Reconnoitre Energies

ENERGY MATTERS

Energy matters – Midnight oil?

By Chris Sladen

15 April 2024 | Published with Anzmex.org

No, this is not an article about the end of the petroleum industry. Neither is it about peak oil. Midnight Oil are one of Australia's most iconic rock bands. Many of their world famous songs and album titles contain links to energy – 'Power and the Passion', 'Diesel and Dust' and 'Rising Seas' to name a few. So, I was very fortunate to be Down Under over Easter and found myself humming many of their tunes. Theoretically I was on holiday but could not help noticing some aspects of the energy sector. Here are my observations:

Our airplane to Australia touched down in Sydney, a Qantas A380 wide bodied full-length double decker. It was completely full of over 480 passengers. Air travel has come back strongly from Covid when pandemic restrictions closed borders. A shortage of airplanes, spare parts and labour, and the return of higher jet fuel prices has led to higher airfares. Qantas stock price on the Australian stock market (ASX) has come back strongly since the 2020 Covid lows, and the ASX 200 index is at all-time highs.

It was no surprise to hear that primary energy consumption in Australia has grown slowly but steadily over the last decade, and that overall, carbon emissions have changed little.

Oil consumption remains flat around 1 million barrels per day (mm b/d). Domestic production has fallen and is now around 0.4 mm b/d and imports have risen to around 0.6 mm b/d. Refinery throughput is down significantly, around only 33% of what it was 10 years ago. Over 20 years, Australia has reduced from 8 to just 2 refineries. In many cases they were 'scuffed', high operating costs pricing them out of the market. Small volume refineries, mostly built in the 1950s and 1960s with low margins per barrel were unable to compete against the high volume refinery complexes in Singapore, often 4–5 times larger. Many locations have now been converted to import terminals and fuel handling sites, and some have plans for sustainable aviation fuel, biodiesel, and green hydrogen. Today, Australia mostly imports fuels and refined products and has compromised its energy independence.

Coal production remains robust. Despite ups and downs over the decade, production around 440 million tonnes is similar to 10 years ago. Australia remains a top 3 coal exporter together with Indonesia and Russia. Domestic consumption accounts for 25% of production, and although its consumption has fallen by a quarter over the decade, the domestic power sector remains a substantial coal user. It is clearly a struggle to move 'Beyond Coal'.

Australians continue to show more interest in hybrid vehicles and plug-in hybrid vehicles which outsell EVs. All varieties show strong year-on-year growth, with EV growth higher than hybrids. These types of vehicles are now ~20% of all new sales. With often very large distances between cities and communities, considerable urban sprawl, and lengthy air travel, there is a dominance of cars, lorries, rail, ships & planes using fossil-based fuels. Targets to be 100% EV sales by 2030 don't seem realistic. However, Australia has now passed the so-called 5% tipping point for EV sales that usually signals much more rapid EV adoption. For the time being, Australia's love of SUVs and 'utes' (permutations of a pick-up truck) continues irrespective of engine type. These form ~80% of all new vehicle purchases.

Australia remains critical for the global energy transition. It is the world's largest lithium ore producer, top 3 for rare earth minerals, and a significant cobalt producer too. Over the last decade, lithium production has grown 5 fold and rare earth production 6 fold. Australia is investing tens of billions of dollars into the supply of graphite, cobalt, and nickel. There are many companies producing a range of components for EV and hybrid batteries. This is seen as reducing reliance on China. Australia seeks to differentiate itself with higher mining ESG standards.

Australia remains the world's largest miner of iron ore supplying an astonishing 38% of global demand. Production is more than double that of second-placed Brazil. The ore is used to create steel used all over the world in the energy sector for pipes, rigs, pylons, cables, ships, tankers, trucks, platforms, buildings etc. Sadly, I had too little time for 'a sticky beak' at the world famous iron ore mines and geology of the Pilbara region in Western Australia.

Geothermal interest in its many variations is increasing. Legislation exists in Australia for both licensing and tenders. I 'had a yarn with' small and medium-sized oil & gas operators who have onshore tenements containing mature fields and legacy assets who see opportunities to add clean heat and power.

Ground source heat pump systems tapping shallow geothermal are increasingly popular where the climate is well-suited. In Canberra, for example, many commercial & government buildings, as well as residential apartment blocks optimise roof-top solar, combined with a shallow geothermal array with heat pumps, hydronic radiators as well as innovative management of air flow and water to provide year round efficient low cost clean heating and cooling.

Over the last decade, installed solar PV has grown around 6 fold, and wind power around 4 fold. Solar is widespread on residential and light industry buildings, but I observed there is plenty of space to add more solar farms. Today, solar production is higher than wind, though the two have broadly similar capacity.

