SOME IMPACTS OF RISING WORLD OIL PRICES ON AUSTRALIAN INDIGENOUS RURAL AND REMOTE COMMUNITIES

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INTRODUCTION

In this paper I raise the issue of 'peak oil' and its impact on Australian Indigenous communities, present consequences of the rise in oil prices over the past three years for remote and regional Australia, and consider possible ways of addressing what I would argue is an increasingly dire future concerning economic development potential considered pivotal to these regions. The impact of 'peak oil' has been particularly difficult on the populations living in tiny and remote Indigenous communities in Western, Central and Northern Australia, the majority of which use diesel fuel for electricity and transport. Electricity powers bore pumps, household and workplace appliances, and equipment such as refrigeration. All food and other freight travels long distances via road transport, which already contributes to the higher prices of goods in remote community stores. The data presented below has been gathered from 'desk top' research, although it vividly points to the need for immediate studies in the communities.

One site of information concerning the impact of higher fuel prices on these communities is in the Western Desert of Western Australia (WA), located about 1,000 km north-east of Perth. The Ngaanyatjarra Council's (2005)[1] annual municipal grant for diesel purchase from the Australian government for 2005 was based on the figure of Aus$1.10 per litre.[2] However, by July of that year the Council had used up their funds as fuel prices peaked at $1.60 per litre during long periods. The Ngaanyatjarra Council has since agreed to enter into a Regional Partnership Agreement (RPA) with the WA State and a Shared Responsibility Agreement (SRA) with the Australian government for additional funding to reimburse the Council against the impact of fluctuating fuel prices.[3] In another jurisdiction, the Aboriginal Air Services (AAS) in Alice Springs (in the centre of the continent) closed its doors in 2006 due to high aviation fuel prices. AAS had provided essential transport services for more than 60 remote communities for close to three decades (Roberts, 2006). Finally, fuel prices of nearly $3 per litre are forcing Indigenous fishers in the Torres Strait outer islands (such as Boigu and Dauan) to return to traditional sail-powered vessels to fish in much

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the same way when European explorers Bligh and Flinders sailed these waters between Australia and Papua New Guinea more than two centuries ago (McGuire, 2006).

WHAT IS PEAK OIL?

'Peak oil' is a description developed in the early 1950s by a Shell geologist, Marion King Hubbert, to describe the way in which oil production from regional reserves follows a path that is similar to a 'bell' curve. Basing his predictions on record of prior oil discoveries and reserve growth, Hubbert predicted in 1956 that U.S. oil production would peak in the early 1970s followed by a peak in world production around the year 2000 (Heinberg, 2003, p. 90). Initially labelled a pariah for his controversial methods, within two decades he was proven correct when oil production in the contiguous U.S. peaked at close to 10 million barrels per day, a rate not since duplicated despite substantial discoveries in Alaska and the Gulf of Mexico. The discovery of new oil reserves peaked in 1960 and since 1990 oil consumption is measured at a rate of nearly 3 barrels of oil consumed for each new barrel discovered (Longwell, 2002, p. 102) (Figure 1).

Robinson and Powrie (2004) report that Australia's Bass Strait oil and gas province initiated production in 1970, reached its peak in 1985 only to begin a steady and irreversible decline. Overall Australia's oil production peaked in 2000 and again is in steady decline. Probability forecasts from Geoscience Australia (2006, p. 18) suggest that this trend will continue unabated during a period in which Australia's projected consumption increases (Figure 2). The probability of new discoveries required to meet earlier consumption and production peaks is not likely. The result: the annual cost of importing oil is over Aus$20 billion per annum, while the net cost of oil imports now exceeding exports by $5 billion in 2005 (The Senate, 2007, p. 64).

Excluding deepwater oilfields, output from 54 of the 65 largest oil-producing countries in the world is now in decline (Robinson, 2006). While global oil production rose markedly between 2000 and 2005, it has since slowed. And since the world oil price began its upward march in late 2002, world oil production has been able to quickly supply the additional oil demanded by the global market. However, as Figure 3 demonstrates, over the past two years world oil production plateaued at 84–85 million barrels each day.[4] Within OPEC, the only country presently

