

SENATE RURAL AND REGIONAL AFFAIRS
AND TRANSPORT COMMITTEE

**INQUIRY INTO AUSTRALIA'S FUTURE OIL SUPPLY
AND ALTERNATIVE TRANSPORT FUELS**

3rd SUPPLEMENTARY SUBMISSION BY

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Australian Bureau of Agricultural and Resource Economics
TECHNOLOGICAL DEVELOPMENT AND ECONOMIC GROWTH
Report 06.1 for the
ASIA PACIFIC PARTNERSHIP ON CLEAN DEVELOPMENT AND CLIMATE

CRITIQUE OF THE REPORT
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May 2006, Revised August 2006

INTRODUCTION

This supplementary submission has been made to clarify the background to the data in Figure 18, p.35 Section 12 of my main submission (No.74) on Climate Change issues. Section 12.1 was a critique of ABARE's report 06.1 on energy consumption projections to 2050 for the six countries of the Asia Pacific Partnership on Clean Development and Climate (APPCDC) at their meeting in Canberra, January 2006. This submission explains the derivation of the oil consumption data in my Figure 18 from figures and tables in ABARE's report—the latter does not explicitly state the relevant data.

DERIVATION OF OIL DATA

Debate has grown since the 1980s over climate change due to carbon dioxide emissions from the burning of fossil fuels and other factors. The deliberations of the Intergovernmental Panel on Climate Change (IPCC) led to the draft Kyoto Treaty in 1999. The Treaty advocated that nations adopt targets to reduce greenhouse gas emissions principally by reducing the burning of fossil fuels. Australia and the USA are among a few nations that have not signed on to Kyoto.

Recent weather patterns are leading to acceptance of the reality of anthropomorphic climate change. That led to the inaugural meeting of the Asia Pacific Partnership on Clean Development and Climate in Sydney in January 2006—Australia, China, India, Japan, South Korea and the USA. Only Japan has joined the Kyoto Treaty. The APPCDC has taken a technological approach to the issue by targeting energy efficiency to reduce fossil fuel consumption and the sequestering of carbon dioxide and storing it in geological formations.

The Australian Bureau of Agriculture and Resource Economics (ABARE) produced a background Report for the APPCDC meeting, *Technological Development and Economic Growth; Research Report 06.1* (ABARE 2006). The reference year is 2001 with projections to 2050 for population, economic growth, fuel consumption and greenhouse gas emissions. It examined three scenarios for reducing greenhouse gas emissions from fossil fuel use, (1) business-as-usual, (2) energy efficiency and fuel options, and (3) the latter plus greenhouse gas sequestration. The report

anticipates substantial consumption increases to 2050 for commercial fuels in all APPCDC countries, especially for the fossil fuels and nuclear power.

The report did not discuss the peak oil debate or its implications AT ALL. Nor did it question resource constraints to economic development that will apply by 2050 and beyond. This critique examines the resource constraint aspects with a focus on oil.

ABARE's report does not explicitly list fuel consumption data for 2001 or for its projections to 2050 for the APPCDC countries. Global energy consumption is projected to grow from just under 9 billion tonnes of oil equivalent (Gtoe) in 2001 to about 21 Gtoe in 2050 (reference case). The six countries accounted for 48 per cent of global energy consumption in 2001, projected to be 55 per cent in 2050 (ABARE 2005, p.12).

Figure 2 (p.12) in ABARE's report *charts* for each country the 2001 energy consumption in mtoe¹ as well as that projected to 2010, 2030 and 2050 (reference case). Table 2 (p.13) in the report shows for each country the *percentage* of consumption for each of the fuels for 2001 and 2005 (reference case). ABARE Figure 10 (p. 32) *charts* the APPCDC countries energy consumption for each fuel in the three scenarios for 2050. This data is listed in Tables 1, 3 and 4 below. *The data has been calculated by scaling from these figures and by using data in ABARE's Table 2.* Energy consumption in 2050 for the energy efficiency/sequestering scenario is 83 per cent of the reference case, slightly less than Case 2, the energy efficiency-alternative fuel case. Table 2 below lists the actual consumption in 2001 from the BP Statistical Review of World Energy 2002.

ABARE's Report does not give the commercial energy consumption for 2050 by country in scenario 3—efficiency and carbon dioxide sequestering, only for the reference case.

Table 1
APPCDC countries energy consumption
Million tonnes oil equivalent (Mtoe)

Country	Total energy – coal, oil, gas, nuclear hydro		
	2001 reference	2050 reference	2050 efficiency/sequester
Australia	110	240	N/A
China	840	4,600	N/A
India	315	1,850	N/A
Japan	515	570	N/A
South Korea	195	390	N/A
USA	2,235	4,000	N/A
Total	4,210	11,600	9,650 (83%)

Table 2 lists actual consumption for 2001 by country and by fuel. Data obtained from the BP Statistical Review of World Energy 2002.

Table 2
Actual consumption in 2001
Million tonnes oil equivalent

Country	Coal	Oil	Gas	Nuclear	Hydro	Renew	Total
Australia	48	38	20	0	4	0	110
China	520	232	25	4	58	0	840
India	174	97	24	4	16	0	315
Japan	103	247	71	73	20	0	515
South Korea	46	103	21	25	1	0	195
USA	586	896	555	183	48	0	2,235
Total 2001	1,450	1,610	715	290	150	0	4,215

BP Statistical Review of World Energy 2002

¹ Million tonnes oil equivalent

Table 3 shows ABARE's projection of fuel consumption in 2050 by country and fuel for the reference case. The data is derived from Figures 2 and 10 and Table 2 in ABARE's report.

