WA’S DOMESTIC GAS RESERVATION POLICY

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Outline

1. Western Australia’s domestic gas reservation policy
2. Project-by-project model
3. Estimates of the economic impact
Domestic Gas Reservation Policy

• LNG projects required to supply equivalent of 15 per cent of LNG exports to WA market

• Enforced using access to land for LNG plants

• **Outcome**: higher domestic gas supply and lower prices
Gorgon & Wheatstone to supply domestic gas under the policy

Ichthys & Prelude have avoided the policy
## Other Studies

<table>
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<tr>
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<tr>
<td>1. National Institute of Economic and Industry Research (2012)</td>
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<td>2. AEC Group (2012)</td>
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<table>
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<tr>
<td>3. Economic Regulation Authority (2014)</td>
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<td>5. ACIL Allen (2014)</td>
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<td>7. Simshauser and Nelson (2014)</td>
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Domestic Gas Reservation Policy

**Tax on production**
- reduces incentive to supply gas
- reduces incentive to invest in exploration and new gas projects

**Subsidy for consumption**
- gas-using industries benefit
- overall economy loses
- gas is diverted to users who value the gas less than the export market
Reservation policy of \( \alpha \% \)

For a given total supply, \( S \), amount sold on domestic market is \( D = \alpha S \)

Domestic price must fall below world price, \( P^W \), \( P^D = a - bD \)

Marginal price received is a weighted average \( P^M = \alpha P^D + (1 - \alpha) P^W \)

Producers choose \( S \) where marginal price equals marginal cost
GAS INDUSTRY MODEL
WA Domestic Gas Supply, 2014

- 50% NWS domestic
- 25% Varanus Island
- 15% Macedon
- 7% Devil Creek
- 2% Beharra Springs
- 1% Red Gully
- 0.2% Dongara
## Supply Side

<table>
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<tr>
<th>Description</th>
<th>Details</th>
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<tr>
<td>Market power on domestic market</td>
<td>Each project recognises that greater output reduces the domestic price</td>
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<tr>
<td>No market power on international market</td>
<td>Price taker for exports</td>
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<td>Heterogeneous projects</td>
<td>10 projects with different costs, capacities and reserves</td>
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<td>Large fixed costs</td>
<td>Past exploration and capacity investments constrain production (short run closure)</td>
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Profit Maximisation Problem

\[ \max_{q_{Di}, q_{Ei}, q_{Xi}, L_{Di}, L_{Ei}, L_{Xi}} \Pi_i = \]

\[ p_{Di}(\cdot)(1 - \delta_{Di})q_{Di} - w_{Di}L_{Di} - FC_{Di} \]
\[ + p_{E}(1 - \delta_{Ei})q_{Ei} - w_{Ei}L_{Ei} - FC_{Ei} \]
\[ - w_{Xi}L_{Xi} \]

Such that:

1) \( q_{Xi} = q_{Di} + q_{Ei} \)

2) \( q_{Xi} = R_i G_i (1 - e^{-\gamma_{Xi}L_{Xi}}) \)

3) \( q_{Di} = D_i L_{Di} \)

4) \( q_{Ei} = E_i L_{Ei} \)

5) \( q_{Di} \geq \alpha_i q_{Ei} \)

6) \( L_{Di} \geq B_i \)

7) \( L_{Xi} \geq 0, \quad 0 \leq L_{Di} \leq 1, \quad 0 \leq L_{Ei} \leq 1 \)
Varanus Island

Output (PJ)

MCd + MCx
MRd

$AUD

RG
Varanus Island

$\text{Output (PJ)}$

$\text{MCd + MCx}$

$\text{MRd}$

$\text{Actual Price level 2014 (less processing)}$

$\text{RG}$
Domestic Demand

- Aggregate price elasticity of demand -0.5
  - industry: -0.2
  - residential: -0.5
  - electricity: -0.9
IMPACT OF RESERVATION
Scenarios

1. **Baseline**
   Current market situation, export prices $10 AUD/GJ

2. **No Reservation**
   Gorgon and Wheatstone open *without* domestic plants, 
large NWS contract ends

3. **Reservation**
   Gorgon and Wheatstone open *with* domestic plants 
large NWS contract ends 
Direct addition of 38% of consumption
Industry impacts

**No reservation**

- **Domestic consumption**
  - Domestic prices
    - -9%
  - Exports
    - 131%

- **Exports**
  - Export prices
    - 0%

**Reservation**

- **Domestic consumption**
  - Domestic prices
    - -20%
  - Exports
    - 119%

- **Exports**
  - Export prices
    - 0%
Reservation Policy impact

Impact on Domestic Supply from existing projects

- NWS: 0%
- Varanus Is: -13%
- Macedon: -27%
- Devil Creek: -28%
- Beharra Springs: -42%
- Red Gully: -40%
- Dongara: -40%
Reservation policy impact

Impact on producer and consumers surplus: annual $AUD bn

- Consumer gain: 1.2
- Producer loss: -1.8
- Overall economic loss: -0.6
Reservation policy impact

Dead-weight loss: annual $AUD

- $13.50 Exports: $1.1
- $10 Exports: $0.6
- $8 Exports: $0.4

Dead-weight loss in annual $AUD for different export prices.
Concluding Remarks

• WA’s domestic gas reservation policy makes Australians worse off
  – lower domestic gas prices reduce production incentives
  – gas is diverted to lower-value uses
  – gains to gas users do not offset losses to producers

• Impact on small projects is proportionally larger due to higher marginal costs and less market power

• Additional losses expected from reduced investment
Reservation policy impact

Impact on producer and consumers surplus: annual $AUD

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<tr>
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<th>Total</th>
<th>Australian Share</th>
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<tr>
<td>Consumer gain</td>
<td>1.2</td>
<td>0.6</td>
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<tr>
<td>Producer loss</td>
<td>-1.8</td>
<td>-0.7</td>
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<tr>
<td>Overall economic loss</td>
<td>-0.6</td>
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