Figure 1 World oil discovery and production: 1900–2002

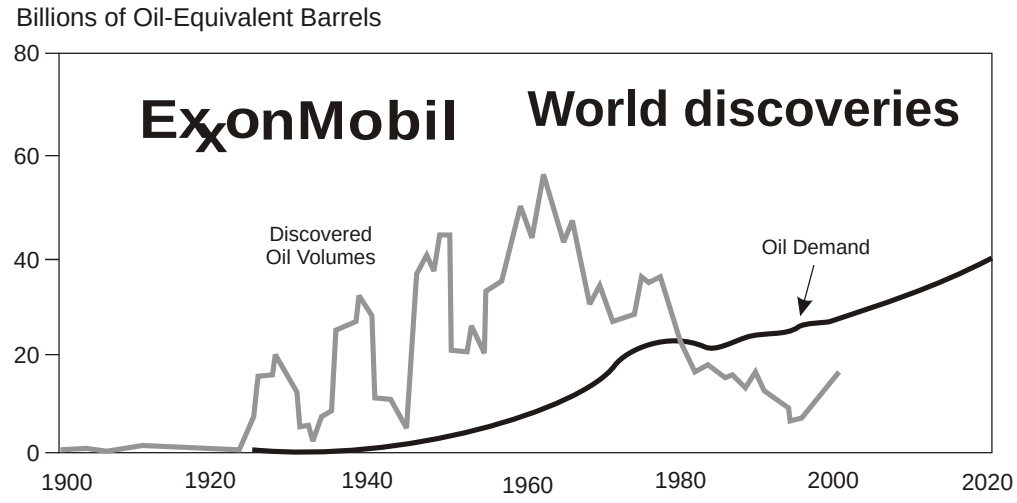
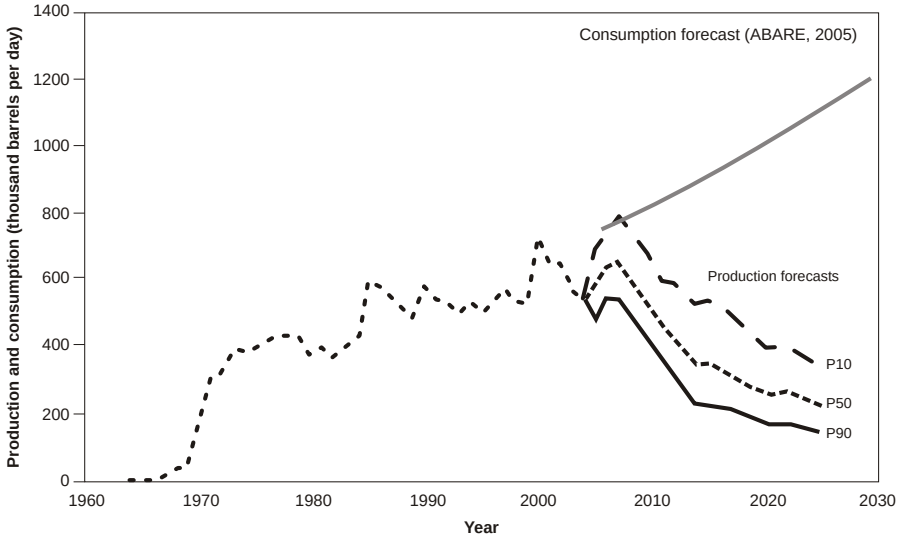


Figure 2 Australia's oil production 1965–2025



with any significant spare production capacity is Saudi Arabia (Appendix A). This surplus is heavy oil that is more expensive to refine than light, 'sweet' crude oil. The absence of any reliable audited reserve and field by field production data in most oil producing countries means it is difficult to develop more than uncertain probability estimates concerning the likely date for a global 'peak'. Estimates for such a 'peak' vary over a great range, from 2005 through to 2030, and beyond (The Senate, 2007, p. 43).

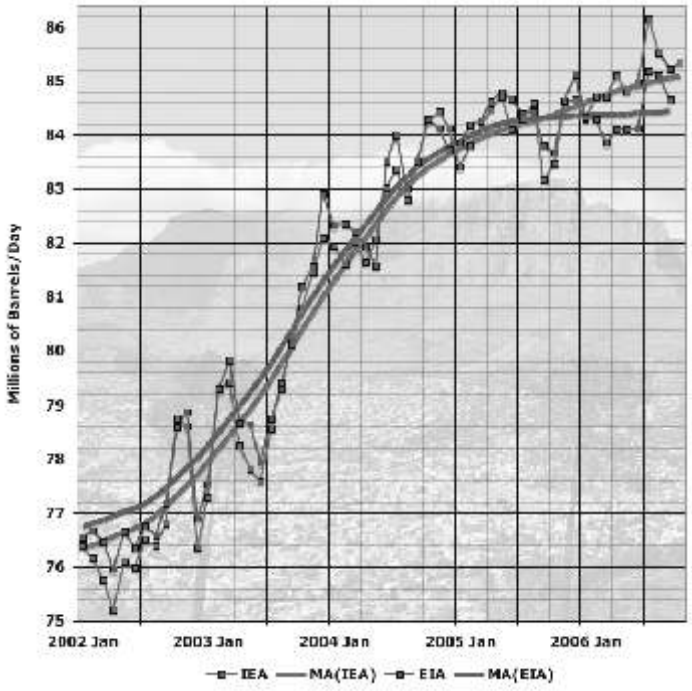
The major impact on Australians, in particular the remote areas, has been the rapid rise and volatile nature of these price changes (Figure 4). In mid-2006 the NYMEX futures price for West Texas crude peaked at US$78 per barrel. Currently, some commentators believe that oil will soon be priced at around US$80–100 per barrel, although some believe that it will drop to around $45 (Helman, 2006). Peak oil does not mean the world will run out of oil, but it does suggest that the world has come to the end of cheap liquid fuels, as global demand (especially from China and India) outstrips the growth in production. It is unlikely that oil will return to the figure of US$20 per barrel that it was trading at just five years ago.

POPULATION IN INDIGENOUS LANDS

A recent Senate Inquiry into Australia's future oil supplies attracted some 200 written submissions, albeit just one examining how Indigenous communities will be affected.[5] Most submissions focused on the impact of price rises on urban drivers and potential policy correctives aimed at reducing weekly fuel bills. The particular location and distribution of remote Indigenous communities is an important aspect of their ability (or lack thereof) to manage these rising prices. According to the 2001 Australian Census (2004), the Aboriginal and Torres Strait Islander population was estimated to be 458,520, or 2.4 per cent of Australia's population. The median age of Indigenous Australians was 20.5 years compared with 36 years for the mainstream Australian population. It is estimated that 25 per cent of the Indigenous population lived in areas classified as remote or very remote compared with only two per cent of the non-Indigenous population (Table 1).[6]

Using data from the Australian Bureau of Statistics (1999) report Community Housing and Infrastructure Needs Surveys (CHINS) to identify future challenges for Indigenous communities,

Figure 3 World oil production: 2002–2006 (as at December 2006)



Source: www.theoildrum.com/story/2006/12/5/144125/842

Figure 4 Volatility in NYMEX oil price: 2004–2006

Source: http://upload.wikimedia.org/wikipedia/en/thumb/2/28/Oil_Prices_Short_Term.png/800px-Oil_Prices_Short_Term.png

