

The Hon. Ms. F. Bailey MP.
Chair Standing Committee
on Primary Industries and Regional Services
PO Box 700
Healesville Vic 3777

Craig Parsonage
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16 May 1999

Dear Ms. Bailey,

National Infrastructure Issues and Recommendations

I have prepared this paper for your attention and consideration. The paper contains four key infrastructure issues and recommendations of national importance.

The first issue relates to the assessment of infrastructure projects, including cost of capital and pricing. The second issue relates to the funding of the nation's road network. The final two issues are visionary; these could provide the platform for both further sustained economic growth and increased employment.

The four issues and recommendations are;

1.0 ISSUE

The cost of capital can significantly affect both the adoption /rejection of infrastructure projects of national significance and the pricing mechanism for recharging users.

1.1 RECOMMENDED ACTION

I. Request the Department of Finance and Treasury in conjunction with the Economic Development Authority to;

- a) advise the Government with recommendations, on the cost of capital to be used by Government in the economic analysis of national infrastructure projects. Both long term (eg 30 plus years) and short term infrastructure projects must be considered.
- b) advise the Government with recommendations, on the options available to it to make an economically viable long/short term infrastructure project financially attractive to the Private Sector.
- c) undertake an examination and report with recommendations, on the pricing options for national infrastructure projects with a view to possible recharge to users.
- d) undertake an international benchmarking review on how overseas countries fund National/ State infrastructure and report with recommendations.

2.0 ISSUE

Additional funds are required for the nation's road infrastructure. From 1988 to 1998 there has been a substantial reduction in road funding.

2.1 RECOMMENDED ACTION

I. Request the Department of Transport and Regional Development in conjunction with each State and Local Government Authority to provide;

- a) a condition audit on the Nation's roads by road type, and
- b) a ten year forward capital expenditure programme for each responsible authority.

II. Promote to all levels of Government the need to;

- a) develop and implement asset management strategies for roads and all infrastructure. These strategies must incorporate demand management and value analysis techniques. Such strategies to be used for both the following circumstances;
 - demand for a new asset, and
 - evaluation of the need for refurbishment and/ or replacement of an existing asset.
- b) train employees in asset management techniques.

III. The Commonwealth Government in conjunction with COAG to develop a forward funding commitment to the Nation's road programme.

3.0 ISSUE

Oil reserves in Australia are rapidly depleting. This will result in an increase in oil imports and a resultant deterioration in the nation's balance of payments.

3.1 RECOMMENDED ACTION

- I. Undertake an oil and gas audit. Seek a report on; the extent of oil and gas reserves in Australia, the current expected life of these reserves and the long term affect on the nation's balance of payments.**
- II. Develop and implement an energy strategy for Australia. This should incorporate;**
 - a) Provide a stimulus to the private sector to encourage further oil exploration and ultimate production within Australian territory.**
 - b) Request a report on the alternative options for the future generation of electricity and their practical viability.**
 - c) Provide Research and Development incentives for the production of electric cars in Australia.**
 - d) Continue to encourage the growth of both exports and import replacement to minimise the detrimental affect increasing oil imports will have on the nation's balance of payments.**

4.0 ISSUE

Water is the life blood of Australia. Irrigation water from the River Murray contributes substantially to the economy of the nation. Improving the availability of irrigation waters for the hinterland of Queensland and New South Wales could also provide substantial benefits to the nation.

4.1 RECOMMENDED ACTION

- I. Initiate an Australia wide competition for concept proposals to improve the availability of irrigation water for the hinterland of both Queensland and New South Wales. Such concept proposals should be both economically viable and environmentally sustainable. A substantial prize (say at least \$AUD 1 million) to be awarded to the winning submission.**
- II. The Government to commit funds to the Feasibility Study, Design, Documentation and Construction as each hurdle is passed.**
- III. Establish a committee of notable Australians to develop the competition criteria, invite submissions, overview the assessment and to recommend to Government the awarding of the prize money.**

The remainder of this paper discusses these issues. Each section concludes with a table of recommendations and consequential benefits.

Forwarded for your consideration.

Yours sincerely,

Craig Parsonage

NATIONAL INFRASTRUCTURE ISSUES & RECOMMENDATIONS

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1.0 ISSUE

The cost of capital can significantly affect both the adoption /rejection of infrastructure projects of national significance and the pricing mechanism for recharging users.

1.1 RECOMMENDED ACTION

I. Request the Department of Finance and Treasury in conjunction with the Economic Development Authority to;

- a) advise the Government with recommendations, on the cost of capital to be used by Government in the economic analysis of national infrastructure projects. Both long term (eg 30 plus years) and short term infrastructure projects must be considered.
- b) advise the Government with recommendations, on the options available to it to make an economically viable long/short term infrastructure project financially attractive to the Private Sector.
- c) undertake an examination and report with recommendations; on the pricing options for national infrastructure projects with a view to possible recharge to users.
- d) undertake an international benchmarking review on how overseas countries fund National/ State infrastructure and report with recommendations.

1.2 DISCUSSION

1.2.1 The cost of capital is vitally important in determining the economic viability of a project. Consider the three projects with net benefit cash flows a), b), and c) depicted in Diagram 1 and with hypothetical net cash flow values shown in Table 1.

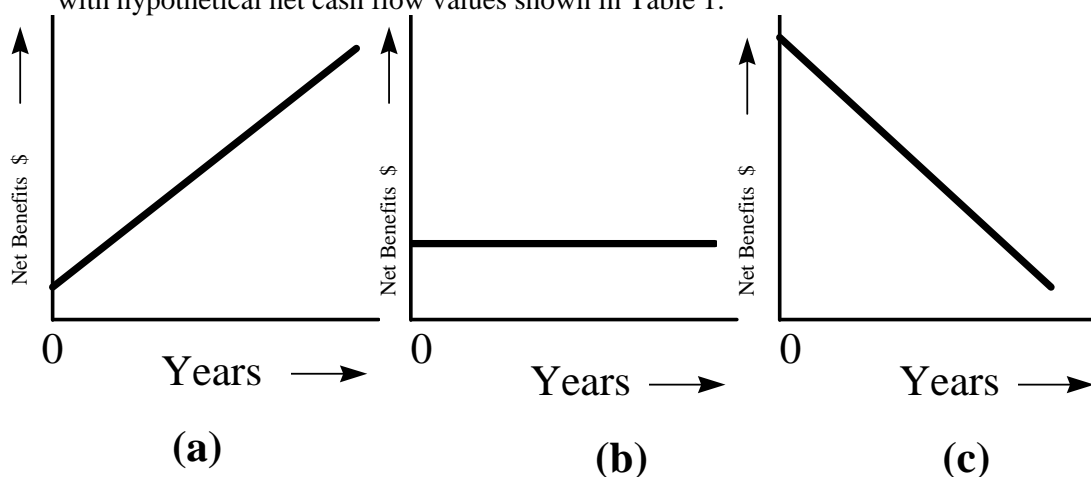


DIAGRAM 1

HYPOTHETICAL NET BENEFIT CASH FLOWS FOR PROJECTS (a), (b), (c)

