

Initiating and Supporting

Major Economic Infrastructure

for State Development:

Defining the Issues

May 2004





WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues

May 2004

Additional copies of this report can be obtained from our website: www.wa.gov.au/tiac

Foreword

The Technology and Industry Advisory Council has noted a shift in the paradigms governing investment attraction due to increased competitiveness in the global resource economy.

The downside of Western Australia's resource abundance is that it occurs in remote areas which makes infrastructure provision a key factor in attracting investment for the development of these resources.

TIAC initiated a project titled, *Initiating and Supporting Major Economic Infrastructure for State Development*, in order to stimulate discussion amongst stakeholders and move the debate to a point where productive discussion occurred between governments and industry on how to resolve infrastructure impediments to national economic growth.

The project consists of two reports titled as follows:

Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues

Initiating and Supporting Major Economic Infrastructure for State Development: Options for Government

This report, *Defining the Issues*, seeks to define and discuss the issues related to the provision of infrastructure to support investment attraction for major economic development projects in Western Australia and highlight the roles of the Commonwealth and State governments.

The second, and more important report, *Options for Government*, will address options that will minimise the impediments to the development of these resources.

To ensure a maximum canvassing of ideas for the next report on *Options for Government*, a 'tear-out suggestion sheet' is provided at the end of this report along with the usual 'comment sheet'. TIAC would like to encourage your participation in the compilation of ideas for the *Options for Government* report by providing your ideas to TIAC via this suggestion sheet.

I would like to take this opportunity to thank Mr Ian Satchwell and Mr Tim Moore of ACIL Tasman Pty Ltd for the provision of consultancy services to develop this study and the members of the Steering Committee for their commitment to this project.

Dr Brian Hewitt
Chair of the Project Steering Committee

Table of Contents

<u>Foreword</u>	<i>i</i>
<u>Table of Contents</u>	<i>iii</i>
<u>Executive Summary</u>	<i>v</i>
<u>Overview of Report</u>	v
<u>The Role of Major Projects in the Economy</u>	v
<u>The Challenge of Attracting New Investment</u>	vi
<u>The Role of Commonwealth-State Financial Relations</u>	vi
<u>Infrastructure for Major Projects</u>	vii
<u>Difficulties in Providing Infrastructure</u>	vii
<u>Approaches to Reducing Impediments</u>	viii
<u>Experience Elsewhere</u>	ix
<u>Defining the Issues</u>	x
<u>The Key Issues</u>	xi
<u>1 Introduction</u>	<i>1</i>
1.1 <u>Report Overview</u>	2
<u>2 Economic Development Issues</u>	<i>4</i>
2.1 <u>The Australian Economy</u>	4
2.2 <u>The Economy of Western Australia</u>	4
2.3 <u>The Role of Major Projects</u>	4
2.4 <u>Opportunities for New Developments in Western Australia</u>	5
2.5 <u>The Changing Economics of Investment</u>	5
2.6 <u>Challenges for Investment Attraction</u>	6
2.7 <u>Policy Issues for Regional Development</u>	7
2.8 <u>Commonwealth-State Financial Relations</u>	8
<u>3 The Nature and Role of Infrastructure</u>	<i>10</i>
3.1 <u>Dealing with Risk</u>	11
<u>4 Major Economic Developments in Practice</u>	<i>13</i>
4.1 <u>Major Western Australian Industrial Developments</u>	13
4.2 <u>Major Queensland Industrial Developments</u>	19
4.3 <u>Major Non-resource Developments</u>	22
4.4 <u>Summary of Case Studies</u>	25
<u>5 Insights on Infrastructure</u>	<i>26</i>
5.1 <u>Infrastructure and Economic Development</u>	26
5.2 <u>The Role of Governments</u>	28
5.3 <u>Options for Providing Infrastructure</u>	29
5.4 <u>The Impact of Government Policy</u>	32
5.5 <u>Infrastructure, Incentives and Project Viability</u>	37
5.6 <u>Private Sector Reluctance to Invest</u>	37
5.7 <u>Risks</u>	38
5.8 <u>Project and Infrastructure Costs in Remote Areas</u>	39