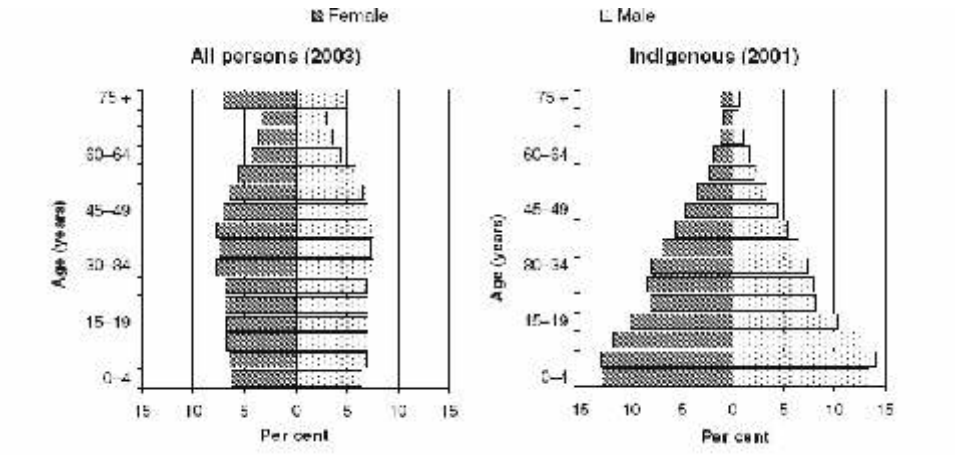
Taylor (2002, p. 13) projects that the Indigenous population in the remote Australian desert (or arid zone) (Figure 6)[7] will grow by about 10,000 people to nearly 45,000 over the next 10 years.

Half of this increase will be in the prime employment age groups (24–65) where population numbers will increase by 35 per cent over the decade. In a later publication, Taylor (2004, p. 98) suggested that high Aboriginal fertility rates will lead to sustained and rapid population growth and a high proportion of infants and children in these communities. In the Northern Territory, the Aboriginal population will double within a generation with a high potential for continued growth beyond that. Unlike the issue of population decline and ageing, which is a problem in many parts of urban Australia, the urgent challenge in many regions with Indigenous communities will be how to house and employ this young Indigenous population while ensuring that they will be able to access cost-efficient transport. Hence, easily obtained and cost-efficient energy will be critical to their future success.

Table 1 Estimated Indigenous population of Australia: 30 June 2001

Jurisdiction	*Indigenous population*	*Proportion of Indigenous population*	*Proportion of jurisdiction population*
ACT	3,909	0.9%	1.2%
New South Wales	134,888	29.4%	2.0%
Northern Territory	56,875	12.5%	28.8%
Queensland	125,910	27.4%	3.5%
South Australia	25,544	5.6%	1.7%
Tasmania	17,384	3.8%	3.7%
Victoria	27,846	6.1%	0.6%
Western Australia	65,931	14.4%	3.5%
Australia	458,520	100%	2.4%

Figure 5 Australian population distribution by age and sex



Source: ABS, 2004b.

Figure 6 Location of arid and semi-arid regions of Australia

Indigenous people's attachment to their land has resulted in the emergence of a distinct settlement structure involving the formation of numerous dispersed, small, and discrete Indigenous communities. This is especially the case in the NT, WA and the far north of South Australia (Cane & Stanley, 1985) (Table 2). These demographic factors have resulted in unique residential settings among Indigenous and non-Indigenous populations living in the desert region. In 1996, only 26 per cent of desert Indigenous people lived in the four major inland urban centres of the arid zone (Alice Springs, Port Hedland, Kalgoorlie and Broken Hill), while the remainder lived in more remote areas (Taylor, 1998). Taylor (2002b, p. 7) reports that close to 30 per cent (nearly 25,000 people) of the Indigenous population living in these remote and very remote regions live in communities usually numbering less than 200 people (Table 2). The future housing and infrastructure requirements of small communities in these remote areas are acute, and they will face additional challenges related to higher fuel prices that will affect food prices and transport and construction costs.

Indigenous communities need for power

While the focus of this paper has been on liquid fuels and transport, many remote Indigenous communities across Australia lack connection to electrical power grids or have intermittent grid power. Of those connected communities 40 per cent experience regular supply interruptions (The Senate, 2000, p. 139). Small, remote communities with populations of less than 50 people use home generators while the larger communities are more likely to use large, community diesel generators or have access to the State power grid. The ABS CHINS study found 133 Indigenous communities (10 per cent) all of which had populations of 50 or less had no electricity supply (ABS, 1999, p. 17) (Table 3).

Likewise, a study in WA indicated that 75 per cent of Indigenous communities rely on electric-powered bores for their water supplies, 20 per cent have their water delivered by truck while the remainder were connected to a town supply (DIA, 2004, p. 33). It is clear from these figures that most Indigenous communities in remote Australia are reliant on diesel fuels for

Table 2 Indigenous communities isolated from service centres, by settlement size

	Settlement Remote				*Very Remote*			
Size	*Comm.*	*% of Isol. Cty*	*Pop.*	*%*	*Comm.*	*%*	*Pop.*	*%*
<19	71	6.7	642	0.8	484	45.9	4,841	6.1
20–49	34	3.2	915	1.2	241	22.8	7,235	9.2
50–99	4	0.4	250	0.3	65	6.2	4,331	5.5
100–199	6	0.6	750	1.0	42	4.0	5,868	7.4
200–499	7	0.7	1,785	2.3	70	6.6	21,915	27.8
500–999	3	0.3	1,650	2.1	13	1.2	9,373	11.9
>1,000	0	0.0	—	0.0	15	1.4	19,358	24.5
TOTAL	125	11.8	5,992	7.6	930	88.2	72,921	92.4

Source: Adapted from Taylor, 2002b, p. 7.

