

## **Liquid Fuel Security for Australia**

The second half of the 20<sup>th</sup> Century was the most benign period in human history. The superpower nuclear standoff gave us fifty years of relative peace, we had cheap energy from inherent over-supply of oil, grain supply increased faster than population growth and the climate warmed due to the highest solar activity for 8,000 years. All those trends are now reversing and we are in the twilight of that period of abundance.

Consider some of the facts. World population was two billion in 1930. Now it is seven billion, up 250%. World grain production was 481 million tonnes in 1930. Now it is 2,400 million tonnes, up 392% thanks to Norman Borlaug and others. Consequently grain prices fell all through that period up until the last few years. Developing country wheat yields peaked at 2.7 tonnes per hectare in 1996 and have plateaued thereafter. Developed country grain yields have plateaued from 2000. The last decade has seen the supply overhang absorbed and now grain prices are running up again. Each day sees another 200,000 people added to the World's population. As adults, each day's cohort will need 66,000 tonnes of wheat per annum to keep body and soul together. On an annualised basis, that equates to Australia's annual average wheat production. Most of the World's population already spends a quarter to a half of their income on food. The price rise that is in train will have a severe impact on their discretionary spending, shrinking the market for goods and services.

If the climate was warming, vast areas of Canada and Russia would be able to be put under the plough and contribute to the World's grain supply. Climate is one subject that is studied intensely these days and we can be certain that the planet's temperature has not risen for fifteen years. We can be almost as certain that a severe, solar-driven cooling event is in train. Instead of the Northern Hemisphere grain belts moving north, they will be moving south. The US Corn Belt will almost make it to the Sun Belt, just as the northern limit of the American Indian corn-belt moved 300 kilometres south from the Medieval Warm Period to the Little Ice Age. Grain production in Canada will be wiped out. Total World grain stocks are expected to be 328 million tonnes at year-end 2012, which equates to 21% of annual demand. Cold-driven reductions in grain supply will be quite distressing to the unprepared, who will then become quite dead.

As for World peace, the artificial creations of the British and the French in the Middle East after World War One will devolve to their tribal entities and that part of the World at least might go back to the Stone Age condition of thirty per cent of adult males dying violent deaths as the normal condition of things. Very few countries in that region produce all of their food requirements. Who will pay to keep them fed when grain becomes scarce and expensive? Added into that mix are the nuclear weapons of the future failed state, Pakistan, and the ones that Iran is intent on making.

Then we have the subject of oil supply and price. Oil was in inherent oversupply from the discovery of the giant East Texas Oilfield in 1930 up to 2004. Since 2004 the price has gone up three fold. What has supply done in response to this big price signal? Nothing. World oil production has gone sideways. Everyone who has an oilfield is producing flat out. They aren't producing more than they did when oil was a third of the price it is now because they physically can't. Soon production of conventional oil will tip over into decline at about one million barrels per day per

annum. Over the last decade, the oil price has been rising at fifteen per cent compound. There is no reason for that rate of rise to slow down soon. Just as having food prices double will be big suppressant of discretionary expenditure, higher fuel costs will also reduce what can be spent on things that aren't transport fuels. In fact, fuel will be a double whammy in food prices. Energy costs are currently 60% of the cost of food production. A doubling of the oil price from here will increase food costs by a further 50% than what scarcity alone will do.

Australia could be insulated from all these things to a large extent if it chose to be. Before getting too excited about another lucky escape for the Lucky Country, let's have a look at the current decision making landscape. A high proportion of the academic/scientific establishment pays lip service at least to the notion that increased atmospheric carbon dioxide causes global warming despite no real world evidence to support that and plenty of physical evidence that it doesn't. The academic/scientific establishment have sold their souls for thirty pieces of silver. Nobody expects them to provide any useful contribution to policy. We must look elsewhere.

The bureaucracy can sometimes do good work for the long term benefit of the country. A case in point is Report 117 on long term world oil supply which had been commissioned by the Department of Transport. The Minister, one Anthony Albanese, quashed the report because its message was inconvenient to a Government in the process of introducing the carbon tax. The report was saved because a Frenchman by the name of Jean-Marc Jancovici put it on his website. Report 117 can be summarised in two sentences from its summary: "The modelling is forecasting what can be termed the 2017 drop-off. The outlook under a base case scenario is for a long decline in oil production to begin in 2017, which will stretch to the end of the century and beyond." Report 117 is complete, with an ISBN number, apart from the printer's name. Report 117 shows that all is not rosy in the world and that Australia is going to have a hard time sourcing all the oil we need on world markets. Australian oil self-sufficiency is now only 50%-odd and by mid-decade will be down to a far worse 25% level. The oil price is rising on a trend that will take it to \$200 per barrel by 2016. So, even if we can source the oil we need on world markets, we will be paying through the nose for it. The money leaving Australia to pay for it will be a gigantic drain on the Australian economy.

