The Oil Drum: Australia & New Zealand
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

The questions we don't ask: A review of the Australian Energy Resource Assessment

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There does not appear to be any metric by which we could argue that our current socioeconomic systems are sustainable. Despite this, we delude ourselves into believing that business as usual can continue indefinitely. We assist ourselves in this art of self-delusion by failing to ask the right questions or simply limiting the information that we are willing to consider. The recently released Australian Energy Resource Assessment (AERA), particularly the aspects related to oil, is yet another example of how our Government, and the bureaucracies supporting it, are failing to ask the right questions. The unfortunate consequences of this approach implies that Australia will be left with few options to respond to a very challenging set of problems, something that could and should be avoidable.

It should be noted that most of the information in Chapter three - oil of the AERA is good, particularly the assessment of Australia's future oil production. To the lay person it would appear to be a thorough and accurate appraisal of Australia's oil situation. The problem's lie in the nuances, the fallacies, the assumptions and the reliance on a narrow and far from fool proof set of data and projections on the international oil arena. These shortfalls could have significant implications for Australia, so lets take a closer look.

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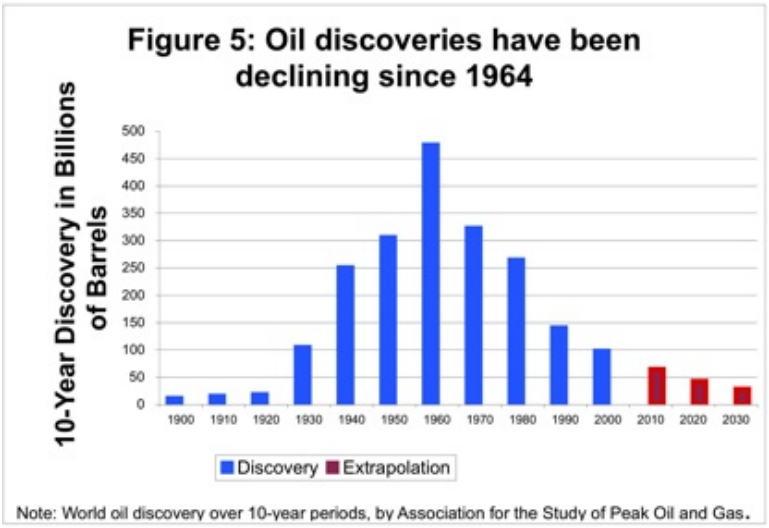
World oil reserves and the R/P fallacy

The AERA confidently asserts that the world has 1,408 billion barrels of proven reserves (table 3.1). This data is sourced from BPs Statistical Review of World Energy 2009 (http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622). The statistical review is viewed as an energy bible by many, yet BP is so confident about this publication that it won't even respond to questions about the data contained therein. The reason being that the information contained therein is not audited and of varying degrees of accuracy. The best example is provided by the 300 billion barrel jump in OPEC oil reserves during the 1980s. For example, Saudi Arabia's oil reserves jumped from 170 billion barrels in 1987 to 255 billion barrels in 1988 and have remained at just over 260 billion barrels ever since. This story is repeated amongst most of the OPEC nations. So what happened in the 1980s. Was there a wave of new discoveries? The answer is no. But what we know did happen is that OPEC introduced a production quota system based upon oil reserves. So maybe, just maybe some of these 'reserves' are political numbers used to enhance the production quota of a nation. If this is the case, some 250 to 300 billion barrels, around a fifth of the worlds proven oil reserves may be paper barrels only.

We then move onto the Reserves/Production ratio, a simple calculation that suggests that there is 42 years worth of oil left at current production rates. The AERA quotes the International Energy Agency suggesting that oil production will increase at one per cent per annum out to 2030. This

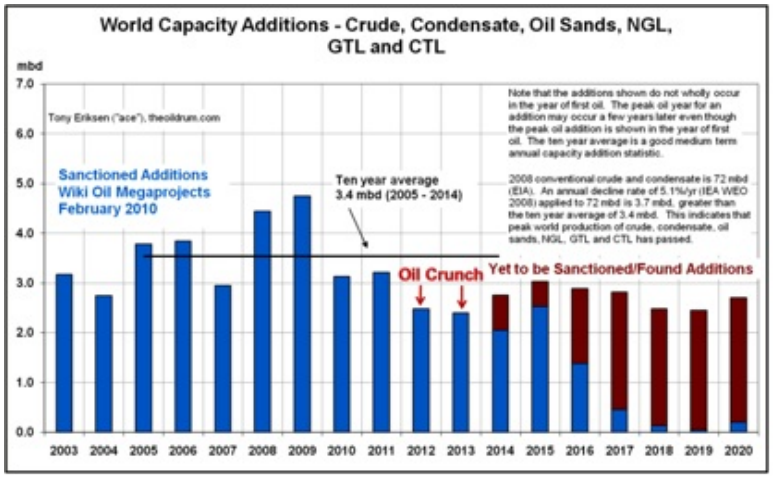
projection would see current reserves exhausted by 2047, only 37 years time. Subtracting $250 billion barrels of OPECs political reserves would see reserves exhausted by 2040, only 30 years time. Raise the growth in production to two per cent per annum and the oil age is potentially over by 2037. These figures are of course nonsense, oil will never run out entirely. We know this because the production profile of oilfields and oil regions roughly approximates a bell curve. Oil doesn't run out, as the pressure drops each field just produces less and less until it reaches a point where it is not economically viable. So this is good news, we will still have oil for many decades (or centuries?) to come, it is just that the flow will not be the 80 odd million barrels a day that we currently produce and the global economy has come to depend upon.