Table 3 Indigenous discrete communities — main source of electricity supply (by Community Size — All Communities)

Type of electricity supply	*< 20*	*20–49*	*50–99*	*100–199*	*200>*	*Total (a)*	*Reported Population*
State grid	44	61	50	60	66	281	4,408
Community generators	85	70	30	33	81	299	50,990
Domestic generators	241	89	12	—	–	342	5,615
Solar	83	43	4	1	–	131	2,321
Solar hybrid	62	21	5	1	2	91	1,994
Other source	2	2	–	1	–	5	212
All communities with an electricity supply	517	286	101	96	149	1,149	108,540
No electricity supply	118	13	1	1	–	133	1,378
All communities*	644	299	102	97	149	1,291	109,994

* Includes 'not stated'

Source: ABS, 1999, pp. 16–17.

their day-to-day electricity to a greater extent than elsewhere. Electricity is also used for water pumps, household and workplace appliances, and for the refrigeration of food and medical supplies, suggesting that a rise in fuel costs increases Indigenous vulnerability.

Transport to access government services

The main mode of transport used in remote Indigenous communities to access key government and community services are cars and/or four-wheel drive vehicles (SUV). People from close to half of these communities must travel anywhere between one and four hours to reach required services, and 16 per cent of residents report travel times in excess of five hours. Due to variable weather conditions, road access to and from various communities may be limited or even impossible to access for periods ranging from four or five, one week periods annually. Thirty-seven communities experience continuous periods of road closure lasting for up to three

Table 4 Fuel consumption per state of Australia, 2006

	Volume (Million Litres)				*Market Share (per cent)*		
	Auto Petro	*Auto Diesel*	*Auto LPG*	*Total Volume*	*Auto Petro*	*Auto Diesel*	*Auto LPG*
NSW	6,031.8	3,558.1	871.6	10,461.4	57.7	34.0	8.3
VIC	4,885.9	2,582.6	1,344.5	8,813.1	55.4	29.3	15.3
Queensland	4,249.9	4,573.9	342.9	9,166.7	46.4	49.9	3.7
SA	1,356.2	1,070.1	230.5	2,656.8	51.0	40.3	8.7
WA	1,891.6	3,230.7	172.3	5,294.6	35.7	61.0	3.3
TAS	464.3	350.0	18.4	832.6	55.8	42.0	2.2
NT	137.9	438.3	5.1	581.2	23.7	75.4	0.9
TOTAL	19,017.7	15,803.6	2,985.1	37,806.4	50.3	41.8	7.9

Source: WA, 2007, p. 41.

months at a time and extreme weather conditions such as floods. Transport infrastructure is a key to the sustainability of these remote communities. West Australian Indigenous MP, Ms. Carol Martin, recently highlighted the problems for her constituents in the Kimberley (north-west WA) due to low road maintenance budgets and the impact of higher fuel prices:

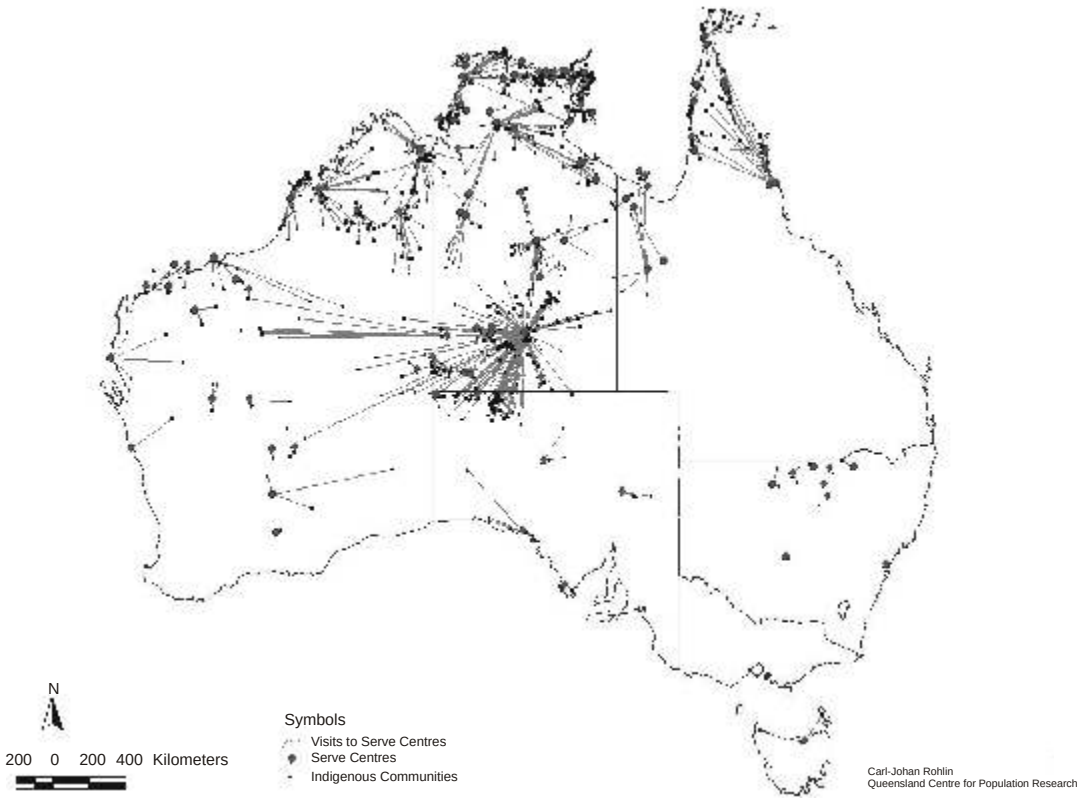
> I would like to raise some issues regarding the Dampier Peninsula, particularly the Dampier Peninsula road. This road is approximately 110 years old. Originally, it was used by the monks to access the peninsula. ... In the past couple of months there has been increasing concern about the freight service. I have been speaking to Broome Freightlines, which specifically services that area. It said that the maintenance costs on its vehicles is restricting its ability to operate. About three weeks ago it upped the ante, and freight costs increased by 20 per cent. The community wore it, because there was not much it could do about it. Norm Gardiner, the owner-operator, rang my office and said that the community had accepted the increase in freight costs, but because of the cost of maintenance on his trucks he can no longer justify servicing the community. He informed me that today would be the last day he would provide the service. ... The reason he can no longer provide the service is that the road is wrecking his vehicles. (Hansard WA, 14 September 2006)

