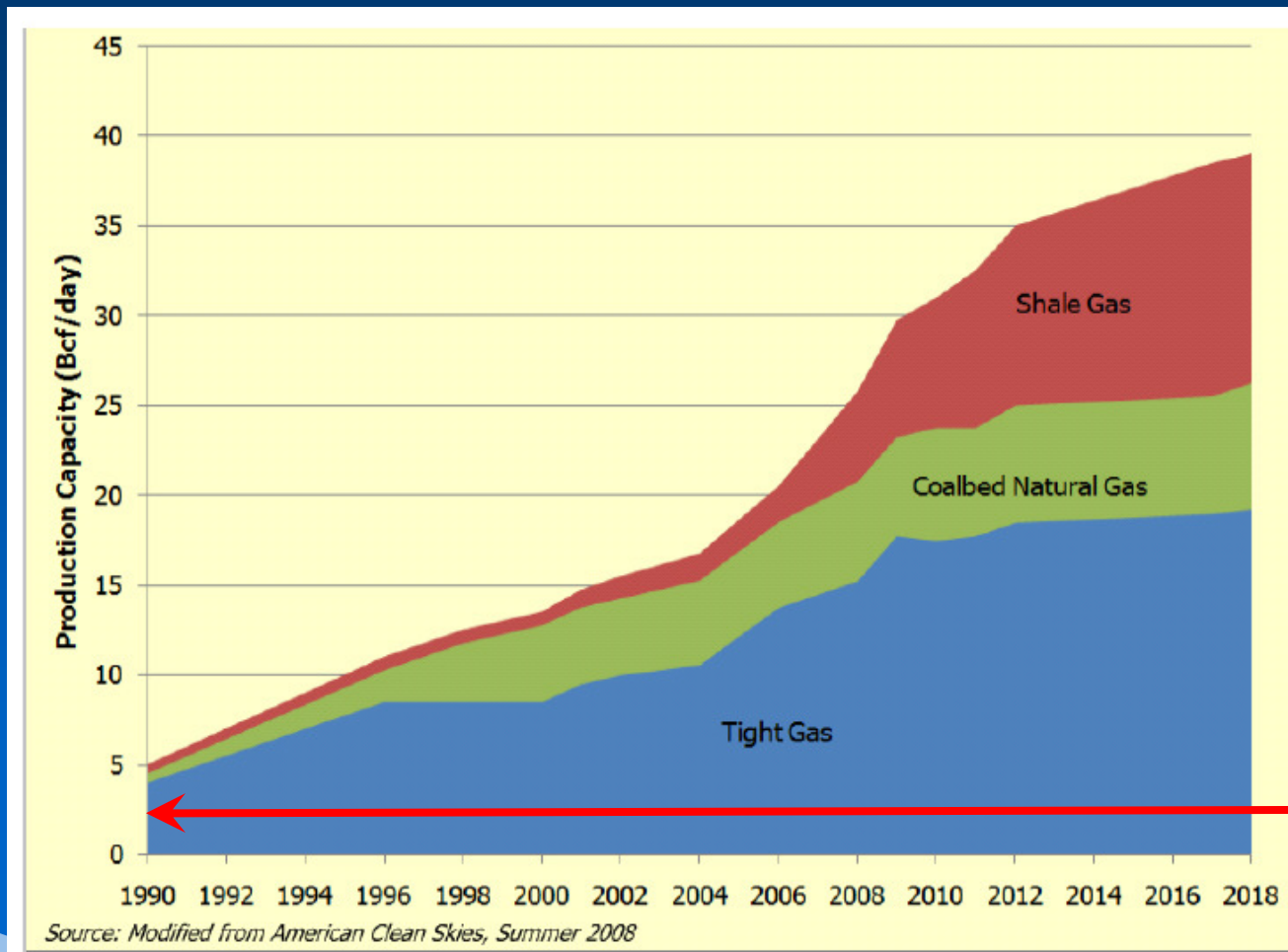


US Natural Gas Production by source



Current East
Australia Gas
Consumption
0.7tcf/yr

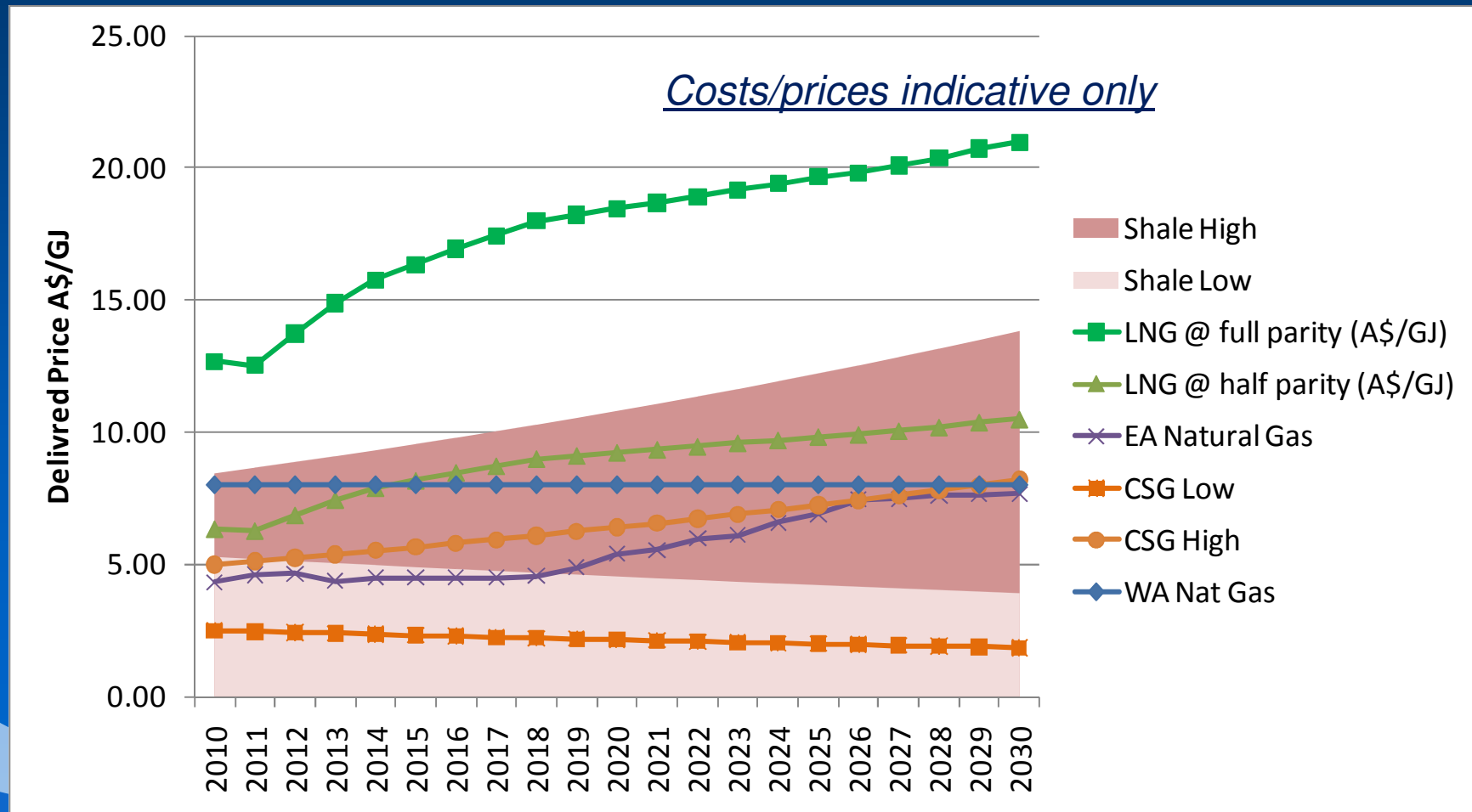
US Unconventional Gas Production



Total East
Australia
Production
2 bcf/day

US Department of Energy, 2009: 'Modern Shale Gas Development in the United States: A Primer'

Comparative economics of various gas sources



Source: ACIL Tasman analysis

Slide 34

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