

Commercialisation of South Island Coal Seam Gas

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Gas

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Outline of presentation

- **Background**
- **The resource**
- **Some potential uses**



Background – L&M Permits

- Had 13 permits
- Now hold seven
- Total Area:
2,225km²
- Total coal
tonnage + 3.6B
tonnes



Preliminary Work programme

- Literature reviews
- Core drilling and sampling
- Desorbtion and isotherms
- Single well modelling
- Preliminary programme completed in 10 permits
- Programme in progress in 3 permits (North Waikato, Winton and Home Hills)
- Preliminary work led to surrender of six permits (5 in Sth Island).

Work Programme - Detailed Evaluation

- **Mini – pilot testing**
- **History matching and 3D modelling**
- **Commercialisation Studies including engineering design**
- **Environmental studies**
- **Programme completed at Maramarua and Kaitangata, Mataura**
- **Programme in progress at Hawkdun & Ohai**

Well Testing Installations



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The Resource

Gas Quality

Gas %	Hawkdun	Ohai	Maramarua	Kaitangata
Methane	90.58	98.21	91.72	99.84
Carbon dioxide	8.42	0.37	7.11	0.11
Ethane	0.04	0.29	0.01	0.03
Hydrogen	0.08	0.00	0.03	0.02
LHV/HHV MJ/m ³	30.77 / 34.15	33.50 / 37.20	31.2 / 34.6	33.6 / 37.2