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
\$Million CASH FLOW TYPE (a)	0	1	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	150	300	600	1140	
\$Million CASH FLOW TYPE (b)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
\$Million CASH FLOW TYPE (c)	200	150	125	100	80	60	40	30	20	15	12																			

TABLE 1

The cash flow depicted by a) could be typical of a long term infrastructure project which provides a platform for economic development.

Assume a real discount rate “R” equal to 6 percent per annum (Cost of Capital) is applied to each of the cash flows in Table 1 so that the net present value (NPV) of each revenue stream is the same (ie \$680 million) at year 0. (Note the real discount rate equals the prevailing annual interest rate minus the annual inflation rate.) The application of a higher discount rate (say 8 percent p.a.) than the real discount rate (“R”=6 percent p.a.) will result in the net present value of project(a) being less than NPV of project(b) which will be less than NPV of project (c). (Refer Table 2) Similarly a rate lower than the real discount rate “R” will result in the net present value of (a) being greater than (b) which will be greater than (c). This is summarised in Table 2.

AFFECT OF REAL DISCOUNT RATE ON NET PRESENT VALUE

NET PRESENT VALUE (NPV) of Cash Flows in Table1

Real Discount Rate	Project (a)	Project (b)	Project (c)
Discount Rate “R”=6% p.a.	\$680	\$680	\$680
8% p.a. (ie. greater than the Discount Rate “R”)	\$434	\$558	\$640
4% p.a. (ie. less than the Discount Rate “R”)	\$1088	\$849	\$725

TABLE 2

$$\text{The Benefit Cost Ratio (BCR)} = \frac{\text{NPV}}{\text{Investment at year 0}}$$

If each of the projects a), b), c) has the same initial investment at year 0, then it is evident that the Benefit Cost Ratio for each of these projects is directly proportional to the NPV. Thus the above table also describes the affects on the Benefit Cost Ratio by the cost of capital. Assume that each hypothetical project referred to in Table 1 has an investment of \$600 million dollars at year 0. Table 3 shows the relevant Benefit Cost Ratios for the hypothetical cash flows in Table 1 with Net Present Values in Table2.

BENEFIT COST RATIOS

Real Discount Rate	Project (a)	Project (b)	Project (c)
Discount Rate “R”=6% p.a.	1.13	1.13	1.13
8% p.a. (ie greater than the Discount Rate “R”)	0.72	0.93	1.07
4% p.a. (ie less than the Discount Rate “R”)	1.81	1.41	1.21

TABLE 3

- 1.2.2** Projects with cash flows of type (a) tend to describe longer term projects which may also be a platform for future development. Type (a) cash flows could describe infrastructure development such as the Snowy Mountain’s Scheme, the barrage and lock system on the River Murray, the Ord River Scheme, the Alice Springs to Darwin Railway line. Clearly high real discount rates (Cost of Capital) discriminate against such long term projects. Inappropriate use of high real discount rates will favour either short term projects or those where the majority of the benefits occur early.

1.2.3 It is often informative and instructive to review prior studies. It is possible with the benefit of hindsight to learn from an examination of the Alice Springs to Darwin Rail Link Study; particularly by taking into account the fluctuations in the cost of capital since the writing of the report. That comprehensive study, which also benefited from the work of prior reviews, demonstrates the affect the Real Discount Rate (Cost of Capital) has on the outcome of the resultant benefit cost ratio.

1.2.4 The following Table 4, an extract from the Alice Springs to Darwin Rail Link Study demonstrates the sensitivity of the cost benefit study to the discount rate. As the initial investment is the same for all scenarios, the BCR is directly proportional to the NPV.

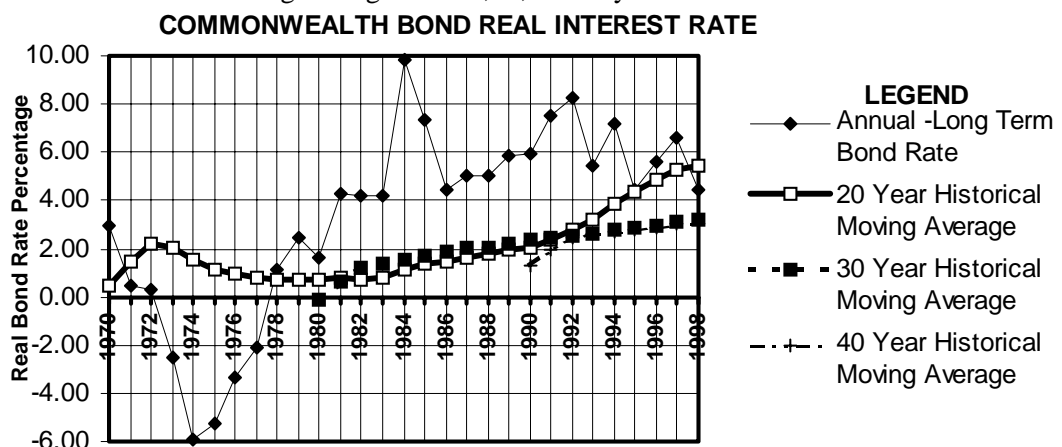
Benefit Cost Ratios for Alternative Traffic Scenarios (3% pa freight growth)		
	Base Rail Traffic	High Rail Traffic
	At 8% Real Discount Rate	
Domestic Rail Freight	0.78	1.04
Domestic and Land Bridging*	0.85	1.10
At 6% Real Discount Rate		
Domestic Rail Freight	1.09	1.44
Domestic and Land Bridging*	1.19	1.53
* Land Bridging:cargo is transferred from ship to rail.		

