Lessons from the Gas Crisis
Upstream Gas Supplier Perspective

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The gas crisis - what went well & what didn't?

Positives

- Co-operation of upstream companies enabled a quick supply response
- NWSP operated reliably during the crisis period
  - Well above normal rates – up to 750 TJ/d
- Market forces enabled efficient allocation among large consumers

Negatives

- At times customers were not taking their allocation out of the pipeline preventing NWSP from producing at maximum capacity
- Not enough transparency - allocation methods created tension among smaller customers
- IMO bulletin board did not have the support of DBP
- Impact on residential users
- Absence of an adequate State emergency plan for a sustained production interruption

WA's future security of supply

- **Risk of a production disruption is real** – plants rarely have 100% reliability
- **Market characteristics** - in the short term to 2012, highly dependent upon gas supplies from two gas plants
- **Upstream investment** – impact of higher gas prices on demand, particularly given the current global financial crisis
- **Supply outlook** - from 2012, the risk of major production interruption is likely to reduce as additional gas facilities come on line – Devil Creek, Macedon
- **Importance of LNG for WA gas supply** – large LNG offers best potential for large scale, lowest price WA gas supply

WA gas market characteristics

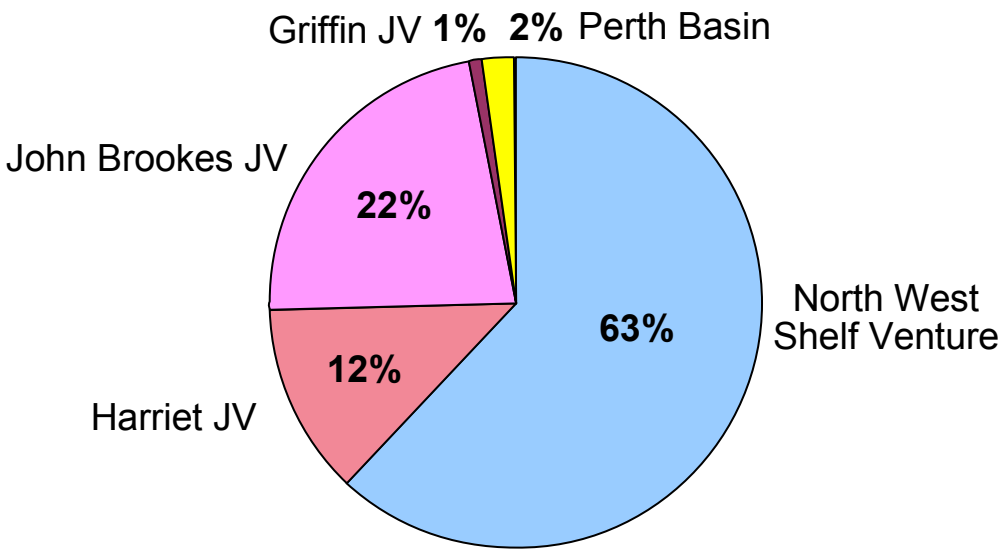
Supply

- NWSV produces 63% of WA's gas
- Varanus Island hub (Harriet & John Brookes JVs) produces 34%

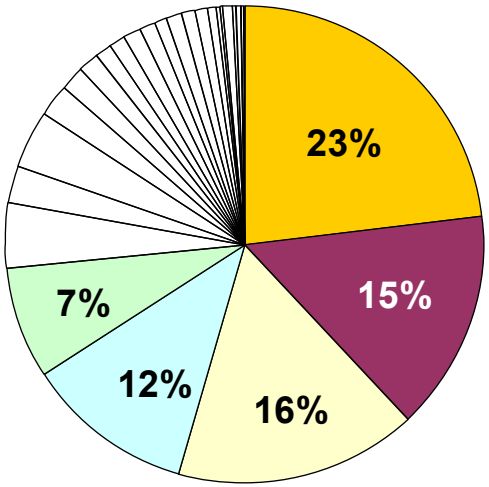
Demand

- Thin market ~40 supply contracts where 5 customers take 72%
- Challenge is aggregating demand to underpin a gas development of sufficient scale to provide economy of scale & reliability benefits