The construction of a sealed road would positively promote Indigenous economic participation in the local pastoral and pearling industries. In response, the Minister for Planning and Infrastructure reported to Parliament that the cost of sealing the 160 km of gravel road would be about Aus$35 million, an amount beyond the local Shire of Broom council's resource base. Such experiences are likely typical for many remote communities of northern Australia. Regrettably there are no government attempts being made to gather data from Indigenous communities concerning their reliance on diesel for transport, or how much suitable infrastructure such as sealed roads would cost (Table 4). Cheap diesel fuels are critical to Indigenous communities, and this reliance is reinforced by the travel data collected (Figure 7).

Indigenous health and access to medical services

High fuel prices also impact on Indigenous health. The ABS reported that 895 (69%) of the 1,291 discrete Indigenous communities in Australia are located 100 km or more away from their nearest hospital, and only 53 per cent of these communities have access to emergency air medical services (ABS, 2005, p. 182).[8] People from

Figure 7 Major Indigenous communities and their economic and cultural travel needs



Source: Taylor, 2002b, p. 10.

these communities have to travel significant distances to access what urban Australians consider to be essential health services. For example, nearly half of the Indigenous communities located in WA, SA and NT have to travel over 25 km to access health centres (see Figure 9).

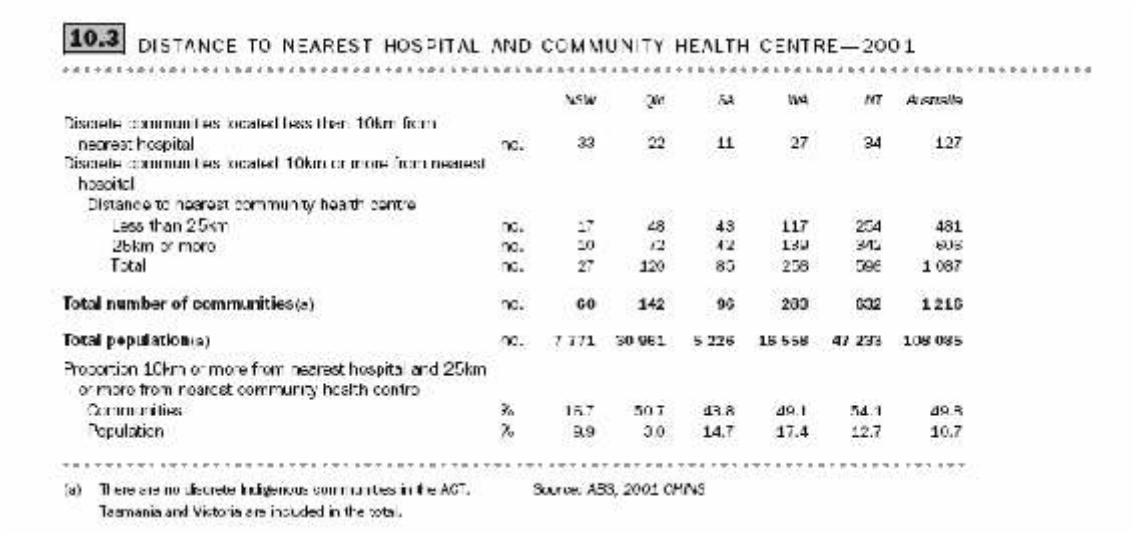
Cultural maintenance and land management

Finally, there is clear evidence that these small Indigenous communities continue to live on their traditional lands located in remote areas to ensure heritage and culture protection. For these communities, transport is essential if elders are to continue educating younger community members. For example, Sullivan (1988, p. 43) reports the "sudden and massive regional mobilisation" of Indigenous people attending a meeting of the Kimberley Land Council (KLC), in a remote location, required a journey of two or three days each way, and that there is a strong correlation between the maintenance of a traditional lifestyle and the retention of Indigenous languages, as an example (Figure 10).

Despite the strong links to their traditional lands, anecdotal evidence suggests that some Aboriginal peoples from smaller communities in WA are leaving their lands to live in larger settlements such as South Hedland. This is being done to try to ease the burden posed by diesel prices that have risen by 30 per cent over an 18-month period (Figures 11 and 12).