Table 4 shows ABARE's projection for reduced fuel consumption in 2050 by country and fuel for scenario 3, the energy efficiency and carbon dioxide sequestering case. **The only data available from the report is that shown in purple.** The data for Totals have been scaled off ABARE's Figure 10 (p.32), and for oil derived from Figure 11 (p.33) for each country. *ABARE does not give a breakdown by country for the other fuels. These are my estimates obtained by juggling the figures to bias against coal in favour of gas and nuclear, in particular for China. ABARE anticipates this outcome.*

Table 3
APPCDC consumption 2050 – reference case
Million tonnes oil equivalent

Country	Coal	Oil	Gas	Nuclear	Hydro	Renew	Total
Australia	95	85	45	0	5	5	235
China	2,400	1,240	450	420	75	45	4,640
India	690	700	125	300	20	15	1,840
Japan	80	270	70	130	20	6	565
South Korea	70	185	50	90	1	--	395
USA	800	1,720	980	400	50	80	4,020
Total	4,130	4,200	1,720	1,340	150	150	11,700

Table 4
APPCDC consumption 2050 – efficiency/technology case
Million tonnes oil equivalent

Country	Coal	Oil	Gas	Nuclear	Hydro	Renew	Total
Australia	75	65	50	--	5	5	200
China	1,800	955	370	560	75	40	3,800
India	410	535	135	415	20	15	1,530
Japan	55	225	90	125	20	5	520
South Korea	35	130	45	110	1	--	320
USA	580	1,340	750	490	50	65	3,275
Total	2,950	3,250	1,430	1,700	170	130	9,650

ABARE'S OIL ESTIMATES

The ABARE projection for APPCDC country oil consumption continuously increases to 2050 and approaches world consumption for 2001. See Table 10 below, data from Table 4 above. The ABARE projection for the efficiency/sequestration scenario implies cumulative world oil production by 2050 of about 2,700 gigabarrels (Gb). This implies a world ultimate of about 5,500 Gb, assuming an oil production peak in 2050. The Association for the Study of Peak Oil (ASPO 2006) estimates world oil production in 2050 will be about 35 million barrels per day, or 12 Gb for the year, about one quarter of ABARE's implied production. Production will have virtually ceased in the US-48, Europe and Russia by 2050 (ASPO 2006).

ABARE's oil consumption projections imply that China and South Korea will require the equivalent of the current Middle East countries oil production in 2050 and the USA the equivalent of 1.25 Middle East's. All APPCDC countries would require three Middle East's. This would require a major revived and sustained discovery rate for giant and super giant oil fields.

Table 10
ABARE Oil Consumption Projections to 2050
Million tonnes oil equivalent & million barrels/day

Country	2001 Actual		2050 Efficiency/sequester	
	Mtoe	M.bls/day ²	Mtoe	M.bls/d
Australia	38	0.75	65	1.6
China	232	5.0	955	19.6
India	107	2.3	535	11.5
Japan	507	5.4	225	4.3
S. Korea	103	2.2	130	3.5
USA	896	19.6	1,340	28
Total	1,614	35.3	3,250	68.5
World	3,552	76.3	~6,000	~120
ASPO -- world			~1,750	~35

The submission of the China Petroleum University in Beijing to the Senate Inquiry (No.21) reinforces these conclusions. The submission expects Chinese oil production to begin decline about the end of the decade. The original fields in east China are already in decline with new discoveries in west China and offshore in the China Sea barely compensating (Xiongqi 2006).

DISCUSSION

There is not much doubt that resource depletion for petroleum resources will significantly shape future energy regimes. ***Neither coal nor nuclear have the qualities needed to substitute for petroleum in transport and agriculture as we use them today.***

The approaching decline of oil and gas production will be one of the main drivers reducing greenhouse gas emissions arising from fossil fuel consumption. It is unrealistic to expect coal-based fuels to replace oil and gas in their transport roles. We are never likely to see coal fired cars or aeroplanes. Policies to curtail fossil fuel consumption to reduce greenhouse gas emissions MUST be integrated with those for managing the decline of oil and gas production.

Government agencies like ABARE MUST start seriously addressing resource limitations and factoring these in to all their reports and recommendations.

Finally, if the data is reliable, what has been the mindset of Chinese leaders and government, and its evolution, that has lead them to pursue such a risky economic agenda with such apparent disregard for the finite limits of their resources base? Perhaps this needs investigation.

There is an urgent need to find answers to these questions?

It is now essential that agencies in Australia like ABARE seriously address the issues of resource depletion that are arising around the world in their advice to governments. Never again should ABARE write a report like that for the January APPCDC meeting that totally disregards these issues. The consequences of not doing so are far too serious.

REFERENCES

ABARE 2006, Technological Development and Economic Growth, Australian Bureau of Agricultural and Resource Economics Report 06.1 for the inaugural meeting of the Asia Pacific Partnership on Clean Development and Climate, Canberra January 2006.

ASPO 2006, Association for the Study of Peak Oil, Newsletters 2006, www.asponews.org

BP Statistical Review of World Energy, 2002 and 2005 issues.

² There are 7.33 barrels in one tonne of oil.

Xiongqi, P, Qingyang, M, Zhang, Jun, Feng, Lianyong 2006, *The Challenge and Counter Measures Brought by the Shortage of Oil and gas in China*, Basin and Reservoir Research Center China University of Petroleum, Beijing, China.