Current WA gas supply ~1000 TJ/d

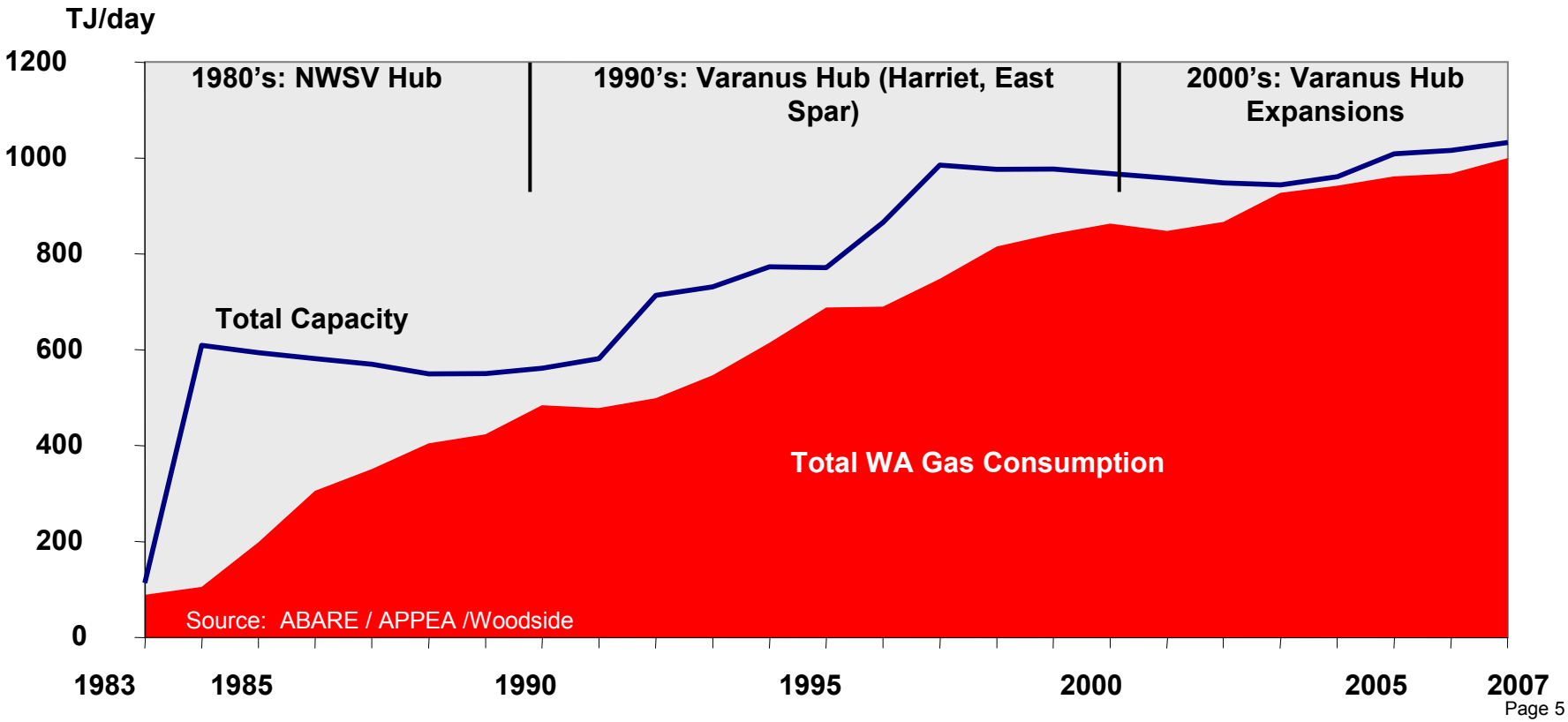


WA gas supply contracts ~1070 TJ/d



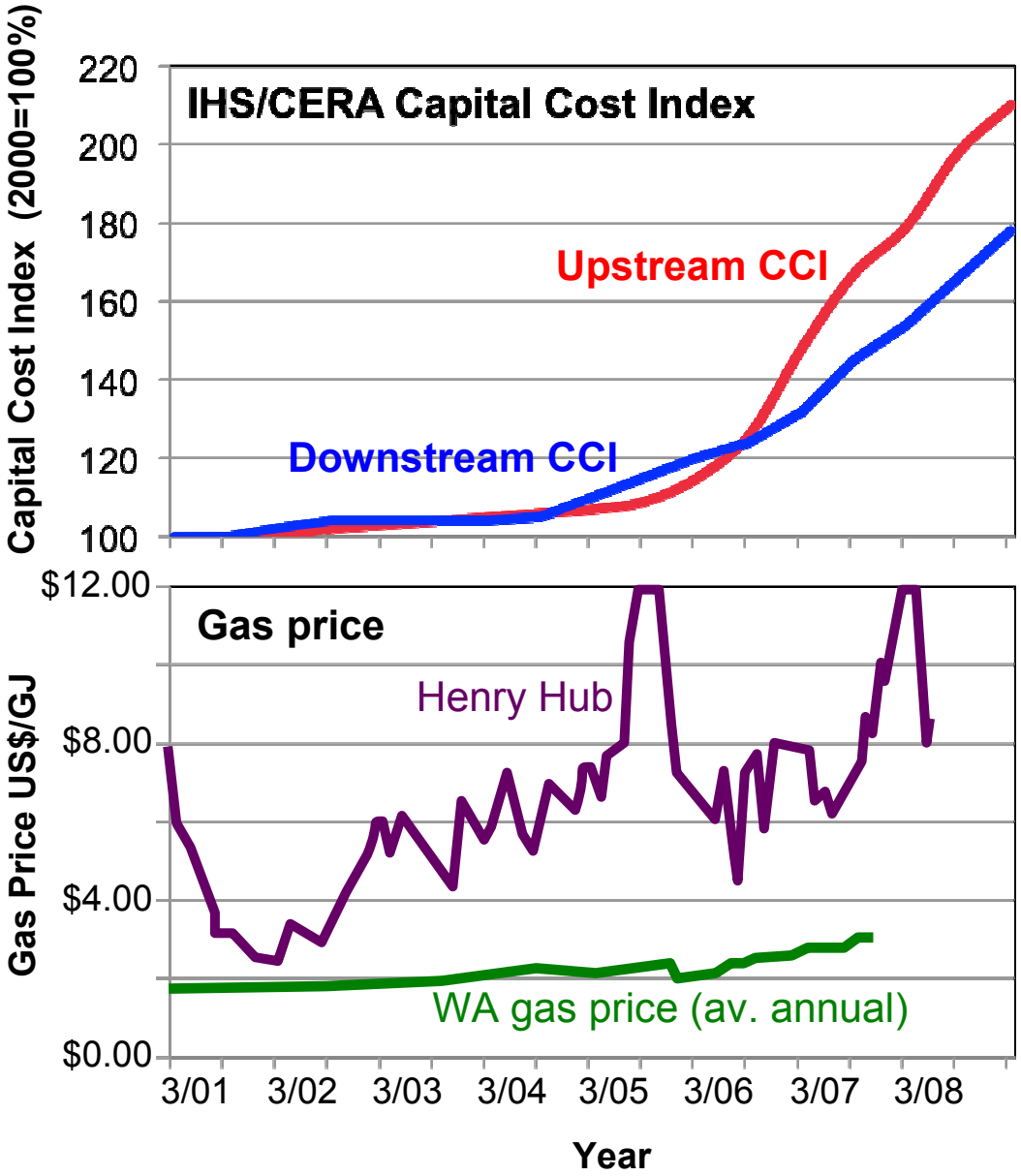
Domestic gas production currently depends on two gas processing centres

- High reliability of supply - NWSV 99% reliability over 24 yrs of operation
- Facilities producing at capacity due to recent rapid demand growth
- NWSV outage of 2 Jan 2008 highlighted need to “renew” contingency plans
  - Government, industry (upstream, midstream & downstream), customers had become accustomed to high reliability of supply