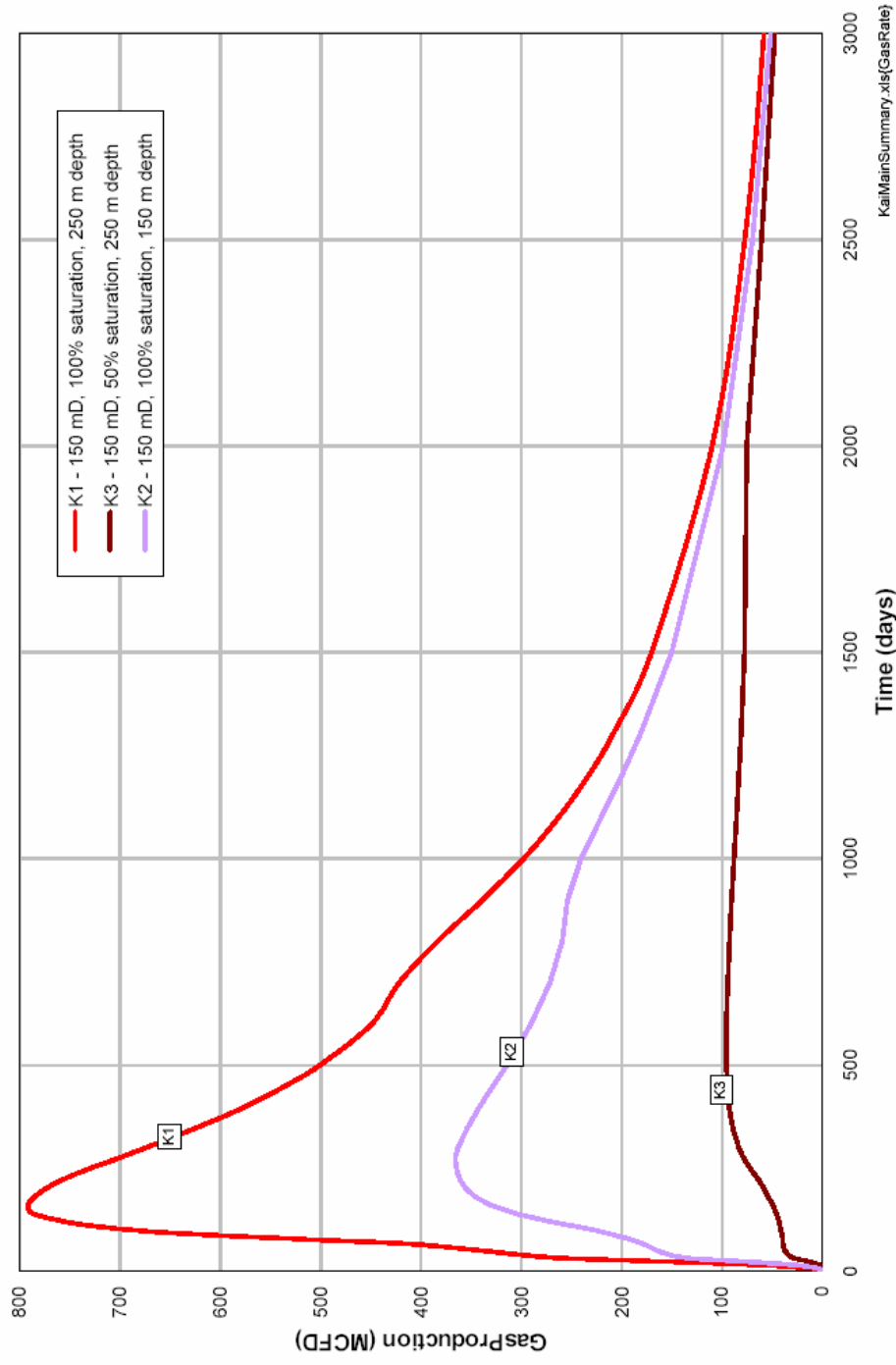
The Resource

Gas Quantity

Permit/field	Potential Resource PJ
Maramarua / Nth Waikato	90
Hawkdun / Home Hills	50
Kaitangata	40
Ohai	105
Winton	?50
Total	? 335

