Resource corridors: A case study of the Pilbara, Australia

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Outline

• Overview of the Pilbara
• History of Pilbara development
• Key infrastructure issues
• Planning approaches
• Some lessons learned
The Pilbara Region is well located to supply Asia with minerals and energy products.
Minerals and energy output trends

At present, around 55 per cent of worldwide LNG capacity under construction is located in Australia. By 2015-16, Australia’s LNG exports are forecast to increase to 41 million tonnes, an increase of 126 per cent from 2010-11.

In 2015-16, iron ore export earnings are projected to reach $68 billion (in 2010-11 dollars), as strong growth in export volumes offsets lower prices.
Australia’s engineering and construction challenge – the largest investment wave since the 1800s gold rushes*

WA & NT projects to 2016: USD220 billion+

Queensland projects to 2016: USD100 billion+

South Australia projects to 2016 USD30 billion+

*Reserve Bank, Australia
Value of minerals and energy production, Pilbara 2011

<table>
<thead>
<tr>
<th>Minerals</th>
<th>Value $</th>
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<tbody>
<tr>
<td>Iron Ore</td>
<td>60,299,259,089</td>
</tr>
<tr>
<td>Gold and Silver</td>
<td>1,006,350,527</td>
</tr>
<tr>
<td>Copper</td>
<td>643,177,118</td>
</tr>
<tr>
<td>Manganese and Salt</td>
<td>585,203,389</td>
</tr>
<tr>
<td>Construction Materials</td>
<td>71,714,696</td>
</tr>
<tr>
<td>Tantalite, Tin and Gems</td>
<td>59,601,079</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62,665,305,898</strong></td>
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<tr>
<th>Offshore Petroleum</th>
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<tbody>
<tr>
<td>Crude Oil and Condensate</td>
<td>12,004,239,925</td>
</tr>
<tr>
<td>Liquefied Natural Gas</td>
<td>9,344,019,455</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1,400,884,445</td>
</tr>
<tr>
<td>LPG Butane and Propane</td>
<td>745,879,960</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23,495,023,785</strong></td>
</tr>
</tbody>
</table>

The Pilbara generates ~ 80% of WA’s minerals and energy production value of $107 billion (2011)

<table>
<thead>
<tr>
<th>Other sectors</th>
<th>Value $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>350,000,000</td>
</tr>
<tr>
<td>Agriculture</td>
<td>50,000,000</td>
</tr>
<tr>
<td>Retail</td>
<td>400,000,000</td>
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</tbody>
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The Pilbara has a Gross Regional Product larger than some Australian states, but most flows elsewhere – including to Perth and as returns to capital.
Pilbara development timeline

1960s
Iron ore deposits delineated; first mines, railways, ports and towns established; population <10000

1970s
Further mines and towns established; offshore petroleum deposits delineated

1980s
Growth of iron ore production; North West Shelf Venture LNG project commissioned; manganese and gold mining started

1990s
New mines; Growth of iron ore production; salt production started; expansion of NWSV project

2000
New mines; Growth of iron ore production; expansion of NWSV LNG project; start of Pluto LNG project

2010
Growth of iron ore production; Gorgon and Wheatstone LNG projects started; population 45,000

2020
Iron ore 600 Mtpa (+150% on 2010) LNG 50 Mtpa (+200% on 2010); population 60,000?
Pilbara infrastructure investment

- Early development 1960s – 1980s
  - three iron ore companies, one LNG operation, two salt operations
    - steady growth, short term planning
  - companies provided most infrastructure – rail, ports, water, power, housing, community infrastructure
    - production infrastructure (rail, ports, power, water) used only by owner – rail and ports part of production chains
  - government provided roads, power and water distribution, and education and health facilities, plus multi-user facilities such as port channels
  - focus of governments was on ‘value added’ processing
Pilbara infrastructure investment

Development since 2000

- Multiple iron ore companies, four LNG operations, several other mining operations
  - rapid growth, multiple options, long term planning
- Companies provide production infrastructure – rail, ports, water, power, employee housing
  - production infrastructure (rail, ports, power, water) used mostly by owner – rail and ports part of production chains
- Sharing of ports, future sharing of rail
- ‘Normalisation’ of towns – several now support multiple company operations
- Governments provide community infrastructure; develop towns
  - shortage of housing and community facilities and services (eg, education and health)
Aspirational Pilbara production represents a quantum shift in output

Iron ore

Oil and gas (LNG)

Source: Draft Pilbara Planning and Infrastructure Framework 2011
Infrastructure planning changes

- **Overall**
  - Cooperative planning within agreed growth parameters
  - Hypothecation of royalty revenues to fund infrastructure

- **Ports**
  - Move to multi-user ports to allow for investment diversity

- **Rail**
  - Future multi-user railways with independent operator
Pilbara Planning and Infrastructure Framework – consolidation of towns
Infrastructure planning changes (2)

- Roads
  - Long-term planning, increased government investment,

- Land, housing and community infrastructure
  - Long-term planning; coordination between companies and government

- Energy
  - Government seeking to establish Pilbara electricity grid

- Water
  - Cooperation between companies and government
Utility infrastructure
Differences in Pilbara population projections – Pilbara Industry Community Council (2010) and WA Planning Commission (2011)

WAPC assumes further mining investment and economic transformation beyond 2015

PICC assumes construction will tail off from 2015
Karratha growth plan
What we have learned

• Early planning and coordination is essential to
  ● ensure infrastructure is delivered
  ● maximise utility and efficiency

• Partnerships between government – mining industry – infrastructure providers needed
  ● but government needs to be careful about getting involved in mining business

• Predicting the future is very difficult
  ● uncertainty can be (part) managed though options
  ● managing risks and rewards essential for infrastructure investment

• *Resource corridors* provide holistic approach

• Efficient integrated production chains are vital for competitiveness of mining operations
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