

## Canberra observed



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### We need action now to avoid third world power cuts

The time has come for the blame game to stop over what caused load shedding and blackouts in southeast Australia. It's time for all sides of the political spectrum to come together and develop a national strategy to ensure a reliable electrical grid that will serve the country for the foreseeable future.

We are caught between a rock and a hard place. The rock is that we need a reliable supply of electricity throughout the Australia. The hard place is that we need to reduce our greenhouse gas emissions in accordance with our commitment to the Paris Agreement on climate change, which came into force in November 2016. In practice this means our inefficient coal fired power stations must be de-commissioned. These are currently supplying the main base load throughout the country and also causing most of our emissions.

It doesn't make sense to blame renewable energy for the blackouts because it only makes up a small percentage of the total generating capacity. For example, in 2015 (<https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>) renewable energy provided 14.6% of Australia's electricity. Of this component, 40%

came from the Tasmanian and Snowy Mountains hydro schemes. Wind and solar combined contributed only 7% to the total production. The grid should not be totally dependent on a source that only provides such a small percentage of the total supply.

#### What are the options?

Judging by the antics in the House of Representatives in February, when the Treasurer Scott Morrison passed around piece of coal, the Coalition government wants to pursue a policy built on coal. Is this a wise course to follow?

There are problems with coal.

1. The price of thermal coal has dropped steadily from US\$130/t in 2011 to US\$40/t in 2017, therefore new coal mines are not attractive investments.
2. Coal is a major polluter, not only of greenhouse gases but also of smog and acid rain. There is no such thing as clean coal. We should try to minimise its use.
3. The technology for Carbon Capture and Storage has not developed sufficiently to be applied routinely to coal power stations. The costs are difficult to estimate and they would vary considerably for each site.
4. There could be a lead time of at least five years before any operating facility could be commissioned.

There are problems with renewables.

1. The lead time for stored hydro could be at least five years for each site and the costs have not been estimated.
2. Large scale battery storage has not been costed or tested in Australia.
3. Wind farms are not very popular with the community unless they are getting a rent from the turbines.

What about gas?

1. Gas produces fewer emissions than either coal or oil.

2. Gas power stations can be powered up and shut down much more effectively than coal power stations.
3. Australia has a huge gas reserve (3.5 trillion m<sup>3</sup>) and at present is producing approximately 70 billion m<sup>3</sup> annually.
4. We need a regulatory framework so that we can access our own gas for domestic use and appropriate infrastructure to process and distribute it. At present most of our gas is exported.

Support for increasing the gas option came from the Australian Energy Market Operator (AEMO). It warned that 'Australia is facing energy shortages if governments do not carry out national planning as exports continue to dominate the country's gas supply.' (<https://www.aemo.com.au/Media-Centre/-/media/be174b1732cb4b3abb74bd507664b270.ashx>). The AEMO report predicts that New South Wales, Victoria and South Australia will be impacted from the summer of 2018–19, and warns that the tightening of the domestic gas market

*It doesn't make sense to blame renewable energy for the blackouts*

will have flow-on effects to the electricity sector unless there is an increase in gas supplies and development.

What about nuclear power?

It would provide a clean reliable base load, but it needs to be costed and it cannot adapt rapidly to fluctuating demands. Furthermore, the politics are against anything nuclear.

#### The way forward

We should use natural gas to replace coal for the next ~20 years and at the same time increase our renewable capacity in wind, solar, pumped hydro and battery storage, as these technologies evolve. There should be a carbon tax to cover the environmental costs of burning coal and other fossil fuels and all government subsidies should be withdrawn so that the real costs of supply are accessible.

Well that's what I think!

## Petroleum Resource Rent Tax regime under investigation

The Turnbull government is contemplating measures to boost the revenue it collects from offshore oil and gas projects, after collections under the PRRT regime fell by more than half after 2012–13 (Katharyn Murphy, *The Guardian*, 11 March 2017). It is estimated that under the current arrangement the Gorgon Project will pay no tax until 2030. A new royalty regime is being proposed by Diane Kraal from Monash University.

I have never understood why the present arrangement is called a 'Rent Tax'. To me, if you rent a house or a car you return the asset in reasonable condition after you have used it. Not so with oil and gas. Once the resource has been extracted it is gone for good! It should really be called an Extraction Tax.

*The tax...should really be called an Extraction Tax*

### Taxpayers to subsidise clean ups

Anyway, it seems that the terms of the current PRRT should be reviewed because at present Australian taxpayers will have to subsidise the clean-up costs of any oil spills in Australian offshore tenements due to the terms of the Petroleum Resource Rent Tax.