Investment in upstream gas business

- Up to 2005, demand could be met by existing capacity
- WA gas prices low until 2006
- Rising E&P capital costs from 2005 (doubling)
- New gas paradigm emerging - the cheap (to develop) gas is all committed
- Rapid increase in gas price since 2006 has triggered investment in new facilities
- …but 3+ year lag time for new supply development

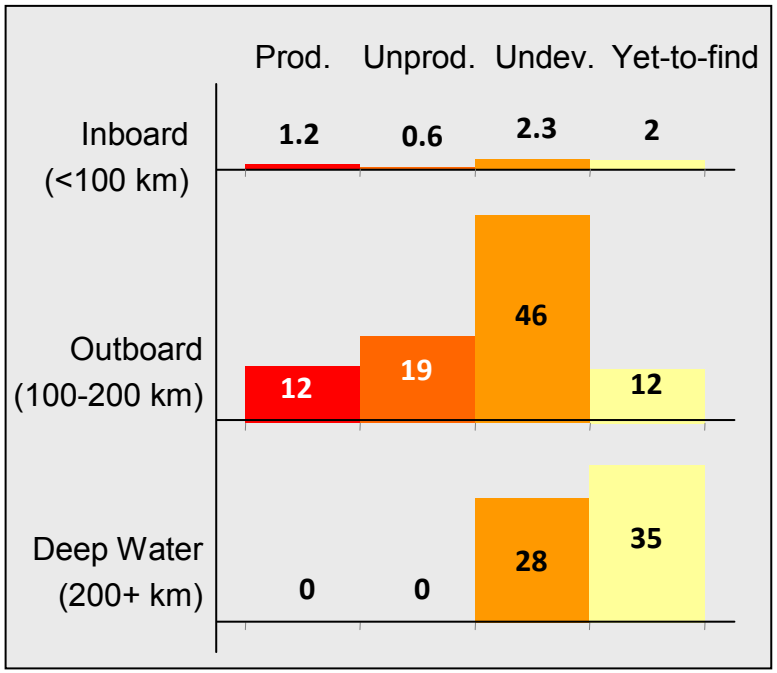


Source: HIS/CERA, Platts, WA Mineral & Petroleum Statistics Digest 2006

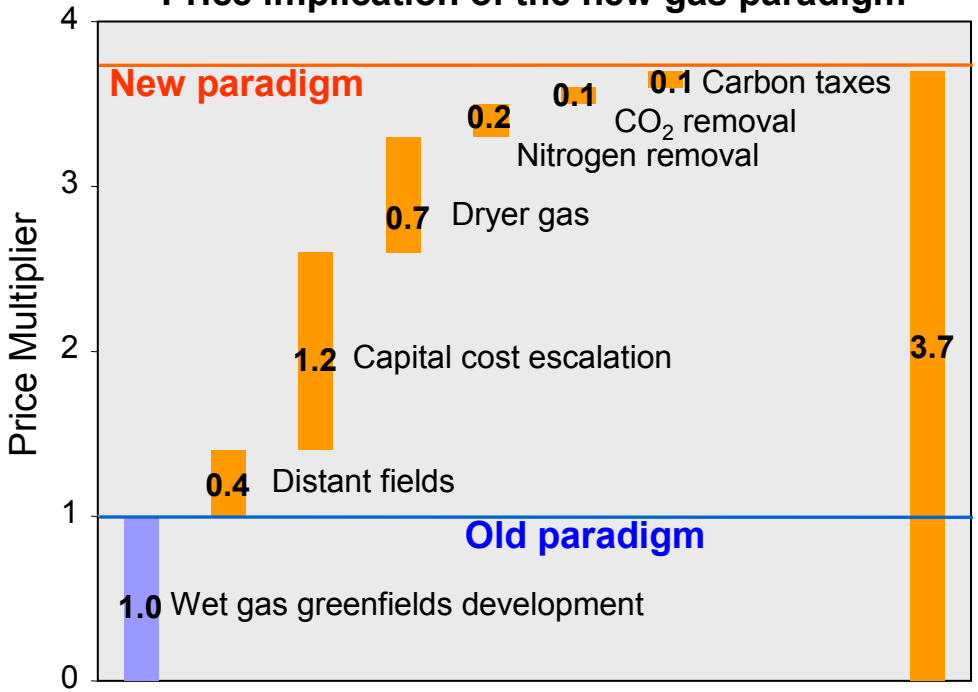
New gas paradigm

- WA has 140.5 Tcf discovered gas resources & 55 Tcf yet-to-find (Woodside)
- Low cost gas from the inboard Carnarvon is developed; low remaining potential
- Exploration focused further west – more **D**istant, **D**eeper, **D**ryer, **D**irtier gas
- Exploration results over last 2 years has confirmed this