Our political leaders have not always been living in a fool's paradise on the subject of liquid fuel security. In 2005, Kim Beazley, while then leader of the federal Labor Opposition, asked in an address to the Australian Institute of Company Directors, "As Australians queue for petrol at around \$4.00, \$5.00 — potentially up to \$10.00 — a litre further down the track, the questions will be: how had our governments not seen the writing on the wall?" In fact the situation is far worse than that. As Australian oil production falls, Australian oil refineries close and we source more and more of our needs from refineries in Singapore, our defence capability decays super-linearly. How can anyone in their right mind think that we could fight in a war to protect ourselves when the fuel necessary for that is coming from the area where that war will be fought? There are only about two weeks' worth of stocks in the Australian fuel system. As soon as a conflict starts in the Asian region, our economy will be paralysed.

To answer Kim Beazley's question, the fate of Report 117 shows that the Federal Government has seen the writing on the wall and they would rather pretend that it doesn't exist. In fact, they have taken inspiration from a Russian joke of the Soviet period — the future is known; it is the past that keeps changing. At the Department of Transport website in January, there was no Report 117 between Reports 116 and 118. Now there is, and it is a report on aircraft movement.

Then there is the matter of our treaty obligations. One of the reasons that our Federal Government put forward for the carbon tax is that it would send a signal to the rest of the world to be virtuous and self-sacrificing also. In the recently released Energy White Paper, that same Federal Government noted that Australia is in breach of its oil stockholding requirement under the International Energy Agency and does not intend to do anything about it. My calculations show that honouring that treaty would require the Federal Government to spend \$300 million per annum on building oil stocks. The Federal Government has no intention of honouring that particular treaty. Instead, they have announced an intention to sign up for the successor to the Kyoto Treaty.

Were Australian Governments always so indifferent to our liquid fuel security? Not at all. When the Bass Strait oilfields were found in the 1960s, they couldn't be economically developed in competition with the low price of Middle Eastern crude at the time. So we had a surcharge on the price of petrol for a number of years until the international oil price rose to above that required for commerciality. Before Bass Strait, the Federal Government used to subsidise oil exploration. That was two generations ago. What kind of painful experiences did that generation of Australians go through that they were quite happy to subsidise oil producers and oil explorers? Do we want to repeat those painful experiences? Well, they will be character-forming when they come again.

What of the private sector in addressing Australia's rapidly declining liquid fuel security problem? Well, one of the reasons that very few businessmen successfully make the transition to being politicians is that most would happily sell their grandmother for a buck. Take the example of the carbon tax. The only company in the top 100 ASX-listed stocks that took a stand against the carbon tax was Brickworks Limited. Most were complicit by their silence or actively connived against the Australian people. The worst were the banks who quite well aware of the damage that the tax would do to the Australian economy, but that thought didn't trouble them as they shoved their snouts deeper into the trough.

The blame does not stop there. John Howard's Government had the opportunity to kill the carbon tax at any time but kept on passing legislation that enabled it, despite John Howard calling himself an agnostic on the matter. It is bizarre that he would so casually set out to crush the Australian economy while not having enough interest to determine if global warming was real or not. It seems that his motivation was the promotion of a nuclear power industry in Australia. He didn't expect the Australian people to vote for a nuclear industry so he was attempting to force it on us through a high cost of coal-based power. As such, he was a second-rate Machievelli. Curse him in living and curse him in dying. Australia needs much better than the likes of John Howard.

But once again the situation is worse than the likes of John Howard who will dissemble in public while being quite aware of the real situation and making that known in private. Some of our major public entities are run by people who have no grip on reality at all. Take Qantas' reaction to the Chilean volcano in mid-2011. A wisp of dust from that volcano drifted 20,000 km across the southern Atlantic and then the southern Indian Ocean to Australia. A barely detectable wisp of dust. Qantas' reaction was to panic and ground some of its aircraft. It is hard to communicate just how stupid that reaction was. It means that Qantas is run by people whose understanding of the world is no more advanced than that pertaining in the Dark Ages. They see malevolent spirits in natural phenomena. They are truly contemptible. It was one thing for Australia's academic/scientific establishment to sell their souls so cheaply – our expectations of them weren't so high. But for a commercial operation to forego profit and cause massive disruption to its customers because of schoolgirl-level hysteria? They are people you don't want around in a crisis because they have no idea how the world really works. How many of Australia's other major public companies are infested by hysterics in upper management?