Power generation has increased around 10% over the last decade. Today, power generation is still dominated by coal at 47%, renewables has grown to 27%, then natural gas at 17%. Renewable energy consumption is up 4 fold in the last decade, even so the country has an enormous challenge to decarbonise its electricity sector. I found a vast array of views on Australia's future expected emissions in 2050. It is a long road to Net Zero.

Nuclear power is banned in Australia on health and environmental concerns, and there is little remaining hydro that can be developed, however pumped hydro storage has potential in certain advantaged locations, such as nearby Sydney or part of an expanded Snowy Mountains scheme. I was fortunate to see the famous Barron Gorge hydropower system and the gigantic 125m waterfall nearby. Power was generated here through Australia's first underground system in 1935 and nowadays the remodelled and overhauled system has a respectable 66 MW nameplate capacity.

Over the last decade, natural gas production has almost tripled to 150 billion cubic metres per year (bcm/y). Around 70% is exported as LNG to energy hungry Asian markets. LNG exports have risen 4 fold, to around 110 bcm/y mostly supplying Japan, China, South Korea, and India.

There is a high risk that under-investment in domestic gas leads to power shortages in 2025. Domestic natural gas consumption has grown steadily and is now around 42 bcm/y. Getting enough gas into the east coast Australia domestic market has been a longstanding problem. Many States have a ban or moratorium on unconventional gas, fracking and coal seam gas, and exploration has dwindled. Nationwide, numerous gas plays remain undrilled and discoveries undeveloped.

On TV, I was very surprised to see lots of adverts highlighting the gas shortage issue, advocating gas as essential adjustable baseload, and seeking both public and government support for gas projects to avoid gas shortages and power blackouts. Electricity restrictions could occur as soon as late 2024. I'm not used to seeing these kinds of adverts. Gas destined for LNG overseas sales cannot be contractually diverted. 'Struth'. With such huge resources in Australia, it was strange to find the country has real energy security issues.

To my surprise, biofuels production has fallen over the last decade! I drove through mile-after-mile of sugar cane fields in Queensland, and had expected bioethanol manufacture would be popular, maybe similar to Brazil. However, there appears to be complex political issues and arduous project approvals. It seemed to be 'nah-yeah-nah'.

A frequent message that I encountered was that the energy sector has become over-regulated, with cumbersome and unnecessary detail which stifles the investors, innovators, and entrepreneurs. I worry that as supply chain costs, labour costs and inflation continue to bite, the energy and mining sectors will abandon training, HSE, skills development and apprenticeships, and focus on short-term profits.

Some people I met felt that the energy sector had become boring. Not my view!! People also described to me their frustration over ineffective climate change policies. Australia's climate action ranks in the bottom 15 of over 60 countries assessed in the 2024 Climate Change Performance Index. The short political cycle of a federal general election every 3 years does not help.

My final stop took me to the Great Barrier Reef. It was heaven for me, and hundreds of things I have seen through my career on seismic data, in wells, cores and rock thin-sections suddenly came to life before my eyes. I did not see a single bleached coral though it does exist in certain areas; what I did see was an extremely healthy reef with lots of new coral growth during the last 50 years in beautiful clear water. We have to try our hardest to preserve this wonder of the world.

As I departed Australia, extracts of Midnight Oil song lyrics seemed to sum up the energy sector and what I had seen and heard. I have no doubt Australia has 'got the best of both worlds'. However, 'the old world is not as safe, with the new world closing in'.

About the Author

Chris writes an occasional series of topical articles on energy for ANZMEX. Between 2019 and 2024 he authored a series of 50 widely read ANZMEX 'Energy Matters' op-eds that tackled big energy issues using real-life personal experiences, and extensive research. Chris runs an award-winning advisory service, Reconnoitre Energies, offering insights to inform, shape a decision, policy & regulation, and guide the next steps for energy ventures; he is also a non-resident fellow at the Institute of Americas. Chris has worked in over 40 countries and published extensively over five decades.

Chris has an energy career of over 40 years, living in Mexico (2001–2018), Russia, Vietnam, Mongolia, China & UK. His contributions to the energy and education sectors have been recognised by the UK Government with both an MBE and CBE, and also the Aztec Eagle from the Mexican Government — the first foreigner in the energy sector to achieve this award. Chris' articles for ANZMEX reflect his experience and enthusiasm and are often also later published to a global audience in the USA, UK and Singapore. They are not paid for in any way.

Send your feedback to:

chris.sladen@reconnoitre.ltd