(Reference: Travers Morgan et alia; May 1995; Alice Springs to Darwin Rail Link Study)

TABLE 4

The Committee on Darwin which in 1995 reported to the Commonwealth Government on the viability of the Alice Springs to Darwin Railway line indicated that it could not recommend the project until it achieved a benefit cost ratio of at least one. If construction had started in 1996 the project, based upon 3 percent growth, then had a benefit cost ratio of 0.78 at a real discount rate of 8 per cent. Referring to Table 4, if 6% rather than 8% had been the then accepted real discount rate (Cost of Capital) the Committee on Darwin could have recommended the project as the benefit cost ratio exceeded one under all scenarios. The discount rate or cost of capital used in the analysis must now be more closely examined.

1.2.5 The real long term bond rate can be argued to be the cost of capital for national infrastructure projects. The real long term bond rate (ie actual bond rate minus the rate of inflation) has been examined from 1951 until 1998. Graph 1 shows the real long term annual bond rate since 1970 as well as historical moving averages for 20,30,and 40 years.



GRAPH 1

The real annual rate since 1970 has moved between -5.91% to +9.84%. While the 40 and 30 year historical moving average real bond rate has varied respectively between 1.28% to 3.07% and -0.13% to 3.22%. The prevailing annual real long term bond rate in 1994 was 7.16%. In a high real interest regime (which existed in 1994) it seems unrealistic that a project would be financed for its duration through expensive bonds. It seems more realistic to presume that a financing strategy would be adopted which would minimise the average real interest rate payable over the life of the project. It is suggested that such a strategy would result in the real cost of capital of the project approaching the 30 or 40 year moving average. If this scenario is accepted then the cost of capital would have been closer to 3%. If a 3% cost of capital had been used in the economic analysis for the Alice Springs to Darwin Railway it is evident that the benefit cost ratio would have easily exceeded one. This concept has far reaching implications for the assessment of long term projects. Similarly it has considerable implications for the pricing for the cost recovery of the provision of services.

1.2.6 The pricing of services is a key consideration for many service providers. The services of each tier of government are generally an input cost to the private sector. As Australian industry strives to become internationally competitive, it is important that the prices charged to the user for the provision of services are also internationally competitive. In addition to the issues of micro economic reform; there are some fundamental criteria which agencies must consider in determining the price of the service;

- a) the extent of project costs directly attributable to the users,
- b) the cost of capital, and
- c) international practice.

If the extent of cost recovery is excessive it will result in prices being too high and this will place an uncompetitive burden on the private sector.

1.2.7 From the foregoing it is evident that the cost of capital used as the discount rate is critical to the outcome of the analysis for new projects and also for the pricing of services on a user pays basis. Therefore it is recommended that the Government seeks a report on the cost of capital to be used in evaluating both long and short term infrastructure projects and for the pricing of services.

1.2.8 There is often a difference between the outcome of economic and financial analyses. Although an economic analysis may return a Benefit Cost Ratio greater than one the project may still not be financially viable from either a Government or a private sector perspective. However, if a project is both economically and financially viable for the Government it may not necessarily be financially viable to the private sector. Also the financial analysis undertaken by a private sector organisation will probably differ from that undertaken by Government. Using the Alice Springs to Darwin Railway as an example, Table 5 gives an indication of some differences which may occur between an Economic Analysis for the project as whole, Government Financial Analysis, and the Private Sector Financial Analysis.

AN EXAMPLE OF DIFFERENCES BETWEEN ECONOMIC AND FINANCIAL ASSESSMENTS

(using the Alice Springs to Darwin Railway as an example)

ISSUE	ECONOMIC ANALYSIS	GOVERNMENT FINANCIAL ANALYSIS	PRIVATE SECTOR FINANCIAL ANALYSIS
General	Considers the total societal impact of a project.	Considers all aspects of a project which provides direct revenue or cost to the Government	Considers those aspects of a project which provides direct revenue or cost to the Private sector.
Direct costs involved in building the infrastructure.	Relevant	Relevant	Relevant
Consequential reduction in the road expenditure on the Stuart Highway.	Relevant	Relevant	Not Applicable
Ball and Langry 1986 assert the Alice Springs to Darwin Railway has an intangible benefit as it would assist with regional security	Relevant (but is intangible because no financial value can be placed upon this issue)	Not Applicable	Not Applicable
Net consequential revenue from Taxation, Excise duty	Relevant	Relevant	Not applicable
Depreciation	Not Applicable	Relevant, because of possible changes to Government revenue.	Relevant
Cost of Capital	Government Rate	Government Rate	Possibly a higher rate than Government because of a higher risk element.

TABLE 5

Thus, if the Government wishes to proceed with an infrastructure project and attract private sector investment via a Build Own Operate (BOO), Build Own Operate Transfer (BOOT) type scheme then it will probably require the Government to provide some financial contribution. It is recommended that the Government seeks a report and recommendations on the options available to it to make an economically viable infrastructure project attractive to private sector investment.

- 1.2.9** Both Governments and the Private Sector are often constrained in undertaking projects because of the lack of available capital. For projects which are deemed to be economically viable and in the national interest the raising of capital needs to be addressed. In the United States of America, State or Local Government Agencies can raise funds for their operations through the issue of tax exempt bonds. The interest on a bond used to finance government operations is generally non taxable (reference USA Department of the Treasury Publication 550). It is recommended that the Government should request an international benchmarking review on how overseas countries fund National/ State infrastructure. The report to the Government should provide a range of options and recommendations for the financing of national infrastructure in Australia.