Just as the oil price in Australia was once so low that oil production here required a subsidy, the oil price is now high enough that a solution to Australia's liquid fuel security problem is in plain sight and within grasp. Before we get to that, we do need to put one matter to rest. That is the notion of carbon dioxide causing global warming. One might be forgiven for thinking that there might be some truth in that notion given how much noise has been made about it. But as with most things promoted by the socialists, the truth is exactly the opposite of what they claim. The truth is that the carbon dioxide level of the atmosphere is still dangerously low and that the more there is, the better for all forms of life on the planet. Let me explain. The pre-industrial level of carbon dioxide in the atmosphere was 286 ppm. Let's round that up to 300 ppm.

The greenhouse gases keep the planet 30°C warmer than it would otherwise be if they weren't in the atmosphere. Of that effect, 80% is provided by water vapour, 10% by carbon dioxide with methane, ozone etc. making up the balance. So the 300 ppm of carbon dioxide is good for three degrees of warming. If the relationship is arithmetic, then 100 ppm of carbon dioxide is worth one degree of warming. We are adding 2 ppm to the atmosphere each year, so that is 100 ppm every fifty years. At that rate, we would fry. Thankfully, the relationship is logarithmic, not arithmetic. The first 20 ppm of carbon dioxide provides 1.6°C of warming and the effect drops away rapidly after that. At the current level of 392 ppm, each addition of 100 ppm only adds 0.1°C of warming. By the time we have dug up all the rocks we can economically burn, and burnt them, we might get to 600 ppm in the atmosphere. So perhaps we might get another 0.2°C of heating from here over a few hundred years. That warming will be lost in the noise of natural climate variation. So much for the problem of global warming. Carbon dioxide is tuckered out as a greenhouse gas. On the positive side of the ledger, it is very beneficial as aerial fertilizer. The carbon dioxide Mankind has put into the atmosphere to date has increased crop yields by 10%. It is like giving the Third World free phosphate fertilizer. Who would be so heartless to deny the Third World that benefit?

The solution to Australia's liquid fuel security problem is the development of our own coal-to-liquids industry. We have a certain amount of coal and we exporting a lot of it to foreigners to keep their lights on. Coal-to-liquids (CTL) requires an oil price of \$70 per barrel to be economic. The oil price we pay in this part of the world is Tapis, which at the time of writing is \$113 per barrel – well in excess of that required for CTL to be viable. The CTL process doesn't need the same high quality coal that we export. Rocks will burn in pure oxygen down to 10% carbon. There is a lot of low grade coal in Australia that is stranded due its high ash content or high water content. The CTL process yields 2.2 barrels per tonne of coal for high grade coal down to 0.6 barrels per tonne of brown coal. The mother lode of brown coal in Australia is the Latrobe Valley. Each billion tonnes of brown coal will yield 600 million barrels of liquid fuels. At that rate, we need to consume about seven billion tonnes to equal the oil that the Bass Strait oilfields have yielded. Whatever figure you use for the mineable reserves in the Latrobe Valley, divide them by that seven billion tonne figure to determine how many Bass Straits of fuel supply are waiting for us to transform them into something useful. On the basis that the Latrobe Valley resource is 112 billion tonnes, that would make 67 billion barrels of liquid fuels to keep Australia's farms and factories running. That is the natural fate of that resource. It is just a question of how much pain we want to go through in the interim.

South Africa was a pioneer of CTL in the post-World War Two era. The company that did that, Sasol, has now forsaken CTL to pursue a Gas-To-Liquids (GTL) plant in the US on the expectation that US gas prices will remain low from shale gas drilling. That is a big mistake. The international LNG market started tightening when the oil price started rising in 2004 and by 2008, the LNG market in Asia was trading at the oil price in energy equivalent terms. On top of that, natural gas can be used directly in vehicles as compressed natural gas (CNG). So the GTL process takes an energy source that can be used directly as an automotive fuel and is priced at the oil price on the international market to make a denser fuel at much the same price but losses 33% of the energy content in doing that. Natural gas has a far better home as LNG feedstock (only 6% energy loss) than as GTL feedstock. GTL is a red herring for Australia.