Carnarvon Basin gas resources

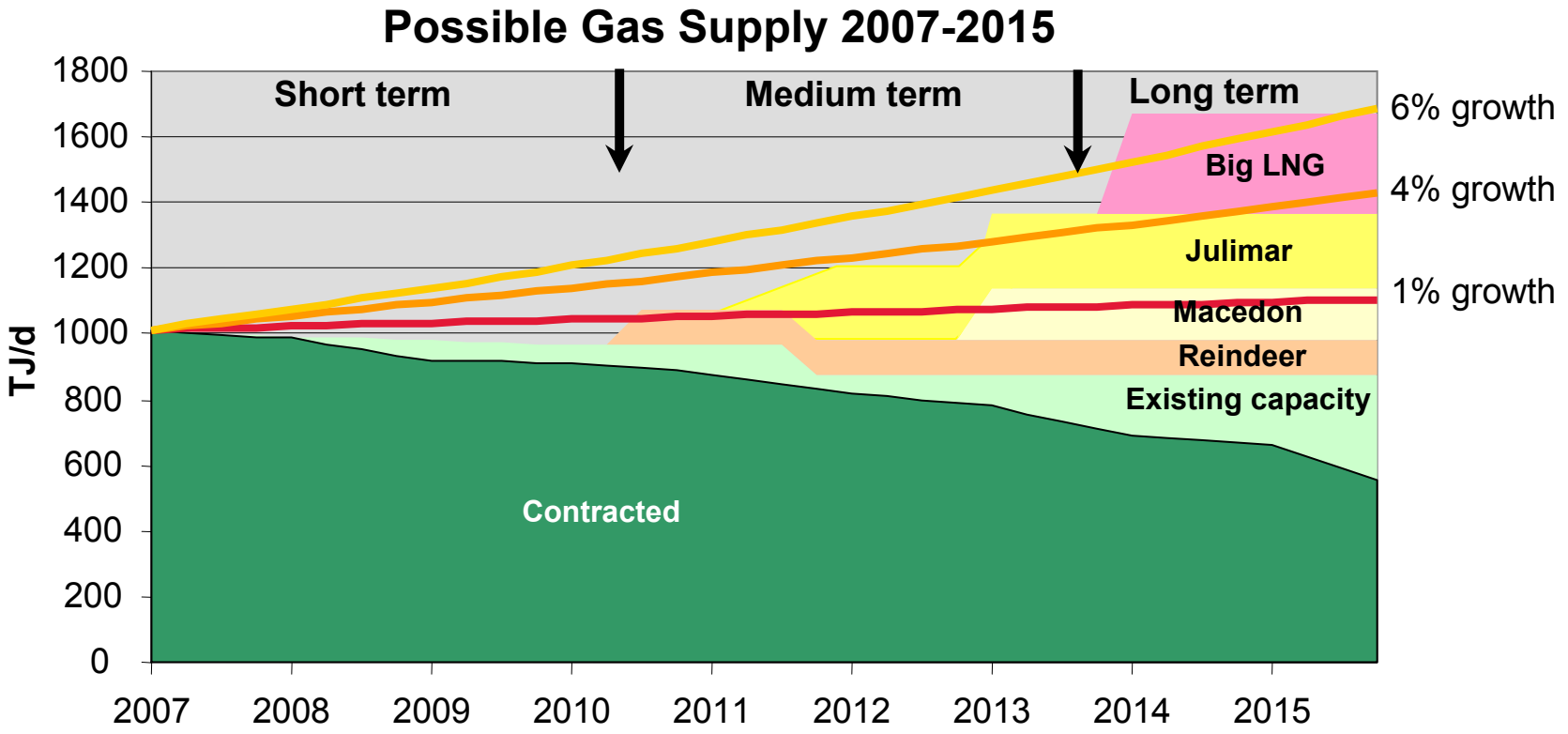


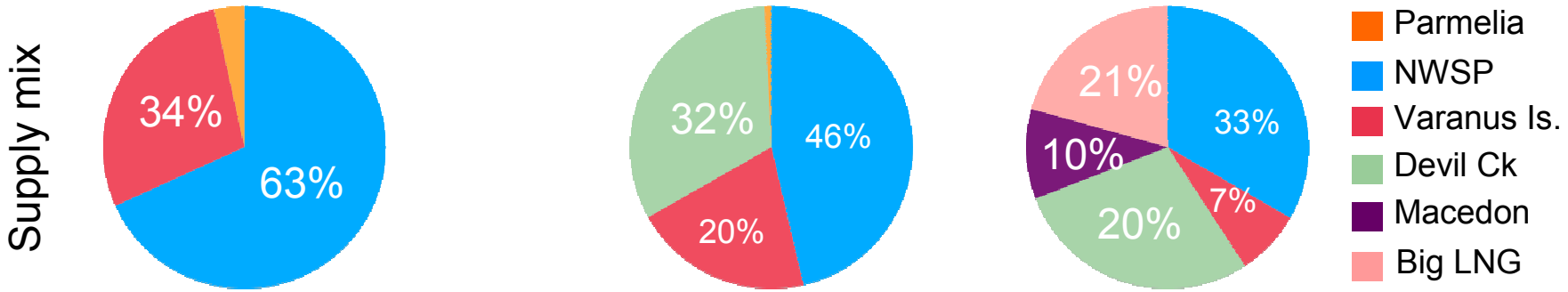
Price implication of the new gas paradigm