Table of Contents

<u>6</u>	<u><i>Insights from Other Countries</i></u>	<i>41</i>
6.1	<u>Foreign Direct Investment: Potential and Performance</u>	41
6.2	<u>Canada</u>	42
6.3	<u>The United States</u>	45
6.4	<u>Germany</u>	47
6.5	<u>International Experiences in Summary</u>	48
<u>7</u>	<u><i>Defining the Issues</i></u>	<i>51</i>
<u>8</u>	<u><i>Bibliography</i></u>	<i>53</i>

Appendices:

<u>A</u>	<u><i>How Markets for Infrastructure may Fail</i></u>	<i>A.1</i>
<u>B</u>	<u><i>Commonwealth-State Relations</i></u>	<i>B.1</i>
<u>C</u>	<u><i>Constraints on Government Spending</i></u>	<i>C.1</i>
<u>D</u>	<u><i>Steering Committee and Consultation Team</i></u>	<i>D.1</i>
<u>E</u>	<u><i>Towards a Western Australian Knowledge Economy 1999-Present</i></u>	<i>E.1</i>
<u>F</u>	<u><i>Western Australian Technology & Industry Advisory Council</i></u>	<i>F.1</i>

Executive Summary

Overview of Report

This report, *Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues*, has been prepared by the Technology and Industry Advisory Council to enable a better understanding amongst community stakeholders of the issues relating to the provision of economic infrastructure to facilitate State development, with particular reference to Commonwealth–State financial relations.

This report – which is the first of two – seeks to define and discuss the issues relating to development of major economic development projects and the provision of infrastructure to support them, highlighting the roles of the Commonwealth and State governments. The report draws on some of the key issues raised in *The Review of Commonwealth-State Funding Final Report* (The Garnaut Report) and focuses them on the economic development issues that face Western Australia and other States.

This report aims to stimulate discussion amongst stakeholders with the goal of achieving productive debate between governments about how these issues might be resolved. Approaches include policy changes and reforms to Commonwealth–State revenue sharing arrangements.

A second report, *Initiating and Supporting Major Economic Infrastructure for State Development: Options for Government*, will examine possible approaches for State and Commonwealth governments to better facilitate infrastructure provision for major projects.

The Role of Major Projects in the Economy

The economy of Western Australia is in large part driven by the resources sector, which also makes a major contribution to the national economy, particularly through exports. Other States and Territories – notably Queensland and the Northern Territory – also have economies in which the resources sector plays a major role.

The resources sector, with its growing value-adding component, will continue to underpin the economy of Western Australia for many decades. It can be expected to continue as the largest exporter of goods in the nation.

Western Australia's rich resources endowment presents significant opportunities for resources development and processing. The opportunities include:

- a second LNG plant;
- new gas processing industries;
- additional iron ore mines;
- expansion of downstream processing of iron ore into direct reduced iron;
- continued expansion of the world leading alumina production region of the South West;
- potential development of an aluminium smelting industry; and
- development of a large-scale paper pulp mill.

The Challenge of Attracting New Investment

To be competitive in international markets, major developments need to be built and operated to world's best practice, and generally to be at world-scale. The proponents of projects that are not tied to particular resources, such as gas processing projects, seek the lowest cost/lowest risk/highest return location for their developments. Projects that depend on a resource for their location (e.g. oil and gas production and mining and minerals processing projects) often compete for capital funds with similar projects being proposed elsewhere by their owners.

Other countries with similar endowments of gas and other resources compete aggressively with Australia to attract investment in major projects. In order to continue to attract investment, which is often footloose, Australia must itself be internationally competitive as an investment destination. This means that it must be at, or close to world best practice with respect to costs, approvals, regulation, energy supply and infrastructure.

This does not mean that Australia should enter into 'subsidy competition' with other countries. This is counter to industry and national interests, and is at odds with at least the spirit of World Trade Organisation (WTO) rules, which preclude payment of subsidies to export or import-competing industries. These rules limit the manner by which Australia or other WTO member nations can provide investment incentives.

The Role of Commonwealth-State Financial Relations

Imbalances between State and Commonwealth governments in the costs of providing infrastructure and revenues for development were highlighted in the Garnaut Report. The report said that the current approach of the Commonwealth Grants Commission distributes the revenue benefits from economic development around the nation, without similarly sharing many of the costs of economic development borne by State governments.