Information provided by a WA government departmental official demonstrates that the budget for diesel in some remote Indigenous com-

Figure 9 Indigenous access to health resources



10.3 DISTANCE TO NEAREST HOSPITAL AND COMMUNITY HEALTH CENTRE—2001

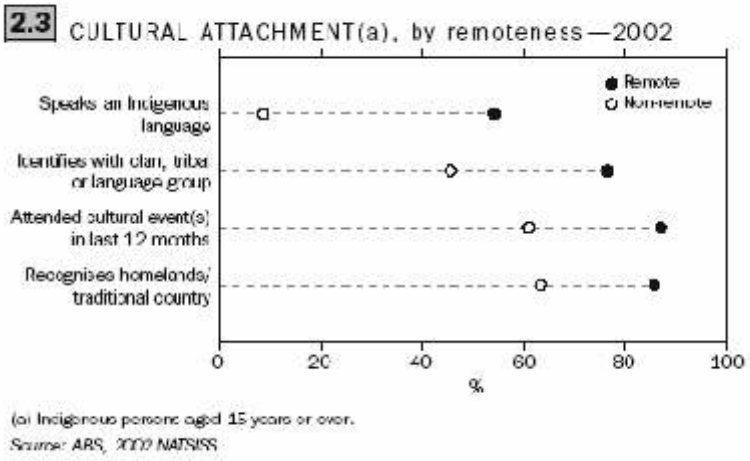
		NSW	Qld	SA	WA	NT	Australia
Discrete communities located less than 10km from nearest hospital	no.	33	22	11	27	34	127
Discrete communities located 10km or more from nearest hospital							
Distance to nearest community health centre							
Less than 25km	no.	27	48	43	117	254	481
25km or more	no.	30	72	42	139	342	605
Total	no.	57	120	85	256	596	1 087
Total number of communities(a)	no.	**60**	**142**	**96**	**283**	**632**	**1 210**
Total population(a)	no.	7 771	30 961	5 226	18 558	47 293	108 085
Proportion 10km or more from nearest hospital and 25km or more from nearest community health centre							
Communities	%	15.7	50.7	43.8	49.1	54.1	49.8
Population	%	9.9	30	14.7	17.4	12.7	10.7

(a) There are no discrete Indigenous communities in the ACT. Tasmania and Victoria are included in the total.

Source: ABS, 2001 CHINS

Source: ABS, 2005, p. 182.

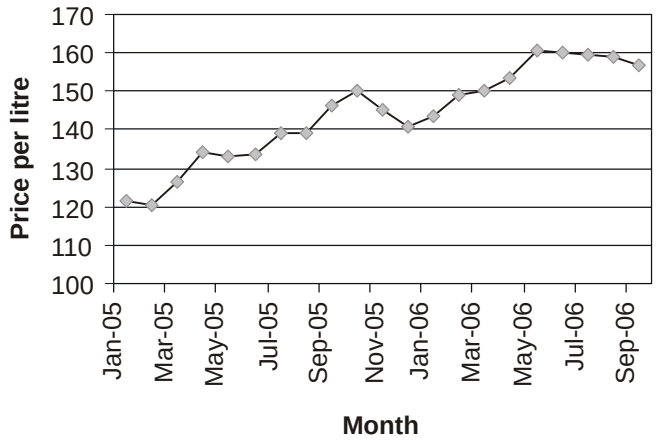
Figure 10 Remoteness and cultural attachment



Source: ABS, 2005, p. 6.

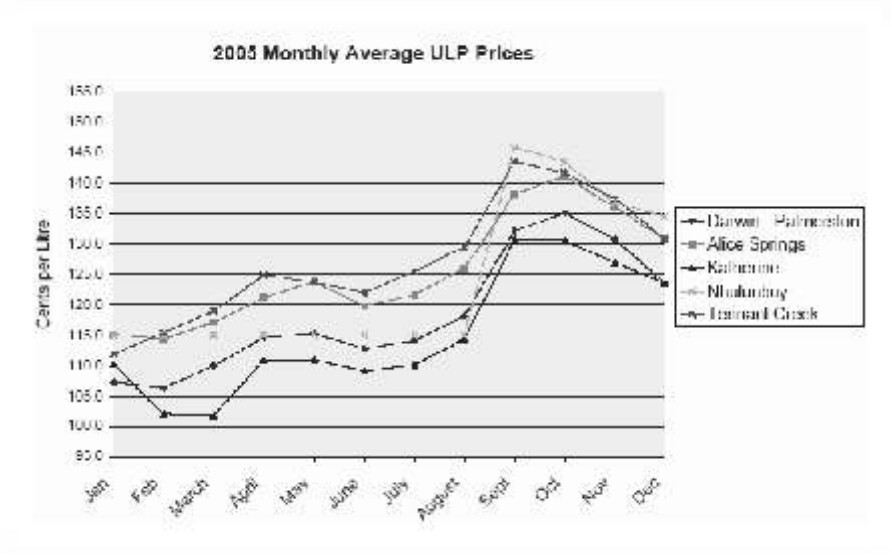
munities rose in 2006 from about 20 per cent of their annual maintenance budget to over 80 per cent. The resulting shortfall in operational revenue resulted in cost cutting to meet budgetary requirements that negatively affected education, health services, and infrastructure maintenance. Additional funds have been provided to Indigenous communities by the Australian government,

Figure 11 Kimberley diesel prices (Jan. 2005 to Sept. 2006)



Note: See <www.fuelwatch.wa.gov.au/prices/dsp_hist_avg.cfm> (last accessed 30 October 2006).

Figure 12 Northern Territory petrol prices — 2005



Note: See <www.nt.gov.au/justice/docs/cba/nt_fuel_watch/nt_fuel_watch_summary_graph_2005.pdf> (last accessed 30 October 2006).

although these monies arrive with obligations to the community. In relation to the Western Desert, additional powerhouse funds were provided to the Ngaanyatjarra Community (2005, p. 7); but under their 'mutual obligations', its members were required to

- take steps to minimise power consumption;
- pay power bills when presented;
- enter into arrangements to settle any outstanding debts; and
- place no pressure on staff or others to provide power services free of charge.

The Ngaanyatjarra Council itself was required to undertake new initiatives such as the following:

- set a benchmark fee collection rate of 100 per cent for all community members;
- develop an education program aimed at encouraging members to save power and minimise fuel costs; and
- implement the collection of tariffs in accordance with the rates set by the Australian government.

