



**Relevance of the Liquid Fuels Trust Board
Work to Present Day Energy Issues.**

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Coverage

The Lignite Resource

Development Options

Development Costs

The Value of the Lignite Resource

Contemporary Importance

Key Points

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South Island Lignite Valuation



Location	In Ground	Tech Reserve	Recovery Factor	NCV	Energy Content	Gas equiv.	cf Maui
Deposit	mil.t	mil.t	%	MJ/kg	PJ	tcf	
Central Otago							
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
South Otago							
Benhar	n.a.	887	-	14.59	12,941	11.93	3.5
Eastern Southland							
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
Southern Southland							
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

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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!

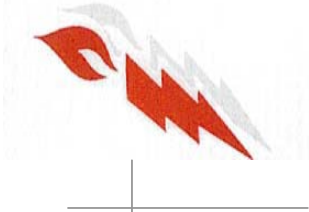
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South Island Lignite Valuation



Processes	Products	Prod/Lignite tonne/tonne	Product GPV NZ\$ million	Process GPV NZ\$ million
Gasification	Syn. Gas	10.86 GJ /t	35,247	35,247
	Gasoline	0.027	19,607	82,780
	Diesel	0.108	63,173	
Liquefaction	Gasoline	0.082	59,295	120,057
	Diesel	0.079	46,051	
	Avtur	0.030	14,711	
Methanol	Methanol	0.277	74,498	74,498
Ammonia/Urea	Ammonia	0.309	83,001	130,552
	Urea	0.167	47,552	
Electricity	Electricity	1,225 kWh/t	77,918	77,918

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The LFTB Lignite Programme

Phase I – 9 Lignite deposits

- **Geology:** Drilling, Geotechnical, Hydrology,
- **Lignite Characterisation:** Proximate & Ultimate analyses, Lithology, Mineral classification,
- **Reactivity Evaluation:** Gasification, Liquefaction,
- **Mine Planning – 24 Mine Plans,**
- **Socioeconomics:** Workforce, Housing, Regional Development,
- **Infrastructure:** Water and Power supply, Roothing, Settlements,
- **Offsites:** Pipelines, Port Facilities,
- **Environmental:** Land use, Water & Air pollution, Wildlife impacts,
- **Rehabilitation:** Mine water management, Land rehabilitation,
- **Engineering Costs & Economics:** National & Commercial Benefit.

A “Whole Project” Evaluation

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The LFTB Lignite Programme

Phase II – 3 Short listed deposits

Hawkdun, Benhar, Ashers-Waituna,

- Much more in detail in all aspects,

Targeted ~ 10 Mtpa,

Methanol production,

30 year Project Life,

Ashers-Waituna selected as preferred deposit,

- 11.4 Mtpa,

More than **\$30 million** spent (Q3 2005).

*Projects **not Economically Attractive.***

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South Island Lignite Valuation



Deposit	Mining Rate million t/y	Production Cost Q2 1982 NZ\$/tonne	Production Cost Q2 1982 NZ\$/GJ
Hawkdun	9.5	7.00	0.63
Home Hills	8.0	9.00	0.81
Roxburgh	4.0	14.10	1.11
Benhar	9.1	7.10	0.49
Croydon	9.0	17.70	1.26
Waimumu	5.0	16.60	1.28
Mataura	10.0	13.00	1.03
Morton Mains	10.0	8.60	1.00
Waimatua	10.0	7.20	0.74
Ashers Waituna	10.0	6.60	0.64

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Current Economics

Updating earlier costs and economics to Q3 2005

Inflation:

- Consumer Price Indices (CPI),
- Product Price Indices (PPI),
- Construction Cost Index (CCI)

Exchange Rates:

- US\$, DM, NZ\$

Technology Improvements:

- Mining techniques (Hydraulic/Face Shovel & Truck),
- Lignite Gasification,
- Fischer-Tropsch Synthesis,
- Combined Cycle Power Generation,
- Greenhouse Gas Emissions from Lignite Feedstock.

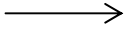
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Current Economics

Q3 1981/Q3 1985 to **Q3 2005**

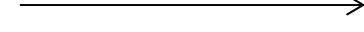
Q3 1985 US\$ → Inflation → Q3 2005 US\$



Exchange



Q3 1985 NZ\$ → **Q3 2005 NZ\$**



Not as Simple as it Seems!



Current Economics

Lignite Mining – Hawkdun Updated to Q3 2005

Mining Rate	Capital Cost	Production Cost	Transfer Price	GPV
Mtpa	\$ mil.	\$/GJ	\$/GJ	\$ mil.
11.1	1,522	1.5-2.0	1.6-2.1	10,793

(Includes Offsites, Infrastructure, Royalties, Levies etc.)

Our Cheapest Source of Primary Energy

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South Island Lignite Valuation

Current Economics

Lignite Processing – Hawkdun Updated to Q3 2005

Process	Products	Units	Product Cost	Transfer Price	Import Parity
FT Liquids	Petrol	\$/tonne	784	845	1,115
	Diesel	\$/tonne	632	681	899
Liquefaction	Petrol	\$/tonne	864	983	1,115
	Diesel	\$/tonne	697	793	899
	Avtur	\$/tonne	584	665	754
Fertilizer	Ammonia	\$/tonne	152	174	414
	Urea	\$/tonne	161	184	439
Methanol	Methanol	\$/tonne	362	396	414
Power	Electricity	\$/MWh	4,227	4,720	8,000

All Exceed National Benefit Criteria (10% IRR)

Some Exceed Commercial Hurdle Rates

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Relevance to Present Day Issues

Worldwide

- Continued High Oil Prices,
- Concerted move to FT Petroleum – **Lignite Feedstock Ideal,**
- National Self Sufficiency and Energy Security,

In New Zealand

- Must replace Maui,
- Lignite is our **Largest and Cheapest** Energy Resource,
- LFTB has assembled a Database – saved both money & time,
 - Resource Proving,
 - Mining and Conversion Technology,
 - Social/Socio-economic,
 - Environmental.
- Hawkdun and Home Hills at Risk – **High Country Tenure.**

Must Recognise the Value of our Lignites

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South Island Lignite Valuation



Key Points

- Lignite is our **Largest and Cheapest Energy Resource**,
- Technically Recoverable reserve is **20 x Maui**,
- Lignite Production costs are in the range **\$1.0-2.0/GJ**,
- Development of **One Deposit** would replace Maui,
- Production via Synthesis Gas is **Nationally Beneficial**,
- Environmental Impacts would be **Manageable and Positive**,
- The LFTB has established a **Valuable Database**, that will save considerable lead time and investment,
- Individual Lignite reserves must **Not** be lost to the Nation.

Lignite is the Key to our Energy Future!

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