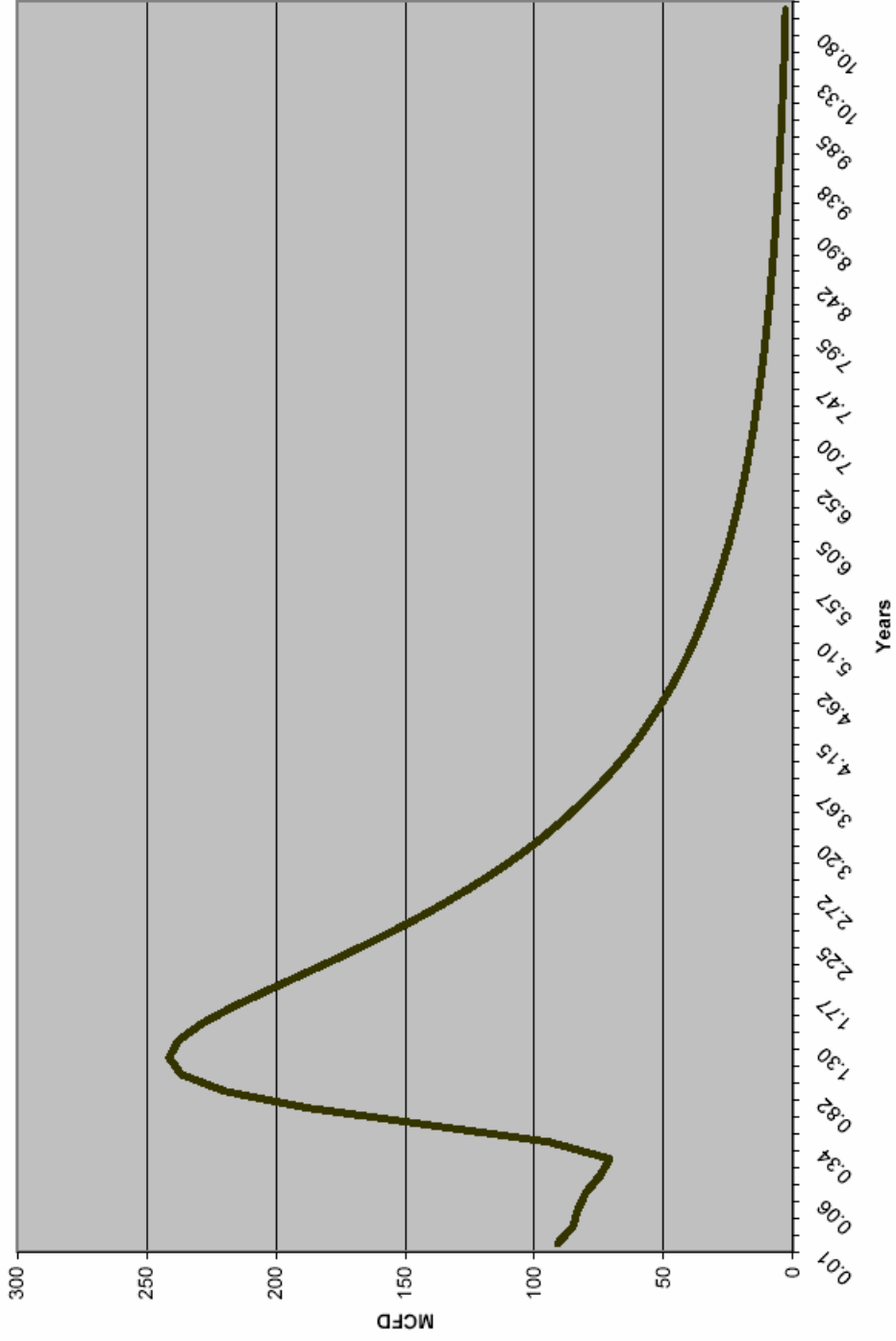
The Resource Deliverability

- **Kaitangata Model by GeoGas**



The Resource Deliverability

Hawkdun Gas MCF/day



Potential Uses

Power Generation

Two systems: gas production and power generation

- **Gas production from well field of up to 30 wells depending on flow rates**
- **gas treatment restricted to water knock out & engine filter**
- **No compression necessary**

Power generation in 5MW multiples

- **Plant – gas engine gen sets: Single units**
- **Each unit 60 tonnes, 8mLx3mWx4mH**
- **Engine Efficiency 35%**
- **Specific generation capacity is 0.0033 MWh/m³**

Gas Collection



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Typical Gas Engines



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Preliminary Economics

- Assume 5MW production

Capex	Hawkdun	Kaitangata
Wells & gas supply	\$1.7M	\$0.75M
Generation and transmission	\$5.1M	\$4.80M

Scenario	IRR
Kaitangata 1	>20%
Kaitangata 2	>20%
Kaitangata 3	>15%
Hawkdun	>20%

Potential Uses Road Transport

- **Lack resource or consumer capacity to justify pipeline**
- **Transport as CNG on road trailers**
- **Ohai, Kaitangata and Hawkdun**
- **Delivery to Queenstown, Dunedin, Invercargill**
- **Annual production + 250,000 GJ/yr**
- **New markets or compete with diesel and LPG**