1.3 BENEFITS/Comments Re THE RECOMMENDED ACTION

<u>RECOMMENDATION</u>	<u>BENEFITS/Comments</u>
<p>I. Request the Department of Finance and Treasury in conjunction with the Economic Development Authority to;</p> <p>a) advise the Government with recommendations, on the cost of capital to be used by Government in the economic analysis of national infrastructure projects. Both long term (eg 30 plus years) and short term infrastructure projects must be considered.</p> <p>b) advise the Government with recommendations, on the options available to it to make an economically viable long/short term infrastructure project financially attractive to the Private Sector.</p> <p>c) undertake an examination and report with recommendations, on internationally competitive pricing options for national infrastructure projects with a view to possible recharge to users.</p> <p>d) undertake an international benchmarking review on how overseas countries fund National/ State infrastructure and report with recommendations.</p>	<p>a) Improved evaluation of infrastructure projects.</p> <p>b) Increased awareness by the Government of the principles involved in determining any Government financial contribution necessary to make an infrastructure project attractive for investment by the private sector.</p> <p>c) Increased private sector financial involvement in infrastructure projects.</p> <p>d) Ensure prices charged for services by agencies are internationally price competitive. <i>As the private sector works towards international competitiveness it is important that prices charged by Government for its services are internationally price competitive.</i></p> <p>e) Australia can ensure it is internationally competitive re the raising of capital for infrastructure projects. <i>In the USA tax free infrastructure bonds are used to assist with the financing of infrastructure.</i></p>

2.0 ISSUE

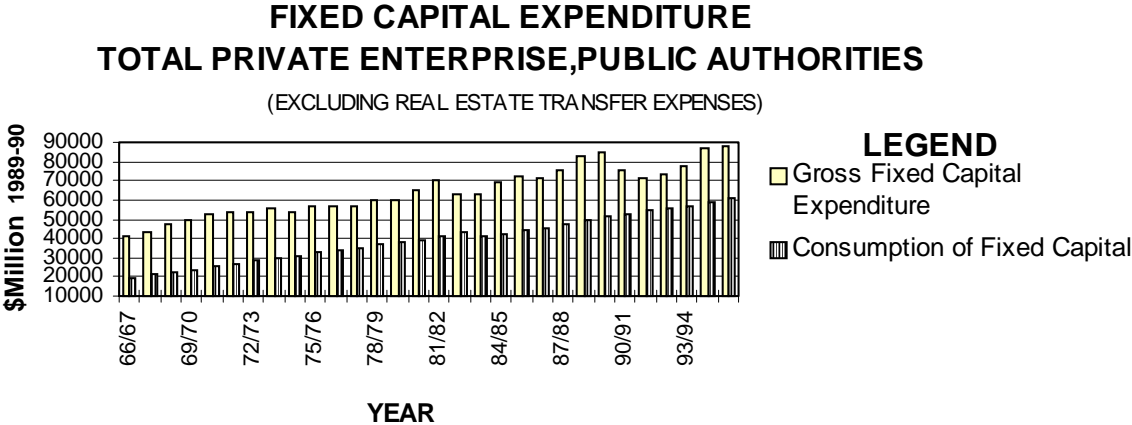
Additional funds are required for the nation’s road infrastructure. From 1988 to 1998 there has been a substantial reduction in road funding.

2.1 RECOMMENDED ACTION

- I. Request the Department of Transport and Regional Development in conjunction with each State and Local Government Authority to provide;**
 - a) a condition audit on the Nation’s roads by road type, and
 - b) a ten year forward capital expenditure programme for each responsible authority.
- II. Promote to all levels of Government the need to;**
 - a) develop and implement asset management strategies for roads and all infrastructure. These strategies must incorporate demand management and value analysis techniques. Such strategies to be used for both the following circumstances;
 - demand for a new asset, and
 - evaluation of the need for refurbishment and/ or replacement of an existing asset.
 - b) train employees in asset management techniques.
- III. The Commonwealth Government in conjunction with COAG to develop a forward funding commitment to the Nation’s road programme.**

2.2 DISCUSSION

2.2.1 Total Gross Capital Expenditure and Consumption of Fixed Capital of both Private Enterprises and Public Authorities is shown below (Graph 1)



GRAPH 1

2.2.2 Graph 1 indicates that Gross Capital Expenditure has exceeded the Gross Consumption (Depreciation) for every year since 1966/67. If expenditure had been well balanced between asset replacement/ renewal and the creation of new assets then there would be no general aging of our infrastructure. The following Table 1 gives a broad indication on the changes in the average age of the Nation’s assets over time.

END OF YEAR AVERAGE AGE OF GROSS STOCK

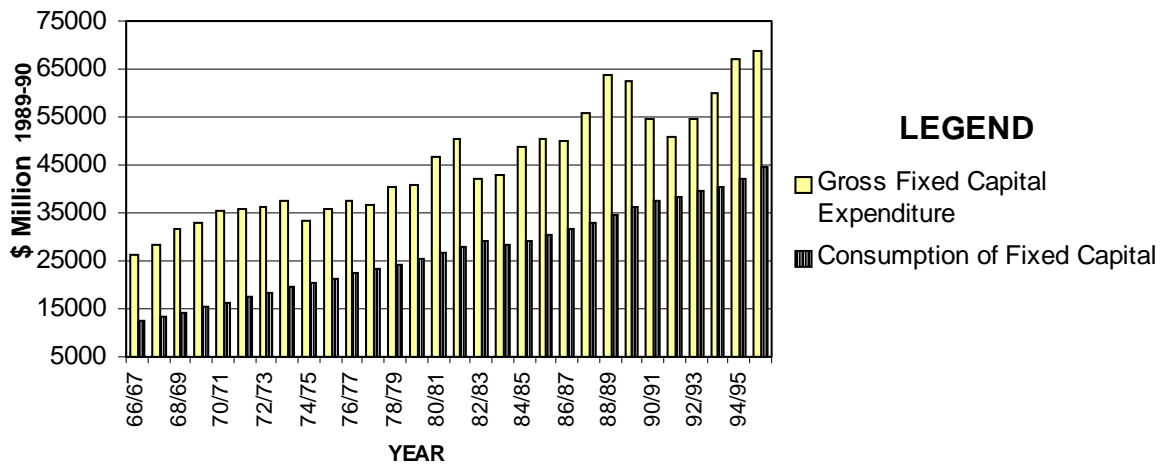
(Reference Australian Bureau of Statistics 5221.0)