Finally, diesel fuels are at the heart of local community economic development ventures as Indigenous leaders attempt to generate the funds required to stay on their lands. In one instance, tourism was promoted as an economic development measure in the Kimberley Natural Resource Management plan (2004, p. 93); however, the success of such ventures would be dependent on affordable fuel inputs. Rising costs and price fluctuations would make it difficult to become and remain competitive with the local and overseas tourist experiences.[9] Pastoralism is another important sector for Indigenous employment. Baker (2000) shows that the fuel costs of pastoral properties in the NT averaged about $57,000 per annum, or about 10 per cent of their total annual expenditures. This figure is considerably higher than properties in other less-remote jurisdictions.

POSSIBLE ALTERNATE SOLUTIONS

In urban areas, governments have a wide range of 'demand-side' solutions that can assist drivers deal with higher fuel prices such as greater reliance upon public transport. In remote Australia, governments must focus on 'supply-side' solutions. These possible solutions include:

i) Alternate fuel sources to replace diesel;
ii) Convincing the State and Australian governments to 'subsidise' the future use of crude-based diesel fuels;
iii) Closing down the remote communities and moving residents to larger centres.[10]

Alternative two was proposed by the Remote Area Planning and Development Board (RAPAD) in a recent submission to a Senate inquiry into Australia's petrol prices in northern Queensland, which is responsible for an area of 385,000 sq km, encompassing 17 towns in 11 local government areas.[11] In support of the proposal, the Mayor of Winton Shire proposed a reduction or abolition of the Federal fuel excise (38¢ per litre) and the Goods and Services Tax (about 10–13¢ per litre) on fuel sales as a way of supporting the sustainable development of remote Australia.[12] Neither of the major Australian political parties appeared to support the proposal, especially given the arbitrage opportunities it opens for those living on either side of a boundary separating areas with different fuel taxes. This negative response begs the question: If governments refuse to subsidise fuel use in remote Australia, what types of economic activities are required to generate the required funding needed to ameliorate the influence of rising fuel costs and fluctuating prices? Evidence collected from the Road and Automobile Club of WA during the Senate inquiry indicated that tourism to remote Australia (and hence income for these communities) was already suffering due to the present rise in diesel prices over the past three years:

Senator WEBBER — Recently there was some publicity looking at price being a determinant for the change of behaviour and about how fewer people are driving east across the Nullarbor and how the roadhouses are really struggling to make a quid. Are you aware of those reports? They are saying they are hardly getting any passing vehicles these days.

Mr Moir (RACWA) — We do not track vehicle movements like that, but anecdotally we hear the same stories as you. We hear that the tourism market in the north-west, which is largely dependent on passenger or private transport, is suffering at the moment because of the fuel prices. With respect to the 'grey nomads', as they are referred to, the retired tourists, anecdotally we hear that their numbers are dropping off because of fuel prices.[13]

These positions were confirmed by another witness appearing before the Inquiry, this time from Queensland:

Councillor Collins (Mayor, Winton Shire) — Total visitor numbers have been declining in

what we call the outback region, which actually runs, outside of the RAPAD Board area, from the New South Wales border at Cunnamulla in the west, north to Mount Isa and Richmond and Hughenden. The outback region covers about two-thirds of Queensland. In that area there has been a general decline — I think it [the reduction] is in the order of about three or four per cent a year for the last four or five years.[14]

It appears that communities in these remote areas can maintain their customs and lifestyles only by convincing the Australian government to develop alternate fuel sources. Communities located in north Australia would benefit from the development of transport fuels based on liquid natural gas (LNG) or compressed natural gas (CNG), developed as part of the fuel developments occurring in the North-West Shelf and Timor Sea regions. Most existing large diesel engines can be appropriately modified although this would require local fuelling outlets to make anywhere from $50–100,000 in modifications. This should not be seen as an insurmountable cost given the alternate cost of housing and caring for people in rapidly growing centres, such as Alice Springs, if remote communities were forced to close. The development of a local LNG/CNG industry could also offer new training and employment opportunities for Indigenous workers to support this change in fuel supplies.

Another possible alternate fuel source is biodiesel. The WA government is presently exploring the policy issues surrounding this option via a Taskforce which is due to report in mid-2007 (ABC, 2006). Biodiesel has advantages over other biofuels, such as ethanol, for it can be developed from agricultural waste in small, cost-efficient local plants (e.g., sugar waste from the Ord River scheme in the Kimberleys). The WA Farmers Federation is currently investigating a plan to develop a network of regional biodiesel plants based on a cooperative model. It is anticipated that each plant would produce between 20–25 million litres of fuel annually. An alternative biodiesel source to agricultural waste could be obtained by planting and harvesting the 'diesel tree', or copaifera langsdorfii. It is estimated a one hectare plantation could produce 12,000 litres of fuel a year — enough to make a small farm self-sufficient in fuel (SMH, 2006). The economics of such an alternate fuel relies on transport distances being less than those for traditional diesel and petrol supplies. Again, the development of a local biodiesel industry in remote and regional Australia could also offer new training and employment opportunities for the growing number of young Indigenous workers.