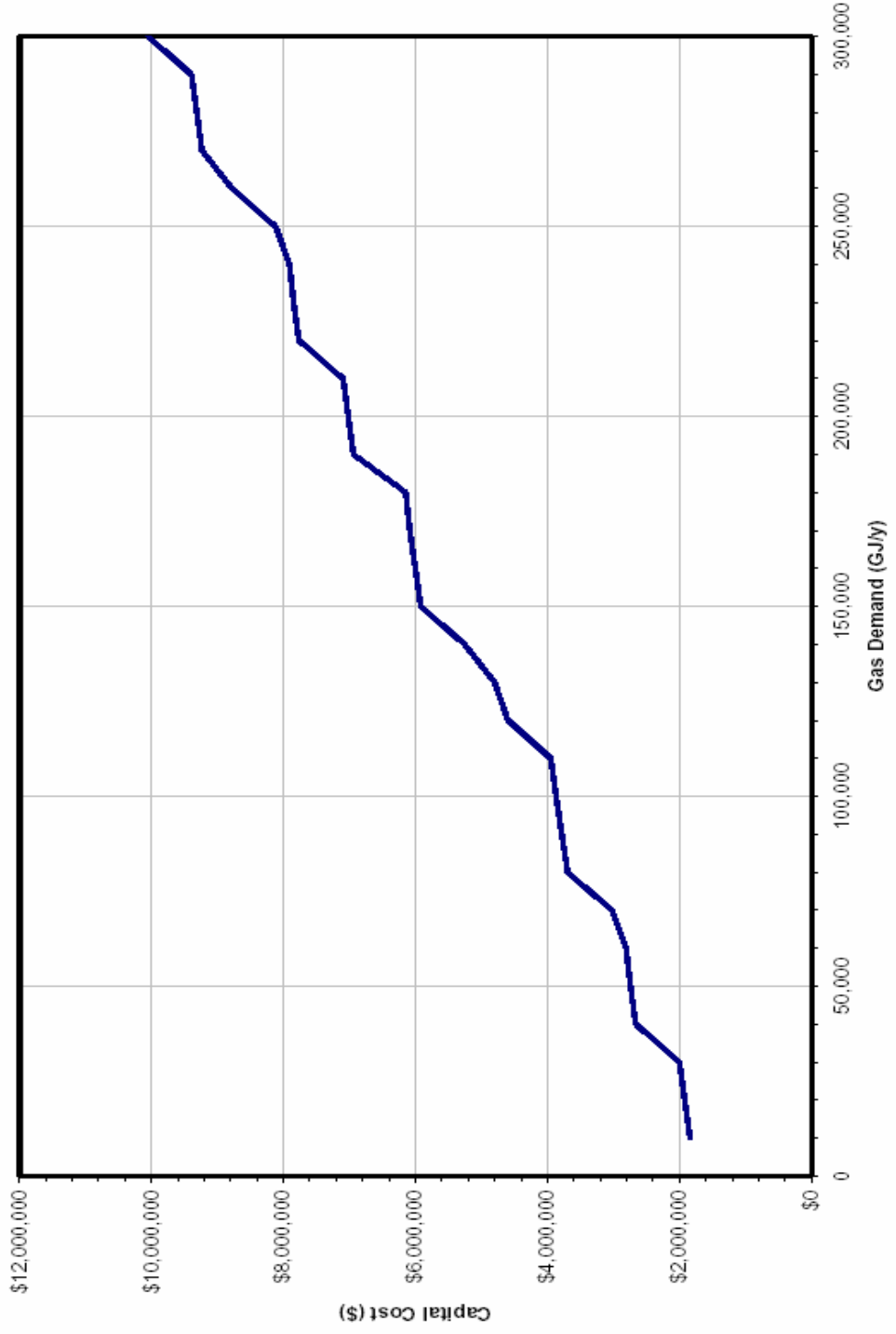
Proposed Project

- **Gas extraction and drying**
- **Compression to 250 bar**
- **Storage on site in cascades of cylinders**
- **Road transport by 110GJ capacity trailers.**
- **Trailers left at use point until empty**
- **Would need 14 trailers and 7 tractors for 250,000 GJ**
- **Distances between 30 and 120 km**

Gas Transporter - Horizontal Steel Cylinders (Marlin CNG Services)