[a]	[b]	[c]	[d]	[e]
YEAR	Total Asset Stock Average Years (weighted average of columns c & d)	Private enterprises Average Years	General Government (Includes e) Average Years	Roads Average Years
1966/67	14.1			
1983/84	13.4	13.9	14.8	16.3
1995/96	15.7	15.1	17.1	18.6

TABLE 1

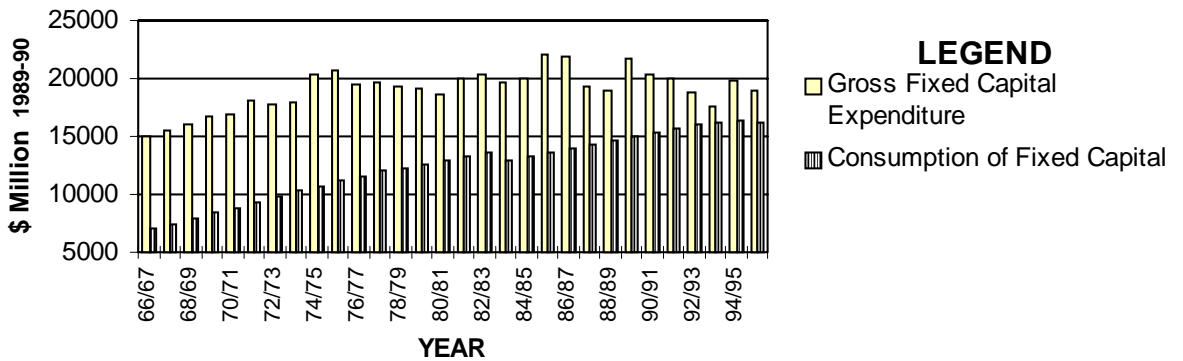
2.2.3 Since the late 1980's there has been a general increase in capital expenditure by the private sector and a decrease in public sector expenditure. This is highlighted by the two separate graphs for Fixed Capital Expenditure by Private Enterprises (Graph 2) and Fixed Capital Expenditure by Public Authorities (Graph 3). The increase in private sector expenditure is consistent with the Commonwealth and State governments' outsourcing policy (eg electricity) and demonstrates that prior to this time private sector expenditure was being crowded out by public sector expenditure.

FIXED CAPITAL EXPENDITURE Private Enterprises, (Excluding Real Estate Transfer Expenses)



GRAPH 2

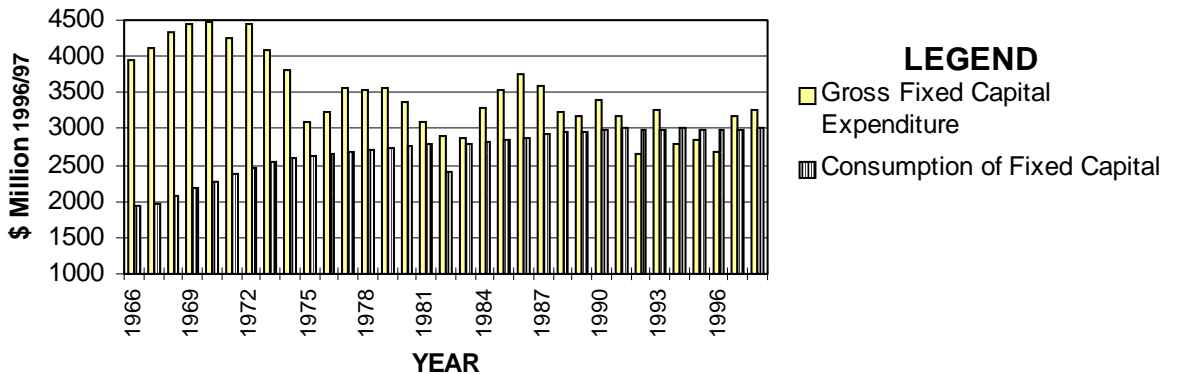
FIXED CAPITAL EXPENDITURE
Public Authorities,(Excluding Real Estate Transfer Expenses)



GRAPH 3

2.2.4 Referring to Table 1, the average age of roads has increased from 16.3 years in 1983/84 to 18.6 years in 1995/96. Initial observations indicate that this may be able to be explained by the decline in road expenditure on Commonwealth, State and Local Roads since 1989 (refer graph 4).

Capital Expenditure
Commonwealth, State & Local Roads (excludes private enterprise investment) \$ million 1996/97



GRAPH 4

Although there has been a decline in road funding since the mid 1980's the funding level has approximately kept pace with consumption or depreciation level (refer Graph 4). However, over the life of a national highway in particular there probably will be;

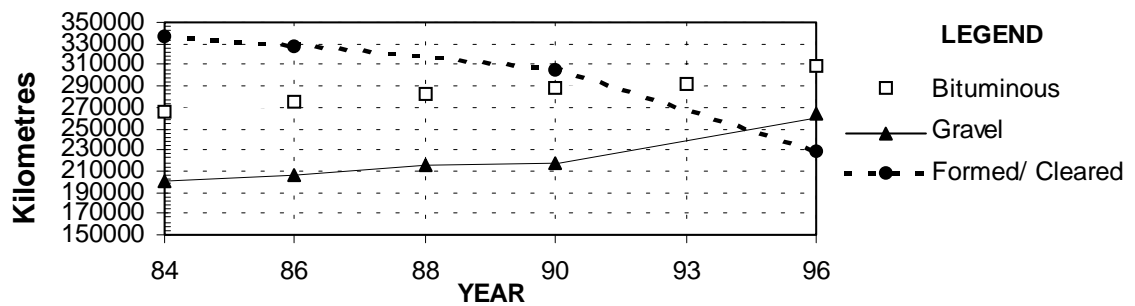
- increases in traffic volumes,
- increased loads,
- changes in traffic engineering design standards.

Thus it can be expected that national highways may become more expensive to construct to the new conditions & standards. Funds allocated to meet only consumption levels may not be adequate to facilitate the replacement/ upgrade of a national highway asset.

2.2.5 The length of sealed road has increased nationally by 42,521 kilometres since 1984. The sealed length has increased from 266,666 kilometres (1984) to 309,187 kilometres (1996). (Refer Graph 5).

