



# **The Realities of Lignite Development in New Zealand: a Low Carbon/Energy Rich Future.**

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## Concept

*Lignite is a Chemical Feedstock*

**– not something to be Burned!**



## Coverage

**The Lignite Resource**

**Development Options**

**The Value of the Lignite Resource**

**Misconceptions**

**Concerns**

**Key Points**

## South Island Lignite: the Realities



Location	In	Tech	Recovery	NCV	Energy	Gas	cf Maui
Deposit	Ground	Reserve	Factor		Content	equiv.	
	mil.t	mil.t	%	MJ/kg	PJ	tcf	
<b>Central Otago</b>							
Hawkdun	812	649	79.9%	11.04	7,165	6.60	1.9
Home Hills	346	246	71.1%	11.10	2,731	2.52	0.7
Roxburgh	245	132	53.9%	12.71	1,678	1.55	0.4
<b>South Otago</b>							
Benhar	n.a.	887	-	14.59	12,941	11.93	3.5
<b>Eastern Southland</b>							
Croydon	484	309	63.8%	14.04	4,338	4.00	1.2
Waimumu	286	217	75.9%	12.98	2,817	2.60	0.8
Mataura	2,940	1,808	61.5%	12.68	22,925	21.13	6.1
<b>Southern Southland</b>							
Morton Mains	1,226	507	41.4%	8.57	4,345	4.00	1.2
Waimatua	962	775	80.6%	9.72	7,533	6.94	2.0
Ashers Waituna	1,357	746	55.0%	10.26	7,654	7.05	2.1



## The Lignite Resource

Lignite in Ground	>9.6 billion tonnes
Technically Recoverable	6.3 billion tonnes
Average Recovery Factor	~70%
Specific Energy (NCV)	8.57 – 14.59 MJ/kg
Recoverable Energy	74,127 PJ
Natural Gas Equivalence	68.3 tcf

***Equivalent to 20 Maui Gas Fields!***



## Lignite Development Options

### Gasification to produce Synthesis Gas

- FT Synthesis to produce Transport Fuels,
- Production of Di-Methyl Ether (DME)
- Production of Ammonia/Urea fertiliser,
- Methanol production,
- Electricity Generation,

### Direct Liquefaction to produce a Refineable crude

*But what would be the Economics look like?*



## National Benefit Economics vs Crude Oil Parity Price

### Gasification to produce Synthesis Gas

- FT Synthesis to produce Transport Fuels, **US\$ 40-45**
- Production of Di-Methyl Ether (DME), **US\$ 50-55**
- Production of Ammonia/Urea fertiliser, **US\$ 25-30**
- Methanol production, **US\$ 40-45**
- Electricity Generation, **US\$ 20-30**

*All would be potentially viable today*



## National Benefit Economics vs Crude Oil Parity Price

**With CCS**

### Gasification to produce Synthesis Gas

- FT Synthesis to produce Transport Fuels, **US\$ 50-60**
- Production of Di-Methyl Ether (DME), **US\$ 60-70**
- Production of Ammonia/Urea fertiliser, **US\$ 35-45**
- Methanol production, **US\$ 50-60**
- Electricity Generation, **US\$ 45-55**

*All would also be potentially viable today*



## Gross National Economic Benefit

Development of a **Single** lignite resource could provide:

- **71 million tonnes** of Transport Fuels - 15-20 years National supply,
- All of our fertiliser requirements for **127 years** with additional exports worth about **\$540 million** per year,
- All our domestic methanol requirements plus an annual export income of **\$1 billion**,
- All of the South Island electricity demand for **60 years**,
- **1.2 million tonnes of Hydrogen** p.a. for about **60 years** – enough to fuel 90% of our vehicle fleet through hydrogen fuel cell technology.

*Significant National Benefits*



## Gross National Economic Benefits

Development of a **Single** lignite resource would have:

- ~\$6 billion Investment for Mine and Processing plant,
- \$75-120 billion Gross Product Value,
- **\$5.3-18.7 billion** Royalty and Revenue Taxes,
- **6,000** new jobs for construction, **2,500** ongoing,
- **\$50-60 million** annual workforce salaries with secondary employment of **\$90-120 million**,
- **\$1 billion** additional housing and social services

*Significant Local and Regional Benefits*



## Future Development

### So why are we not pursuing development?

- Government believes that lignite development will result in large GHG emissions,
- The National Energy Strategy has placed lignite development on the “back burner” until such time as CCS can become a realistic option for limiting GHG emissions.

*But, is this correct?*



## Some Misconceptions

- We do not have a coherent protocol for assessing source-to-end use carbon footprints in this industry. **This is needed!**
- GHG emissions are not as great as claimed if energy source-to-end use carbon inventories are fully accounted,
- There are ways to integrate plant operations that can maximise carbon capture in the final products.
- Process Electricity supply need not come from burning lignite. This recognition can greatly reduce the carbon footprints of lignite development options,
- Production of transport fuels from lignite can have a lower carbon footprint than their production from conventional crude oil,
- CCS does not eliminate lignite development,

***We must address these misconceptions***



## Some Concerns

- Current policy for pricing carbon emissions would prevent any lignite development,
- Proposed legislation would make it economically attractive to produce carbon exempt products for export – thereby depriving New Zealand of the domestic benefit of its energy resources,
- The wrong signals are being given to the energy industry in terms of exporting its national energy resources.

*We must address these concerns*



## Key Points

- Lignite is our *Largest and Cheapest* Energy Resource,
- We must recognise, and pursue potential development of our largest energy resource,
- Lignite Production costs are viable at today's international oil prices – both with and without CCS,
- Development of only *One Deposit* would replace Maui,
- Production via Synthesis Gas is *Nationally Beneficial*,
- Government must be informed of the Realities involved in lignite development

*Lignite is one of the Keys to our Energy Future!*