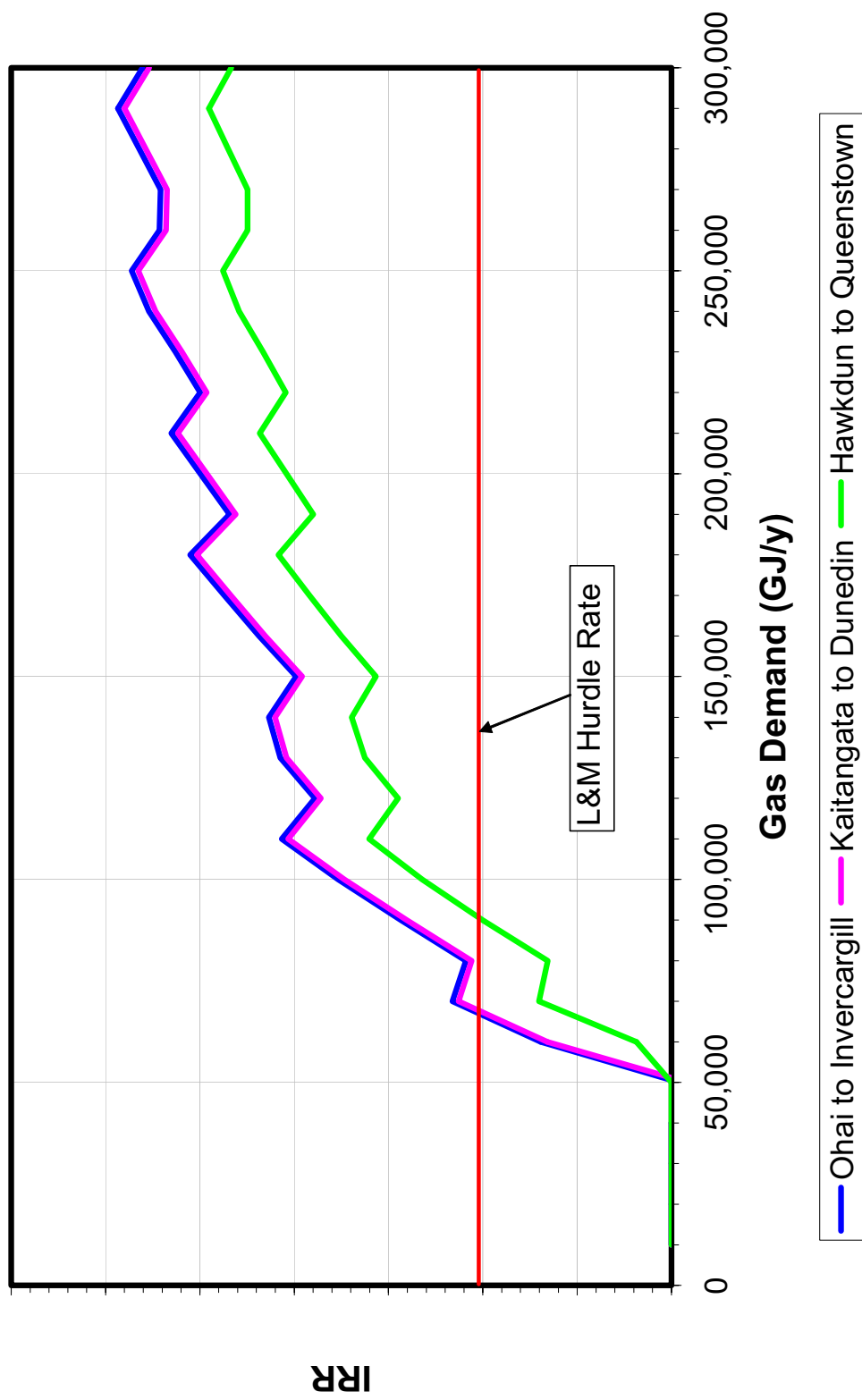
Capital Costs



Potential Economics

- The delivered cost of CSG is less than the delivered cost of LPG and diesel for gas demand greater than 100,000GJ/yr
- To compete with coal on price, delivery needs to be to nearest centre and be more than 100,000 GJ/yr

Estimated IRR for Road Transport of Gas



Summary

- **South Island CSG is a good quality clean fuel**
- **Power generation or CNG transport on a small scale appear to be feasible**
- **Further studies to firm up costs**
- **Shareholder commitment to pilot plant(s) in 2006-7**