Constructed Road Length (Reference Australian Year Book)

1984 to 1996



GRAPH 5

During this period 1.387 million homes were constructed (ABS 8752.0). Assuming all these new homes occurred in new subdivisions, then this would have accounted for the construction of approximately 14,000 kilometres of the national increase in road length. The cost of most road construction in subdivisions is borne by the subdivider and is recouped in the cost of the land. The cost of construction of these roads is not included in Graph 4.

It can be concluded that approximately 28,000 kilometres of new road was constructed out of the revenue during the period 1984 to 1996. Thus all the investment in roads has not been used in asset replacement/ renewal. This has undoubtedly contributed to the aging of the road inventory.

2.2.6 As a generalisation it appears that the construction of some new roads has been undertaken at the expense of the replacement/ renewal of some existing road assets. Road authorities need to develop and implement asset management strategies which tend to maximise the value of the investment. These techniques are also equally relevant to the management of all infrastructure assets. Therefore the Government should promote to each level of Government the need to implement asset management strategies. These strategies incorporate demand management and value analysis techniques. Such strategies should be used for both the;

- demand for a new asset, and
- evaluation of the need for refurbishment and/ or replacement of an existing asset. The Governments of South Australia and New South Wales have each independently developed criteria for asset management; these provide models for reference.

2.2.7 The Government should seek from the Department of Transport and Regional Development (working in conjunction with the relevant Authority in each State) a condition audit on the Nation's roads by road type. The audit should also incorporate Local Government roads. In addition a ten year forward capital expenditure programme should be sought from each responsible authority. This will provide an overview on the standard of the road assets and will also indicate the future level of investment required in this infrastructure. This will assist the Commonwealth Government in conjunction with COAG to frame future budgets. Further it will also assist road agencies and industry with resource planning.

2.2.8 Crude oil, natural gas, LPG and petroleum product provides the Commonwealth Government and State Governments with substantial revenue. In 1995/6 the Commonwealth Government received \$AUD 11,227 million in revenue from this source while the States received \$AUD 1,635.7 million. This total revenue was in excess of 4.5 times the capital investment in roads during that period. (In excess of 70% of refinery product is consumed by automobiles or trucks.)

Clearly the revenue from crude oil, natural gas, LPG, and petroleum products is being used to cross subsidise other Government programmes and this is a sensitive political issue.

2.3 BENEFITS/*Comments* Re THE RECOMMENDED ACTION

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2.3 BENEFITS/Comments Re THE RECOMMENDED ACTION

<u>RECOMMENDATION</u>	<u>BENEFITS/ Comments</u>
<p>I. Request the Department of Transport and Regional Development in conjunction with each State and Local Government relevant Authority to provide a condition audit on the Nation's roads by road type and a ten year forward capital expenditure programme for each responsible authority.</p> <p>II. Promote to all levels of Government the need to</p> <p>a) develop and implement asset management strategies for roads and all infrastructure. These strategies must incorporate demand management and value analysis techniques. Such strategies to be used for both the following circumstances;</p> <ul style="list-style-type: none"> • demand for a new asset, and • evaluation of the need for refurbishment and/ or replacement of an existing asset. <p>b) train employees in asset management techniques.</p> <p>III. The Commonwealth Government in conjunction with COAG to develop a forward funding commitment to the Nation's road programme.</p>	<p>a) Provides Government with a more precise assessment of the state of the Nation's Road assets and will assist with forward funding programmes.</p> <p>b) The information also provides the Government with improved control and will increase the accountability of road agencies.</p> <p>c) Consistent approach to Asset Management between all levels of government.</p> <p>d) Ensures measures proposed with respect to an asset are rigorously tested.</p> <p>e) Maximises the value of expenditure.</p> <p>f) Developing a long term financial plan will assist industry, the Commonwealth, States, & Local Governments with resource planning.</p>

3.0 ISSUE

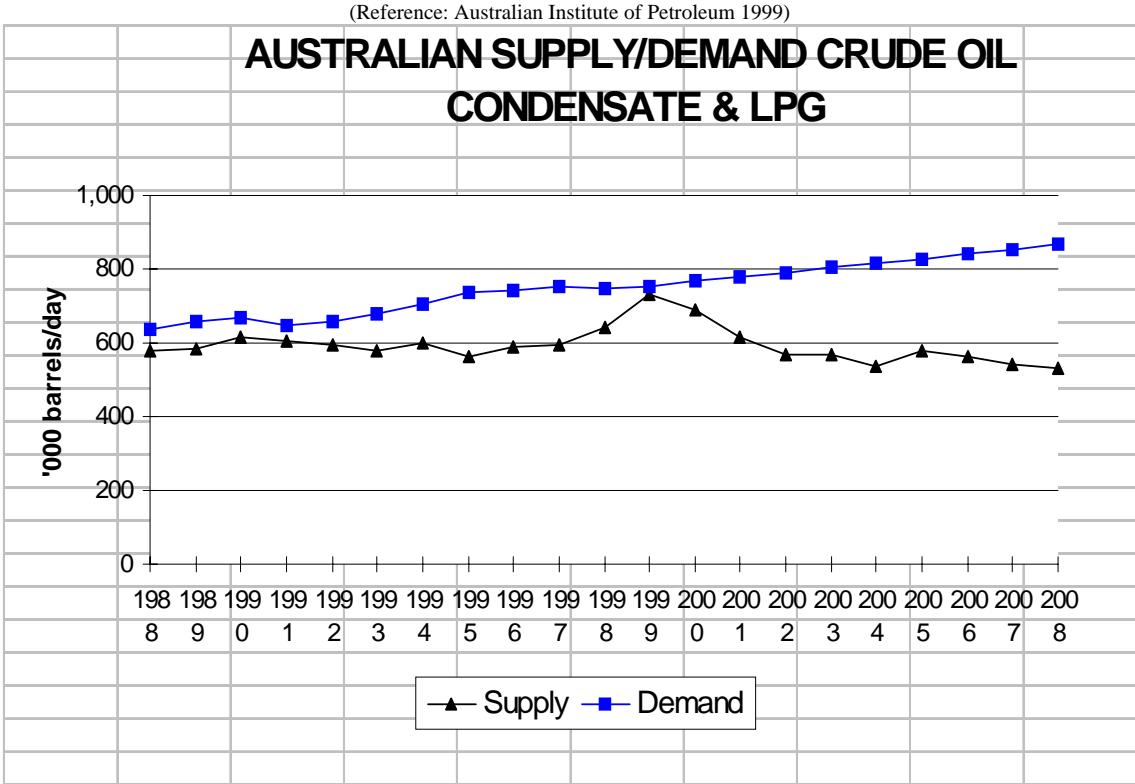
Oil reserves in Australia are rapidly depleting. This will result in an increase in oil imports and a resultant deterioration in the nation’s balance of payments.

