

## LIQUID FUEL FROM COAL

### It may be only a matter of time before we go down this route: what's involved?

We've already passed 'peak oil', so it's a dead-set certainty that oil prices will rise dramatically in the next few years. Alternative fuels are being investigated at a great rate, but our fuel distribution network is based largely on liquid-fuel products. Any liquid that can be burnt in place of petrol and diesel will get a look-in before gaseous products that have distribution and storage infrastructure problems to overcome.

There's a big push by natural gas producers for wider implementation of methane, CH<sub>4</sub>, as a vehicle fuel, but the problems of vehicle tank size in relation to kilometre range just won't go away. Natural gas won't work in long distance vehicles unless its liquefied and stored in cryogenic tanks on the vehicle at -160°C.

Our internationally-owned coal miners reckon the Commonwealth Government's tax imposition smells, so it's likely they'll cut back on at least some new projects. Converting coal to liquid fuel is an option that could generate additional revenue for coal miners and could be sold to the public as an excellent way of reducing our increasing dependence on imported oil products, especially if the miners sell the fuel idea to the Government with tax concessions attached.



There's certainly enough coal around to do the job.

Ask the average Australian how much coal Australia has and you'll get the answer that we have much of the world's reserves, but actually we have only six percent of the estimated global black coal reserves. Nonetheless, we're the largest exporter of black coal and even then we have enough to last around 200 years. On top of that we have around 25 percent of the world's brown coal reserves.

Coal-to-liquids (CTL) technology involves either direct or indirect liquefaction and can use either black or brown coal, so it has the potential to use lower-ranking coals, such as those available in the Surat, Bowen, Gippsland, Arckaringa, Northern St. Vincent and Collie basins.

The direct CTL process is at the prototype stage and works by dissolving the coal in a solvent at high temperature and pressure, followed by hydrogenation (adding hydrogen) with a catalyst, and further refining to produce high-grade fuel suitable for use in transport.

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The indirect process has been used since the Germans employed it during World War II to make up for disrupted fuel supplies. It requires gasification of the coal and the resulting 'syngas' is then condensed in the 'Fischer-Tropsch' process to produce liquid fuel.

Both methods produce synthetic fuels that are cleaner burning than diesel and petrol, with lower nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), hydrocarbon (HC), and carbon monoxide (CO) emissions.

So, converting that coal into liquid automotive fuel sounds like an attractive proposition, doesn't it?

Almost.

There's no such thing as a free lunch and dining on CTL is no exception. The big problems are very high up-front investment and emissions from the production of CTL.

Estimates are that CTL has a whole of life carbon footprint at least 50 percent higher than that of conventionally refined petroleum products and may well be double the refined oil figure. South Africa produces 30 percent of its liquid fuel from coal and its plants have been categorised as the worst CO<sub>2</sub> emitters in the world.

It's clear that CTL will increase overall emissions unless the resulting CO<sub>2</sub> is somehow prevented from entering the atmosphere. The best hope for that seems to be carbon capture and storage, which involves collecting all the gas and pumping it into underground reservoirs. Even then, overall CO<sub>2</sub> emissions will be reduced by only 20 per cent.

Although the International Energy Agency view is that CTL production is likely to remain a niche activity during the period up to 2030, there are a number of demonstration CTL plants operating in Australia, with Linc Energy's production of refined diesel from coal gasified underground at Chinchilla, Queensland appearing to be the most advanced. This plant has a capacity of 20,000 barrels each day.

As oil reserves dwindle and more customers dip into the pool every day, it's a case of living in interesting times...