A striking example is in Western Australia, where the Commonwealth gains the majority of tax revenues from offshore gas fields, while the State bears the majority of the cost of government funded infrastructure to support these developments. This lowers the financial incentive for the State to provide such infrastructure, particularly in the light of pressure to raise expenditure on health, education and law and order programs, plus infrastructure required to support growing populations in service towns, and to maintain the State's 'AAA' credit rating.

This artificial division of the costs and benefits associated with major projects means that it may not be an economically rational decision for the State to commit funds to their development, though for Australia as a whole, it may be rational to do so. In practice, however, Western Australia has continued to provide funds.

Further, the Garnaut Report found that equalising the fiscal effects of a State's good or poor economic performance dulls incentives for growth-promoting policies and distorts decision-making.

The Commonwealth Grants Commission recently conceded that Western Australia's costs of providing services to be above average, with reasons including:

- the structure and nature of the economy, including the effect of the large mining and primary industry sectors on the need for regulation and research; and
- the dispersed population, which results in higher costs of communication, roads, freight, allowances for staff working in remote areas and diseconomies of scale in service provision.

Infrastructure for Major Projects

Resources operations are typically located in rural and remote regions of Western Australia and other parts of the nation, close to the deposits of minerals, coal, oil and gas on which the industry is based. In order to be developed, these operations require infrastructure such as electricity, gas and water supplies, roads, ports, railways and worker accommodation.

Infrastructure can be provided in several ways:

- Project developers can provide it themselves (for example an iron ore railway and port).
- Specialist infrastructure providers, including Government Business Enterprises, can construct and operate infrastructure and receive payment from users (e.g. a gas pipeline or electricity supply).
- Public-private user-pays arrangements can be put in place (e.g. cooperative water supply arrangements).
- Where none of the above options are feasible, governments may provide infrastructure, e.g. multi-user ports, water supply facilities and roads, for which they usually charge users, and education and health facilities in towns that service developments, for which they usually do not charge.

Difficulties in Providing Infrastructure

There are increasing difficulties in providing essential infrastructure for major projects. Resources projects find it increasingly difficult to provide infrastructure themselves and remain competitive in the global marketplace. Third party infrastructure providers also find it less attractive than previously to provide infrastructure on commercial terms. Changing government priorities and limited funds mean that resources for government infrastructure provision are severely limited.

This report examines 10 case studies of projects in Western Australia and other States. From these case studies, reasons for difficulties in providing infrastructure to support major projects include:

- the remote location of many projects and the consequent paucity of infrastructure such as roads, energy and water supplies, and ports;
- the common-user nature and economies of scale of such infrastructure and the consequent inefficiencies of construction and use by single projects;
- increasing competition from projects in other, often lower cost countries and declining real prices for minerals and energy products mean that Australian projects constantly have to reduce their capital and operating costs.

- project proponents report that construction costs in remote parts of Australia such as the Pilbara are 20 to 30 per cent higher than comparable locations in other countries;
- complex approvals processes can cause delays and increase costs in establishing infrastructure and projects;
- commodity price risk and the greater risk of stranded infrastructure assets when infrastructure is provided by government or the private sector for single projects;
- regulatory policies and processes which can lead to increased risk and lower returns for third party infrastructure providers;
- changes to the corporate taxation system which have reduced depreciation allowances and consequently the financial attractiveness of infrastructure projects relative to other investments;
- inconsistency of approach and lack of coordination between governments on how they facilitate major projects and provision of infrastructure – e.g. the Western Australian government prefers to fund common user infrastructure directly, while the Commonwealth provides funds to project developers to provide their own infrastructure which they are obliged to make available to others;
- World Trade Organisation rules prohibit direct subsidy to individual export projects and require that infrastructure provided or funded by government be multi-user in nature; and
- while governments generally have healthier balance sheets than some years ago, some are moving away from providing infrastructure and services for major projects where these can be provided more efficiently by the private sector, thus freeing up State resources for the priority areas of health, education and community infrastructure and services.