3.1 RECOMMENDED ACTION

- I. Undertake an oil and gas audit. Seek a report on; the extent of oil and gas reserves in Australia, the current expected life of these reserves and the long term affect on the nation’s balance of payments.
- II. Develop and implement an energy strategy for Australia. The energy strategies should;
 - a) Provide a stimulus to the private sector to encourage further oil exploration and ultimate production within Australian territory.
 - b) Request a report on the alternative options for the future generation of electricity and their practical viability.
 - c) Provide Research and Development incentives for the production of electric cars in Australia.
 - d) Continue to encourage the growth of both exports and import replacement to minimise the detrimental affect increasing oil imports will have on the nation’s balance of payments.

3.2 DISCUSSION

3.2.1 The following graph obtained from the Australian Institute of Petroleum shows that Australia will be virtually self sufficient with oil supplies in 1999. However, it is estimated that by 2008 approximately 40% of the nation’s oil will be imported (refer Graph 1 below).



GRAPH 1

As a consequence of the predicted increase in oil imports there will be a deterioration in the nation’s annual balance of payments. It is estimated in 2008 there will be an additional \$AUD 3 billion (\$1999) of oil imports. As a crude indicator of the fragility of Australia’s oil reserves; the estimated existing Crude Oil and Condensate Reserves 1995 (includes both viable and non

proven reserves) divided by the quantity of crude refined in Australia per annum provides an output of less than 15 years of yield. (This is not a factual life but should be treated purely as an indicator.) It is recommended that the Government should undertake an audit of the Nation's oil reserves, their expected life and the anticipated long term affects on the nation's balance of payments.

3.2.2 As Australia has limited oil and gas reserves it is in the nation's interest for the Government to develop an energy strategy. The Government should create an environment which will minimise the affect of the predicted decline in the nation's oil reserves and our increasing reliance on imports. The Government has several options available to address these limited reserves. Some suggested strategies are;

3.2.2(a) Provide a stimulus to the private sector to encourage further oil exploration and ultimate production within Australian territory. Through increased activity in exploration, new oil fields may be found, thus decreasing our reliance on imported oil. There are significant lead times from the discovery of new reserves to bringing them into production. Therefore this issue should be considered as a high priority by the Government.

If Australia becomes predominantly dependent upon crude oil imports then there is a long term danger that the oil companies may elect to cease refining most of the crude in Australia. The oil companies may elect to import petroleum rather than crude oil. This would have an even greater detrimental affect on the balance of payments as well as reducing employment in this industry.

3.2.2(b) Many of the nation's power stations use oil or gas as fuel for the generation of electricity. Like most developed countries Australia has a high reliance on electricity as a source of energy. The Government should request a report on the alternative options for the future generation of electricity and their practical viability. **The preparation of an options document will facilitate awareness of the issues within the Australian community as well as stimulating debate on the alternative options for the future fuel source for the nation's power stations.**

The Australian Government may elect to opt for a fuel source which could position Australia amongst the lowest cost electricity producers in the world. This would provide the nation with another competitive advantage. Such a strategy could then attract energy hungry industry to Australia. As a result there could be an increase in;

- industry,
- wealth creation,
- import replacement & exports,
- employment.

This could result in a positive impact on the nation's balance of payments.

3.2.2(c) Provide Research and Development incentives for the production of electric cars in Australia. Vehicles consume approximately 70% of the Australian production of petroleum products. Stimulating Research and Development and ultimate production of electric cars in Australia could significantly reduce the nation's demand for petroleum products. Such an initiative could place Australia in a leadership position in the production of electric motor vehicles. This could result in additional export opportunities for Australian industry.

If a significant percentage of Australia's motor vehicle kilometres should be undertaken by electric vehicles this could markedly reduce the nation's net generation of carbon dioxide gas. The magnitude of any net reduction in carbon dioxide emissions would be dependant upon the fuel source used for the additional electricity generation.

3.2.2(d) Continue to encourage the growth of both exports and import replacement to minimise the detrimental affect increasing oil imports will have on the nation's balance of payments.

3.2.3 Adoption of the above strategies should place the nation and the Government in a strong position for the future.

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3.3 BENEFITS/*Comments* Re THE RECOMMENDED ACTION

<u>RECOMMENDATION</u>	<u>BENEFITS/ <i>Comments</i></u>
<p>I. Undertake an oil and gas audit. Seek a report on; the extent of oil and gas reserves in Australia, the current expected life of these reserves and the long term affect on the nation's balance of payments.</p> <p>II. Develop and implement an energy strategy for Australia. This should incorporate;</p> <p>a) Provide a stimulus to the private sector to encourage further oil exploration and ultimate production within Australian territory.</p> <p>b) Request a report on the alternative options for the future generation of electricity and their practical viability.</p> <p>c) Provide Research and Development incentives for the production of electric cars in Australia.</p> <p>d) Continue to encourage the growth of both exports and import replacement to minimise the detrimental affect increasing oil imports will have on the nation's balance of payments.</p>	<p>a) This knowledge will provide the government with an understanding of the extent of crude oil and gas reserves.</p> <p>a) Oil and gas reserves could increase. New fields could reduce our dependence on imports and consequently would reduce the predicted negative affect on the balance of payments. <i>There could be an even greater detrimental affect on the nation's balance of payments (refer 3.2.2a).</i></p> <p>b) Increased awareness of the issues by the community and the associated debate should assist Government with future policy direction on the fuel source for the nation's power stations. <i>The Australian Government may elect to become one of the lowest cost electricity producers in the world. Such a strategy could then attract energy hungry industry to Australia.</i></p> <p>a) Australia could gain niche leadership in the motor industry through electric motor cars. b) Increased employment opportunities. c) Increased exports and improved balance of payments. d) Possible reduction in net carbon dioxide emissions.</p> <p>e) Continued growth in exports could minimise any detrimental affects on the balance of payments by the predicted increase in imports of crude oil.</p>

4.0 ISSUE

Water is the life blood of Australia. Irrigation water from the River Murray contributes substantially to the economy of the nation. Improving the availability of irrigation waters for the hinterland of Queensland and New South Wales could also provide substantial benefits to the nation.