There is a synthetic fuels plant that is pertinent to what we need to do in Australia. This is the Great Plains Synfuels plant in North Dakota. It was conceived under the Carter Administration as a response to the Second Oil Shock of 1980. As with most Carter initiatives, the intention was good but the execution was flawed due to a poor understanding of the real world. At the time, it was thought that the US had a shortage of natural gas so the Great Plains plant was set up to make synthetic natural gas instead of diesel and jet fuel. That perceived shortage was simply due to bad Federal legislation on the price of interstate trade in natural gas. Nobody explored for gas because it was unprofitable to produce. The shortage was artificial. As soon as that legislation was repealed, gas production came back. For the last twenty-eight years, that plant has been burning 18,000 tonnes per day of brown coal which could make 20,000 barrels per day of liquid fuels. How many such plants does Australia need to replace its current level of imports? The answer is twenty-five for starters. More than that and we can export as well. Australia will have a higher standard of living and be safer.

What are the Chinese doing about CTL, if anything? They are going gangbusters. As at mid-2011, there were eight active CTL projects in China – three operational and five under construction or planning. The total production capacity of these efforts to date is 600,000 barrels per day, which is much the same as what Australia needs to install in the near term. Australia should at least match China in CTL capacity, barrel for barrel. The Chinese can be very practical people. Only 70% of Chinese wind farms are connected to the power grid. The wind farms were paid for by the Europeans under idiotic carbon offset programmes, but nearly a third of them weren't worthwhile connecting to the grid, so the Chinese didn't bother.

There is another thing that the Chinese are doing that Australia should emulate. To put that into context, let's go back to the beginnings of peak oil theory, back to Dallas in 1956 and King Hubbert's paper entitled "Nuclear Energy and the Fossil Fuels". Hubbert realized that Mankind's use of fossil fuels was only a blip in our history, and that if we were to have a future, that future would of necessity have to be nuclear-powered. The development of CTL to replace our rapidly depleting oil production would halve the life of our coal reserves. The current dominant nuclear technology of uranium-burning light water reactors has a couple of major shortcomings – a tendency to blow up and a legacy of high level waste that will last for over one million years. There actually is some urgency in developing the right nuclear technology for the millennia to come. The Chinese are trying a number of technologies, including the plutonium breeding reactor commercialized by the Russians. The most promising technology is molten salt reactors burning thorium. One term for them is Liquid Fluoride Thorium Reactors (LFTR).

China's interest in LFTRs was triggered by an article in *American Scientist* in July 2010. A delegation visited Oak Ridge National Laboratories in the US where molten salt reactor work was done in the mid-1960s. The Chinese LFTR project was announced at a meeting of the Chinese Academy of Sciences in January 2011. Oak Ridge had 1,894 Chinese visitors in 2011! The project currently employs 432 people, expected to rise to 750 in 2015. A working 2 MW (t) reactor is expected by 2017 and a 10 MW (e) by 2020. There was a mere six months between reading an article in a scientific journal and committing to a major new thrust in nuclear research. The contrast between that and the billions spent in the West on recreating medieval fear and superstition, and calling it climate science, could not be more stark. The Chinese research project is budgeted at \$400 million. For that investment, they will get the cheapest, safest power source possible and it will power them for millennia. Of course Australia could and should also support a full blown thorium reactor project. The \$3,000 million spent on pink batts would have paid for it many times over.

Could a Federal Labor government do the right thing, see the light on the hill and get Australia's CTL industry underway? That would require a "black is white" moment and that has happened before. Back at the time that Australia was subsidising oil exploration, Labor policy was that non-State education was bad. Then overnight their position flipped so that State aid to private schools was a good thing, with some schools being more equal than others. Should Federal Labor have a similar moment of clarity over the carbon tax, then the Federal Coalition would be left high and dry as a bunch of idiots who believe in the idiotic carbon cult. While the Federal Coalition continues to promote the notion that a 5% reduction in Australia's carbon dioxide emissions is a good thing, they cannot be taken seriously on the subject of Australian

liquid fuel security. The two are mutually exclusive. To be relevant to Australia's future, the Coalition would have to drop the Labor policy that it has adopted. Adopting the right policy wouldn't cost anything. In fact, in full flower it would generate tens of billions of dollars in Federal Government income from corporate tax on the CTL project owners and PAYE tax on their employees.

To differentiate themselves from Labor, set the terms of the policy debate, fire up the base and do the right thing for the country, all the Coalition has to do is to undertake to do two things:

1. Repeal all the carbon-related legislation and close the Department of Climate Change.
2. Rebate the fuel tax by one cent per litre for every dollar that the oil price falls below \$70 per barrel.

With respect to point 2, this is sending a signal to Australian industry that CTL plants are being encouraged instead of being discouraged. No money will change hands. Nothing more is needed. Industry will do the rest.

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