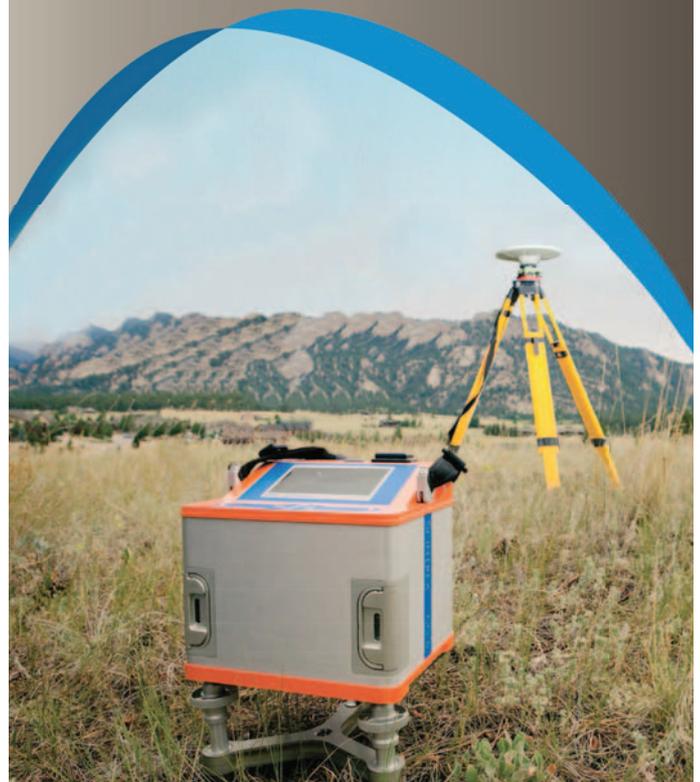
At Senate Estimates in 2016 Treasury officials confirmed that companies would be able to claim a tax deduction for expenses incurred from cleaning up pollution. (*The Guardian*, 25 February, 2017). Different 'uplift rates' would apply to clean-up costs depending on whether the spills resulted from exploration or production activity. It means the costs of cleaning up oil spills from exploration wells would be tax deductible, and could be held over and 'uplifted' into future years at an annual rate of 17.5%.

An interesting situation!

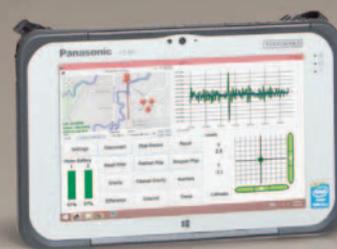
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## Minerals exploration rebound continues; petroleum still in the doldrums

### Gold drives mineral exploration recovery

Investment in mineral exploration continues to increase, according to the mineral and petroleum exploration data for the final quarter of 2016, released on 27 February 2017 by the Australian Bureau of Statistics (<http://www.abs.gov.au/ausstats/abs@.nsf/mf/8412>).

The trend estimate increased 3.4% (\$12.0m) to \$369.5m in the December quarter 2016. This is an increase of 4.6% above the December quarter for 2015.

The largest contributor to the increase was Western Australia (up 4.3%, \$10.0m). WA now hosts 60% of the country's mineral exploration investment and approximately half of this amount was invested into gold exploration (\$133m).

In original terms, mineral exploration expenditure rose 6.2% (\$23.6m) to \$403.1m. It is now at similar levels to what it was in the December quarter 2005, but well below the peak of \$1163m in the June 2012 quarter (see Figure 1). The other good news is that exploration on areas of new deposits rose 15.0% (\$17.1m), which exceeds the increase in expenditure in areas of existing deposits, which rose 2.5% (\$6.7m).

In other words, companies are starting to look for new deposits.

All data have been normalised to December 2016 A\$, using the CPI. The raw data were supplied courtesy of the Australian Bureau of Statistics. See:

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/8412>.

The minerals exploration rebound is in lock-step with the value of the market capital of the main resource companies listed on the ASX (Figure 2). This bottomed out in January 2016, which coincides with the minimum quarter for exploration data in March 2016. If you invested in shares represented by the companies that were used in calculating the All Ordinaries Index in July 2000 your return would have been approximately 1% per year plus dividends. If you invested in the major resource companies the return would have been approximately 5% per annum plus dividends. A good investment!

*The minerals exploration rebound is in lock-step with the value of the market capital of the main resource companies*

### Petroleum still in the doldrums

The story for petroleum is not so good. Both onshore and offshore exploration fell in the December 2016 quarter and the trend estimate for total expenditure is now at its lowest level in the 2005–2016 period. It fell 2.9% (–\$9.5m) to \$320.0m in the December 2016 quarter. This is well below the peak of \$1593m recorded in the June 2014 quarter.