CONCLUSION

This paper argued that analyses must be conducted into the vulnerability of remote Indigenous communities' dependence on cheap fuel supplies that are rising and demonstrate volatile price changes. Their continued existence relies on regular flows of low-cost diesel and petroleum fuels to support nearly all essential community infrastructure and functions. The shift in recent decades from limited regional travel and use of local resources for fuel to a reliance on hydrocarbons presents a significant challenge as the effects of 'peak oil' in Australia are imposed. The future sustainability of remote settlements will require considerable future research efforts to quantify the real situation, to consult with community members and to evaluate ways to reduce the dependence on oil-derived fuels, or its replacement by biodiesel. Such issues are not specific to Australian Aboriginal population. Cunningham (1999), for example, describes the plight of First Nations in the Yukon trying to develop and maintain an air-based medivac program. Similarly, Suppiah et al. (2003) describe how basic functions such as garbage collection in remote British Columbia First Nations communities can be hindered by lack of funds and road transport. In Australia, some solutions are emerging in WA at least, but they will require several years before we are able to measure their results or to produce the required levels of biofuel at a cost-efficient price. The danger of unchecked fuel costs could impede regional economic developments in regional and remote Australia leading to an exodus of young men and women from their traditional lands.

NOTES

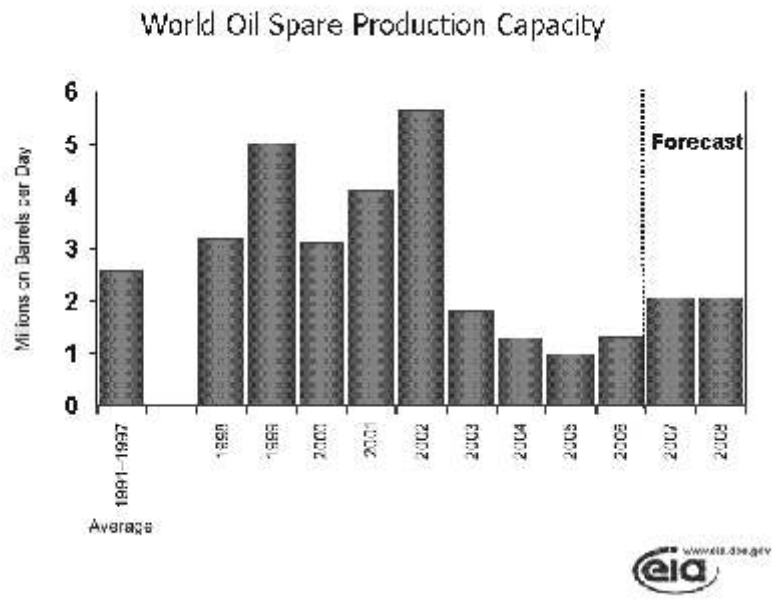
1. This remote region is home to 11 small Indigenous communities and in 2004 these communities were granted native title over an area of about 188,000 sq km. Online: <www.nntt.gov.au/media/Ngaanyatjarra.html>.

Appendix A OPEC Oil Production (as at January 2007, thousand barrels per day)

	7/01/2005	*Jan-07*		
	OPEC 10 Quota	*Production*	*Capacity*	*Surplus Capacity*
Algeria	894	1,360	1,430	70
Indonesia	1,451	860	860	0
Iran	4,110	3,700	3,750	50
Kuwait	2,247	2,500	2,600	100
Libya	1,500	1,650	1,700	50
Nigeria	2,306	2,250	2,250	0
Qatar	726	810	850	40
Saudi Arabia	9,099	8,800	10,500–11,000	1,700–2,200
United Arab Emirates	2,444	2,500	2,600	100
Venezuela	3,223	2,340	2,450	110
OPEC 10	28,000	26,770	28,990–29,490	2,220–2,720
Other Liquids		4,305		

Source: Table 3a. <http://www.eia.doe.gov/emeu/steo/pub/3atab.html> (Energy Information Administration/ Short-Term Energy Outlook — February 2007).

Appendix B Global Surplus Oil Prediction (U.S. Department of Energy, 2007)



Source: *Short-Term Energy Outlook*, February 2007 <http://www.eia.doe.gov/emeu/steo/pub/gifs/ Slide13.gif>

2. In early 2007, Aus$1 is worth approximately US$0.78 [online].
3. See <www.indigenous.gov.au/rpa/wa/warpanov0501.pdf> (last accessed 30 October 2006).
4. These figures for 'oil' includes the production of other liquid hydrocarbons such as ethanol, bitumen and liquids condensates from the production of natural gas. IEA — International Energy Agency in Geneva and EIA — U.S. Department of Energy, Energy Information Agency, Washington, D.C.
5. See <www.aph.gov.au/Senate/committee/rrat_ctte/oil_supply/submissions/sublist.htm>.
6. See <www.aihw.gov.au/indigenous/>.
7. The arid zone amounts to 3.5 million km^2, or 45 per cent of the Australian land mass (Taylor, 2002, p. 4).
8. This proportion is likely to be now lower with the closure of AAS in Alice Springs, reported above.
9. Roarty and Barber (2004, p. 3) list the following reasons why country petrol prices tend to be higher than metropolitan prices: "A country service station typically sells less than half the amount of fuel of a metropolitan service station. Hence there is less opportunity to reduce the operating margin on fuel sales taking into consideration the overall viability of the business. Additionally there is higher distribution costs associated with country retail outlets. Furthermore, there are generally lower sales of higher profit non-fuel items in the country."
10. Alternative three will not be explored here, but there are many influential stakeholders who are already pursuing it as a 'solution' to other Indigenous issues such as community violence. This includes influential journalist Nicholas Rothwell from The Australian (2006a; 2006b) and the then-Minister for Indigenous Affairs, Hon. Amanda Vanstone (2005) who threatened "All Australians living in remote areas of the country have less access to services.... Perhaps we need to explicitly draw a line on the level of service that can be provided to homeland settlements."
11. See <www.aph.gov.au/Senate/committee/economics_ctte/petrol_price/submissions/sub43.pdf>.
12. See <www.aph.gov.au/hansard/senate/commttee/S9691.pdf>, p. E29.
13. See <http://www.aph.gov.au/hansard/senate/commttee/S9623.pdf>, p. E36.
14. Ibid., p. E33.

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