4.1 RECOMMENDED ACTION

- I. Initiate an Australia wide competition for concept proposals to improve the availability of irrigation water for the hinterland of both Queensland and New South Wales. Such concept proposals should be both economically viable and environmentally sustainable. A substantial prize (say at least \$AUD 1 million) to be awarded to the winning submission.**
- II. The Government to commit funds to the Feasibility Study, Design, Documentation and Construction as each hurdle is passed.**
- III. Establish a committee of notable Australians to develop the competition criteria, invite submissions, overview the assessment and to recommend to Government the awarding of the prize money.**

4.2 DISCUSSION

4.2.1 The Murray-Darling Basin forms the nation's agricultural heartland, supplying a \$AUD 10 billion agricultural industry and one third of Australia's food. Approximately 75% of the nation's 1.2 million hectares of irrigated land is found in the Murray Darling Basin (reference Water Resource Group Department of the Environment and Natural Resources, 1997; Fact sheet 11). This region contributes significantly to the Australian economy. It is evident that a significant proportion of the economic benefits obtained by irrigation in the Murray-Darling Basin can be attributed to the Snowy Mountain Scheme and the Barrage/Lock system on the River Murray.

4.2.2 It is recognised that there have been some environmental consequences (eg the diversion of water from the Snowy River and increased salinity of the river system), but the benefits and disbenefits must be assessed impartially.

4.2.3 Our forefathers showed considerable vision in the planning and construction of the Snowy Mountain Scheme and the Barrage/Lock system on the River Murray. As a consequence of that vision our nation today is reaping considerable economic benefit and considerable direct and indirect employment. Dr. Bradfield in 1933 also created a vision to turn back rivers in North Queensland to irrigate the hinterland. In 1984 a revised Bradfield proposal was estimated to increase Queensland's Gross Value of Production by \$4 billion per annum (\$1997) at a cost of \$4.95 billion (\$1997) (The Office of Northern Development, Queensland; (1989) Assessment and Feasibility of Revised Bradfield Scheme). There has been considerable debate about the viability of this scheme. However, the concept behind the scheme to provide irrigation water to the hinterland had merit then and still has merit today.

4.2.4 Both Queensland and New South Wales contribute to the Darling River basin. Is there an economic and an environmentally sustainable concept proposal which could provide supplementary flows to the River Darling? The solution should increase irrigation in the Darling basin; increase summer flows in the River Darling and reduce the salinity of the down stream river system.

4.2.5 Increasing the availability of irrigation water for the hinterland of both Queensland and New South Wales (refer 4.2.3 & 4.2.4) would provide a tremendous boost to the rural communities in these States. It would improve both the rural and national economy. The development of a concept to increase irrigation capacity in the hinterlands of Queensland and New South Wales would;

- provide a major infrastructure projects with resultant employment,

- provide a platform for economic growth,
- increase agricultural production,
- attract industry into regional Australia,
- create increased sustainable employment,
- increase exports and improve the balance of payments.

4.2.6 It is recommended that the Government initiate a National Competition aimed at finding a concept proposal which would improve the availability of irrigation water for the hinterland of Queensland and New South Wales (refer 4.2.3 & 4.2.4). An acceptable concept proposal must;

- address both 4.2.3 & 4.2.4,
- be economically viable,
- be environmentally sustainable, and
- increase summer flows in the South Australian reach of the River Murray.

4.2.7 A Steering Committee of notable Australians should be established to develop the competition criteria, invite registration, invite submissions, develop assessment criteria, overview the assessment, and if applicable advise the Government of a competition winner. It is suggested that there should be a significant prize (eg a million dollars) for a proposal that in the opinion of an Evaluation committee, the Steering Committee and the Government complies with all the criteria. In addition to a single prize it is suggested that the registrants who are invited to submit a proposal could apply for reimbursement of some of their costs up to a prescribed amount of say \$50,000.

4.2.8 Such a competition could create considerable enthusiasm within the community and would create necessary community awareness and debate on the issues. The Government and the Australian community could gain considerable benefits from such an initiative. The competition could be re-run again if no viable proposal is submitted.

4.2.9 If a concept proposal is considered by the Steering Committee to meet the assessment criteria and is awarded the prize, then the Government should commit funds to a feasibility study. Subject to the satisfactory outcome of a feasibility study, the Government should then commit funds to the Design, Documentation, and Construction of the proposal.

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4.3 BENEFITS/*Comments* Re THE RECOMMENDED ACTION

<u>RECOMMENDATION</u>	<u>BENEFITS/ <i>Comments</i></u>
<p>I. Initiate an Australia wide competition for concept proposals to improve the availability of irrigation water for the hinterland of both Queensland and New South Wales. Such concept proposals should be both economically viable and environmentally sustainable. A substantial prize (say at least \$AUD 1 million) to be awarded to the winning submission.</p> <p>II. The Government to commit funds to the Feasibility Study, Design, Documentation and Construction as each hurdle is passed.</p> <p>III. Establish a committee of notable Australians to develop the competition criteria, invite submissions, overview the assessment and to recommend to Government the awarding of the prize money.</p> <p>IV. Establish a committee of notable Australians to develop the competition criteria, invite submissions, overview the assessment and to recommend to Government the awarding of the prize money.</p>	<p>a) A large national infrastructure project would be a boost to industry and would create substantial employment during the construction phase.</p> <p>b) Increased irrigation capacity in the hinterlands of Queensland and New South Wales would;</p> <ul style="list-style-type: none"> • provide a platform for economic growth, • increase agricultural production, • attract industry into regional Australia, • create increased sustainable employment, • increase exports and improve the balance of payments. <p><i>Such a competition could create considerable enthusiasm within the community and would create necessary community awareness and debate on the issues. The Government could gain considerable kudos by such an initiative.</i></p>

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