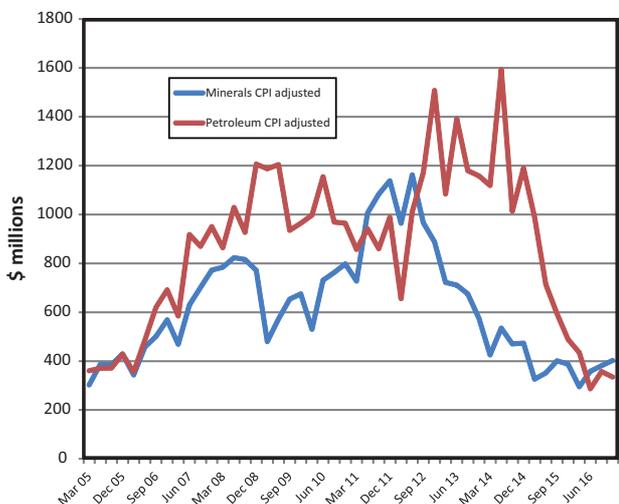
Exploration expenditure on production leases fell 30.9% (\$10.2m) however, the exploration expenditure on all other areas rose 1.0% (\$3.0m). The largest contributor to the decrease in the trend estimate was Western Australia – down 9.3%, to \$214m. However, WA captured 64% of the national total so there is a good base for a re-bound. As can be seen in Figure 1, the downward slope appears to be decreasing.

The other bad statistic is the level of oil production by Australia. This continues to decline (see Figure 3) and the oil price is still hovering around US\$50/bbl – nowhere near the heady heights of US\$100/bbl between 2011 and 2014.

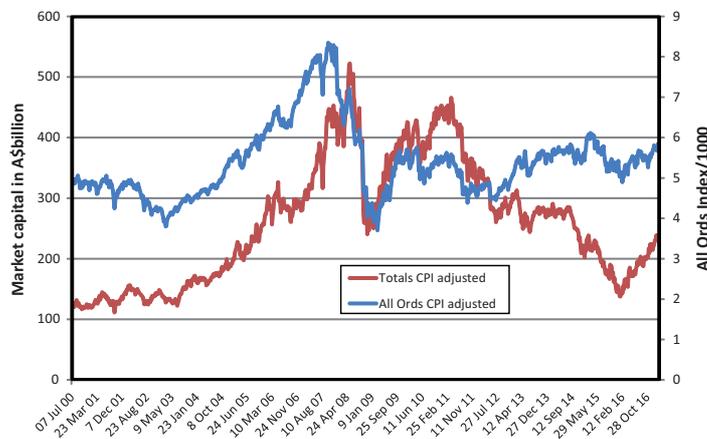
The production of natural gas might save us. This has increased steadily from 1100 Mm<sup>3</sup> a quarter to 1500 Mm<sup>3</sup> from 2010 through 2016. However, the politics of this resource are complex and unpredictable.

Domestic consumers are complaining about Australian gas being shipped and sold to wholesale customers in Japan for 40% less than it is sold to Australian customers, despite the extra costs of liquefying and shipping the gas there (<https://www.theguardian.com/business/2016/aug/16/australian-gas-40-cheaper-japan-than-australia-despite-export-costs>).

Furthermore, there are questions about the level of the resource rent tax. Companies in Australia operating large gas-to-liquefied natural gas (LNG)



**Figure 1.** Quarterly mineral and petroleum exploration investment for the period 2005–2016.

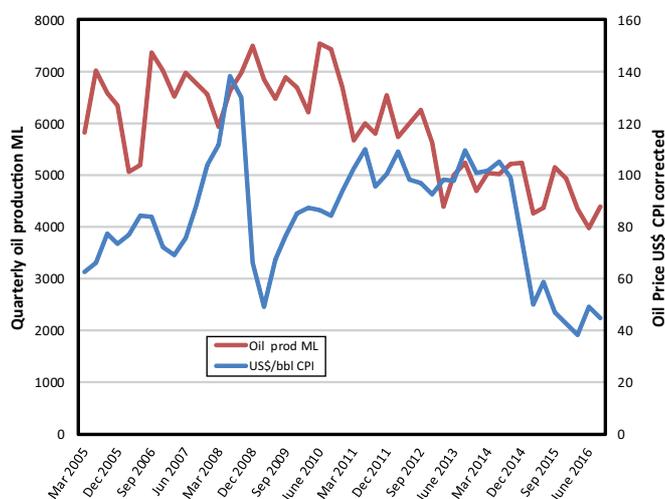


**Figure 2.** All Ords Index and market capital of resource companies listed in the top 200 companies in the ASX between 2000 and 2016. All values have been corrected using the CPI to December 2016 dollars.



projects pay a resource rent tax (a tax levied on above-normal profits) as well as the regular company tax. Above-normal profits from these new projects are perhaps a decade away, which is why there has been a recent drop in resource tax revenue (<https://www.theguardian.com/environment/2016/nov/22/australia-must-catch-up-with-other-countries-on-how-it-taxes-gas>).

This all too complicated for a mere geophysicist, but the message is: beware the politics when governments try to do deals on the run.



**Figure 3.** Total Australian Oil and Condensate quarterly production 2005–2016 in ML per quarter and West Texas crude oil price in US\$/bbl, normalised to December 2016 dollars. Sources from: <http://www.environment.gov.au/energy/petroleum-statistics> and <http://www.economagic.com/em-cgi/data.exe/var/west-texas-crude-long>.

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