



Southland lignite and the climate: an introduction

The coal industry plans to mine and exploit massive quantities of the world's dirtiest coal - lignite - under prime Southland farmland. This represents a very real and major threat to our climate. Coal Action Network Aotearoa is committed to preventing this major expansion of the coal industry.

State-owned Solid Energy has already begun building a pilot lignite conversion project, and has plans to build much larger and more damaging projects. Privately-owned L & M Lignite is also considering lignite conversion schemes.

At least 6.2 billion tonnes of lignite is technically and economically recoverable in ten major deposits in Otago and Southland. The in-ground lignite resource is approximately 11 billion tonnes.

What is lignite?

The dirtiest and lowest value of all the coals, lignite is yellow to dark brown, intermediate between peat and sub-bituminous coal and more than half water. Some do not consider it coal at all. Globally it is abundant, but lignite has not been exploited to any extent in NZ because it is inferior to higher-rank coals (e.g., bituminous coal) in heating value, ease of handling, and storage stability. It is uneconomic to transport any distance because of its low energy and high water content.

Solid Energy and its plans

Solid Energy, a State Owned Enterprise of the New Zealand Government which the current National Government has earmarked for partial privatisation, is currently investigating several options for converting its lignite resources in Southland (est. 1.35 billion tonnes) to fuels and other products. Construction of a pilot briquetting plant is already underway, a lignite-to-diesel plant is planned and Solid Energy is assessing the viability of a lignite-to-urea plant in partnership with Ravensdown. These could all be built in one giant industrial park as the urea and diesel processes both require the same initial steps. However, as of early 2012, sites for the planned lignite to diesel or lignite to urea plants have not yet been selected.

Lignite briquetting

Solid Energy's pilot briquetting plant will use 140,000 tonnes per year (tpy) of lignite to make around 90,000 tpy of briquettes. Now that Fonterra, the main customer for current lignite mining, has clearly stated (to NZPA in January 2011) that it will not use briquettes, it is hard to see any significant domestic market. If it manages to find an export market, the company plans to build a plant ten times larger in a year or two, using 1.4 million tonnes per year (MT/y) of lignite. Internationally, the briquettes would have to compete with sub-bituminous coal which is abundant and does not require processing to remove the water.

Lignite to urea

Solid Energy is investigating, in a joint venture with fertiliser supplier Ravensdown, a more than \$1 billion plant to make urea, a nitrogen fertiliser. This would target the export market as well as replacing imports. From 2 million tpy of lignite they would make 1.2Mt/y of urea, aiming to begin in 2016.

Lignite to liquid fuel

Solid Energy announced in 2011 it planned to start construction of a lignite-to-liquids pilot plant. This has not yet happened. The eventual full-scale plant, which under Solid Energy's most recently announced plans would go into production around 2017, would use 12 Mt/y of lignite and make about half of NZ's diesel while in operation. It is not clear what technology they are planning to use, as their agreement with an Australian firm promising new technology appears to have fallen over. The likeliest route is via decades old Fischer-Tropsch technology

used by Germany in World War II and by South Africa when it was under oil embargo.

Conversion from lignite to liquids is so dirty that the resulting diesel would pump out double the carbon dioxide emissions of the diesel we burn now, which is made from petroleum.

What about the carbon dioxide emissions?

Solid Energy has admitted at a select committee hearing that these projects together could raise NZ's greenhouse gas emissions by 20%. We have an official government target to reduce emissions by 10-20% by 2020, but no plan on how to achieve that. Leading international climate scientist James Hansen has calculated that if we are to stabilise the climate at a safe level we need to drop emissions dramatically, by phasing out coal globally by 2030. It does not make sense to begin new coal projects on this scale.

Solid Energy has said it will "take responsibility" for all its carbon emissions and comply fully with the Emissions Trading Scheme (ETS). However the ETS grants exemptions for 90% of emissions for large energy intensive export companies; and the carbon price they pay for the remaining 10% is very low and no sort of deterrent. This is a huge subsidy which would amount to hundreds of millions of dollars for Solid Energy over a 20-year life of the plants and do nothing for the climate. While Solid Energy CEO Don Elder asserts that the emissions would be taken care of by carbon capture and storage (CCS), this technology is experimental, site-dependent, inordinately expensive, and its history is littered with failed pilot projects. There are no plans to install it on the pilot briquetting plant being built at the moment.

L & M Lignite

L & M Lignite, a subsidiary of the larger L&M group, is the other big player in lignite. They currently have exploration permits covering 210 square kilometres, in Hawkdun, Mataura, Edendale, Morton Mains, Waimatua, Kaitangata and Ashers Waituna. Their exploration has identified resources of approximately two billion tonnes (plus privately held coal which may be able to be acquired). Environmental and feasibility studies into the production of liquid fuels, petrochemicals, electricity generation and methanol are being conducted. They have discussed a multi-billion dollar Fischer-Tropsch refinery covering 70 ha at Hawkdun, in Central Otago, to make diesel. However their plans are much less advanced than Solid Energy's.

Health effects

Studies show residents of open cast coal mining communities are exposed to coal dust from mining, processing and transport which, when inhaled, increases the incidence of chronic lung disease, kidney disease and hypertension. Coal contains toxic trace elements which can pollute water and harm human health and ecosystems.

For a more detailed discussion of the health and other environmental risks of lignite mining, see Medical Students for Global Awareness, "Lignite mining and processing in Southland New Zealand: a fossil-fuelled disaster for current and future generations" (2011), available at <http://www.msga.org.nz/?p=127>

Coal Action Network Aotearoa

Coal Action Network Aotearoa (CANA) is a group of climate campaigners committed to fighting the continuation of coal mining in Aotearoa New Zealand.

CANA's objectives are to:

1. Phase out coal mining and coal usage within 20 years, initially by opposing new and expanded coal mines.
2. Promote a cultural change so that mining and using coal are unacceptable.
3. Work towards a society where people and the environment are not exploited for profit.
4. Work towards a socially just transition to a coal-free Aotearoa New Zealand.

To get involved, please email coalactionnetwork@gmail.com and ask to be put on our mailing list, or visit <http://coalactionnetworkaotearoa.wordpress.com/>