Supply outlook

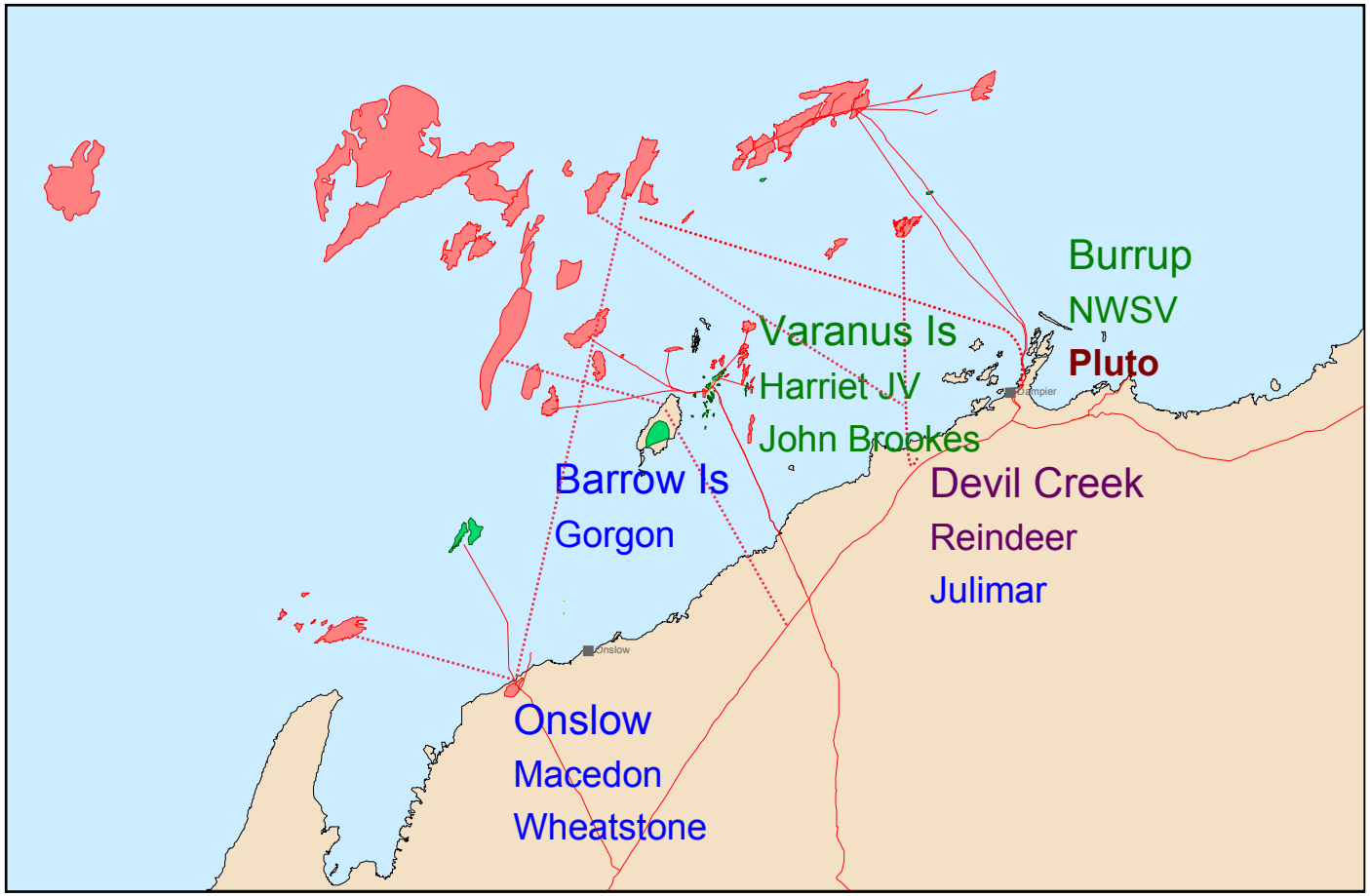
- Dependence on two plants unchanged in short term
- Improving diversity from 2012 with more fields producing & new gas plants