The AERA gets around this little problem by suggesting that new oil discoveries and reserves growth could offset the problem of declining reserves and production levels (p. 48). A very strong argument could be mounted to suggest that this is highly unlikely to occur. Despite significant technological advances, oil discoveries have been in long term decline for over forty years as shown in the chart.



Note: World oil discovery over 10-year periods, by Association for the Study of Peak Oil and Gas.

The depletion rate from existing oil fields is somewhere in the order of 4.5 – 6% per annum (http://www.aspousa.org/index.php/2010/03/drawing-the-lower-and-upper-bou...), a figure that will continue to increase. Combining these factors, and the projects scheduled to come on line over the next few years (see chart below), it becomes obvious that world oil production is unlikely to grow much, if at all in coming decades, indeed the opposite is more likely the case. And this does not consider the many and varied geopolitical influences that could result in reduced production levels.



Source: http://energybulletin.net/node/51447

For some reason however the AERA does not detail these factors anywhere in its analysis. Unfortunately this is not the only gap in the AREA.

Exports and imports

'a key assumption is that demand for oil will continue to grow and will be met from a variety of sources including imports, ...' (p. 64)

If this is a key assumption, then the question of where these oil imports will be sourced from can, should, but hasn't been asked. Australia's oil production peaked in 2001 and is likely to continue declining according to the AREA. We now import a significant percentage of our oil requirements but with our consumption expected to grow by 1.3% per annum our imports are expected to increase at 3.3% per annum out to 2030. This will result in 75% of Australia's oil requirements being sourced from over the sea. There is significant doubt that this volume of oil will be available in the future as I have written about previously (http://www.onlineopinion.com.au/view.asp?article=8842). The concept is not a difficult one to understand, as an oil exporting nations oil production goes into decline while its domestic consumption increases, the ability to export oil dwindles rapidly. Applying The Export Land Model (http://aspo-usa.com/2009presentations/Jeffrey_Brown_Oct_11_2009.pdf) to the world's top five oil exporters, suggests that at the time Australia needs 75% of its oil requirements to be met by imports, that these countries will be approaching zero net oil exports. This calls into significant doubt the soundness of this key assumption and begs the question; what is plan B?

Oil intensity

Time to consider another misconception; the oil intensity of the economy. Oil intensity is the quantity of oil consumed per unit of GDP. The AERA states that:

The continued decrease in oil intensity also complements broader environmental and energy security policy goals. (p. 66)

This statement is disingenuous. Addressing oil intensity without addressing total consumption is a nearly pointless activity. For example if we double vehicle fuel efficiency but at the same time double the number of vehicles on the road then our fuel consumption remains the same. This is the point that focusing on oil intensity misses. Despite the decades long trend of declining oil intensity, total oil consumption has continued to increase as have greenhouse gas emissions. If we really want to complement environmental and energy security policy goals the key is increasing fuel efficiency and reducing the number of vehicles on the road and reducing the distance travelled.

Net energy

What is the difference between a barrel of crude sourced from Saudi Arabia and a barrel of synthetic oil sourced from the Canadian tar sands? The answer is net energy. One of the reasons that crude oil is such a useful energy source is that its net energy profit is so high. However net energy is a major disadvantage for all of the alternatives to crude oil such as biofuels, tar sands, oil shale, Coal to Liquids (CTL) and Gas to Liquids (GTL).

For example, the net energy profit of tar sands is about 4 (ie. five units of energy are produced for every one invested). A paper (http://www.mdpi.com/1996-1073/2/3/490/pdf) published in the peer reviewed journal Energies suggests that global oil and gas production had a net energy profit of 17 in 2006. The importance of this is that the alternatives to crude oil cannot compete on a barrel per barrel basis. So even though alternative fuels might offset some of the declines in crude oil, when considered on a net energy basis, the actual energy available for our economies to do useful work maybe much smaller, implying that our economies might also be smaller. Concepts

such as net energy and energy returns on investment are concepts that governments, many economists and the team that wrote the AERA don't seem to understand.

Conclusion

So there you have it. Thousands of hours of time and taxpayers money invested into a product that is incomplete, misleading and fails to grasp some fairly simple concepts. This results in an assessment of Australia's future oil and liquid fuel situation that is not only unduly optimistic but also fails to provide the basis upon which a plan B can be developed for our nation as we enter the second half of the age of oil. This leaves us in the rather uncomfortable position of having a plan A, business as usual, which is not viable and no plan B. How, in a country as advanced as ours does this occur? Maybe if we could, as a society, resolve that question, we would be much better off, both now and into the future.