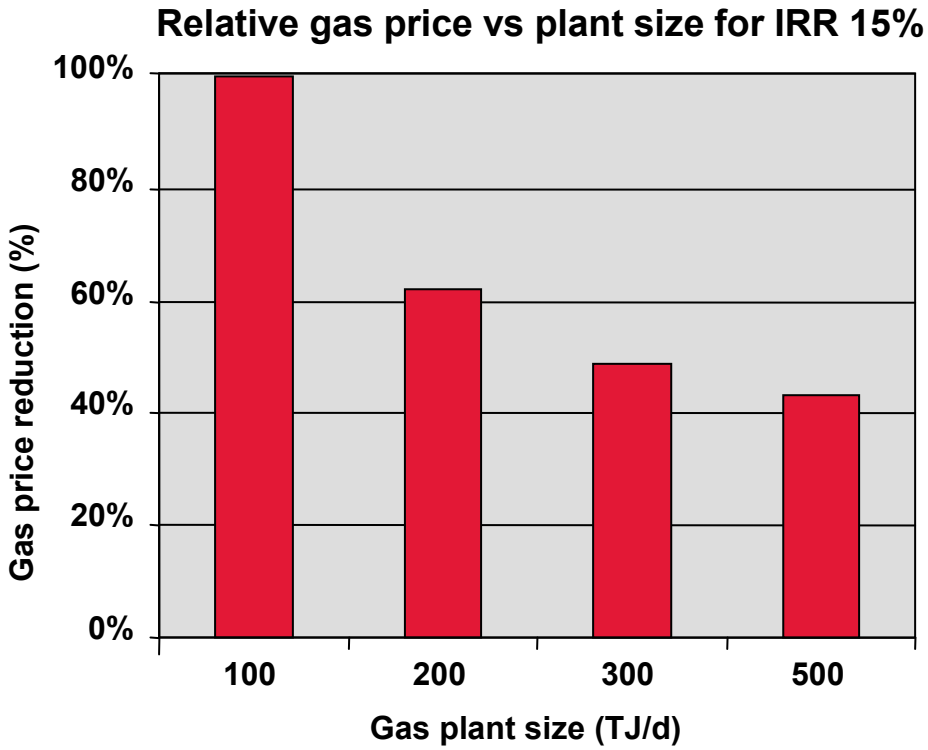
Increasing gas infrastructure diversity

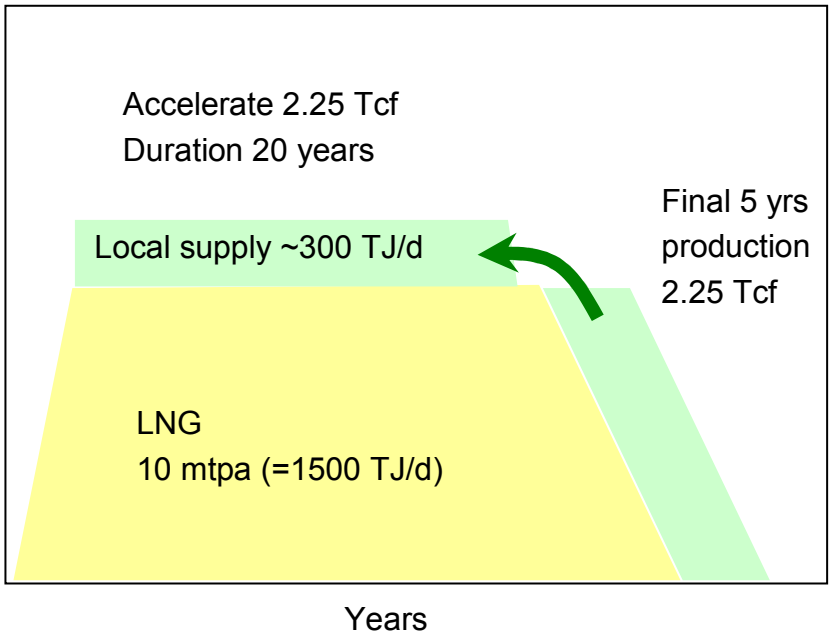
- Currently NWSV & Varanus Island production hubs
- New infrastructure being constructed – Pluto, Reindeer/Devil Ck
- Emerging infrastructure – Gorgon, Macedon, Julimar, Wheatstone
- Offshore pipelines are ~30-40% development cost: onshore plant ~25-35%



Importance of LNG for WA gas supply

- Several large LNG projects (>15 Tcf) likely to proceed
- Domestic gas supply adds value to big LNG
  - Domestic gas sales seen as a production acceleration opportunity for new projects
  - Different economic drivers to a greenfield domestic gas development
- Size matters - bigger plant size provides economy of scale - 50% reduction in gas price from 100 to 300 TJ/d for same IRR
- Bigger plant more likely with large LNG project





Conclusions

During the crisis period

- Overall good co-operation of upstream, midstream & downstream
- Need for improved transparency (e.g. National Gas Law, bulletin board)
- A single gas specification would give flexibilty in a crisis (Australian standard)

Outlook for supply diversity/reliability

- Short term to 2012 - still highly dependent upon gas from two plants
  - Historically high reliability but risk of interruption is real
- From 2012, the risk of major production interruption is likely to reduce as additional gas facilities come on line
  - Large scale LNG represents the best opportunity for additional local gas capacity – lower price & bigger capacity
  - The cost of gas development precludes creating redundancy in infrastructure
- Further gas developments are very dependent upon gas demand growth, gas pricing and capital costs trends

State energy contingency plan

- Need to re-establish an emergency plan to mitigate the risk of production interruption – e.g. strategic diesel reserves, gas storage etc