It is important to address these reasons, to ensure the policy environment does not create gaps that make Australia as a whole less able to provide infrastructure for major projects. The lack of infrastructure mitigates against quick foreign investment decisions, while conversely the availability of infrastructure will assist the State with investment attraction and, as a result, a growth in the Australian economy.

Approaches to Reducing Impediments

State and Commonwealth governments recognise the need to ensure that infrastructure is available to facilitate development of major projects in rural and remote locations.

The Commonwealth government has implemented a number of approaches, including:

- ‘effective life’ depreciation provisions for capital assets to reflect their economic rather than physical life, which for some classes of infrastructure assets, have partially compensated for the loss of accelerated depreciation provisions under the New Tax System of 1999;
- a current Productivity Commission review of the regulations applying to gas pipelines in Australia, which is examining the benefits, costs and effects of the Gas Access Regime, including its effect on investment in the sector and in upstream and downstream markets; and
- a review of the Commonwealth’s approach to investment attraction (the Blackburne Review) and the restructuring and refocus of the Commonwealth inward investment agency, *Invest Australia*;

- accreditation of State environmental assessment processes for the purposes of the Commonwealth Environmental Protection and Biodiversity Conservation Act; and
- funding of project developers to provide infrastructure by some State governments and the Commonwealth under its *Strategic Investment Coordination Program* (as noted, there has been a lack of coordination between some governments in facilitating infrastructure in the same area due to differences of approach).

There are also approaches being developed at State level. Government initiatives in Western Australia include:

- implementation of the recommendations of a review of approvals processes in Western Australia (the Keating Review) which sought to streamline these processes;
- a restructure of two Western Australian industry departments into one entity (*Department of Industry and Resources*) and its enhanced focus on investment attraction; and
- provision of multi-user infrastructure in industrial zones (including the Burrup Peninsula).

Despite these initiatives, however, several of the fundamental policy gaps outlined remain.

Experience Elsewhere

Internationally, other countries have experienced similar challenges in ensuring that essential infrastructure is provided to facilitate development and economic growth. Countries such as Singapore and Qatar have responded by providing development-ready sites for major industry, complete with most infrastructure requirements.

Other federations have recognised the issues of vertical fiscal imbalance and the potential impact on incentives on state and provincial governments to provide infrastructure.

In Canada, the debate on the differential between the federal and provincial governments on taxing and spending powers appears to be just as intense as in Australia. The issue of financing the infrastructure which is required to make project developments succeed has also been recognised as important to the Canadian economy.

Efforts have been made by the Canadian government to address this issue. *Infrastructure Canada* was created in 2002 to manage and lead federal participation in the development and implementation of a long-term strategy to meet Canada's modern infrastructure needs. It provides strategic advice and research and is responsible for coordinating and managing infrastructure funding programs, and one of its aims is to promote sustainable economic development.

In the United States, fiscal equalisation plays a minor role in fiscal federalism. Intergovernmental transfers in the United States usually address specific functions or programmes, but this does not generally result in a high degree of fiscal equalisation. In any case, State governments in the United States have greater taxing powers than their Australian counterparts.

Government funding of infrastructure to support major projects appears to be less common, with more emphasis given to lowering overall costs or providing support not directly tied to infrastructure in order for major projects to proceed.

The next TIAC Report, *Initiating and Supporting Major Economic Infrastructure for State Development: Options for Government*, will examine in more detail the approaches of other nations.

Defining the Issues

The case studies and international experiences reviewed in this report reveal a myriad of issues to be relevant in the provision of infrastructure for major projects. Amongst these issues, some are consistently important to the commitments that governments make and to the outcomes of major economic development. There are also some that are approached less well than they should be. The issues of primary importance are as follows:

1. The cohesiveness of the approach to government involvement – where there are several governments involved (as there always will be in Australia), the extent to which they integrate their approaches, communicate with each other and have common approaches to information required and timing of commitments:
 - Importantly, this also includes consistency in terms of form of commitment. The practice of the Commonwealth government providing funds to the proponent for common user infrastructure while the State governments tend to fund infrastructure directly can and has led to poor outcomes.
2. The consistency and transparency of governments’ rationale for involvement – the certainty with which the public and proponents can understand how governments will become involved and why:
 - This includes the use of methods to assess the value of infrastructure at a micro level – such as cost-benefit analysis – and that information being made available to the public.
3. Management of risks – how support can be provided and policies implemented that:
 - Do not result in government funding infrastructure or projects directly that do not proceed or do not deliver the expected benefits;
 - Assist private sector infrastructure providers to achieve returns commensurate with risks.
4. The use of direct support versus the use of incentives – as is the case in Canada, governments can provide support through generic incentives rather than targeted assistance, with project proponents and private sector infrastructure providers fully responsible for project specific infrastructure:
 - Accelerated depreciation for certain asset classes and regulatory regimes that provide incentives for investment are two examples.
5. The importance of policy and the business environment in influencing the attractiveness of investment in major projects and infrastructure – with negative examples in Australia including:
 - Approvals processes that remain complex, time consuming and costly, despite government efforts to streamline them;
 - High construction costs in remote parts of Australia, notably the Pilbara;
 - Regulatory policies and processes relating to infrastructure such as gas pipelines that have increased risks and reduced returns for investors.

Any discussion on funding of infrastructure for major economic development must also take into account the wider policy issues affecting investment in projects and infrastructure in Australia.

6. The need for Commonwealth-State financial arrangements which provide incentives to States and Territories to foster major development for national benefit.

The Key Issues

The issue of infrastructure provision to support economic development is multi-faceted and requires a comprehensive and cooperative policy approach by both Commonwealth and State governments. Addressing issues that inhibit investment – such as construction costs in rural and remote locations and tax treatments of high cost, long-life assets – is important to both facilitate investment in major projects, and to encourage the private sector to provide infrastructure. Addressing aspects of Commonwealth-State financial relations is also an important component of a comprehensive approach.

The issues identified in this report provide a basis on which to consider the range of options to address these and their relative merit. The second TIAC report *Options for Government* will examine possible approaches in detail.

1 Introduction

The significant part of the economy of Western Australia is driven by major economic developments, primarily in the resources sector. Other States and Territories – notably Queensland and the Northern Territory – also have economies where economic development occurs through large industrial developments. These projects – and the States that host them – make major contributions to the national economy, particularly through exports. Investment in such projects, however, is becoming increasingly challenging to attract.

The proponents of projects that are not tied to particular resources, such as gas processing projects, tend to seek the lowest cost/lowest risk location for their developments. Projects that depend on a resource for their location (e.g. oil and gas production and mining and minerals processing projects) often compete for capital funds with similar projects being proposed elsewhere by their owners.

Other countries with similar endowments of gas and other resources compete aggressively with Australia to attract investment in major projects. In order to continue to attract investment, which is often footloose, Australia must itself be internationally competitive as an investment destination. This means that it must be at, or close to, world best practice with respect to costs, approvals, regulation, energy supply and infrastructure.

Australia and its States and Territories have done much during the past two decades to enhance their competitiveness as investment destinations. The floating of the Australian dollar, reforms to energy, transport and water markets and changes to regulation and approvals have reduced investment impediments and better equipped the Australian economy and its industries to compete internationally.

Change is ongoing. Recently, the state of infrastructure, particularly common user infrastructure to service industry development – and how it should be funded – has been subject to much debate. Commentators, industry advocates and policy makers have argued that the quality of infrastructure is being eroded by poor planning, inappropriate policies, financial pressure on governments and unwillingness by the private sector to invest in certain classes of infrastructure.

The importance of the issue was highlighted when, during the National Party's 2003 conference, the Deputy Prime Minister John Anderson argued that more needed to be invested on infrastructure to maximise economic growth. On the topical issue of how budget surpluses should be spent, he stated that funding infrastructure should be a greater priority than tax cuts.¹ A similar discussion is occurring within the Federal Opposition.

Infrastructure funding is also recognised by Treasuries as an important issue for the present and the future. The Secretary to the Commonwealth Treasury, Dr Ken Henry² has noted that there are two important questions facing Australia with respect to infrastructure:

¹ ABC Online, *Rural Australia needs infrastructure, not tax cuts: Anderson*, 11 October 2003, [<http://www.abc.net.au/news/newsitems/s964836.htm>].

² Dr Ken Henry, *Fiscal Policy in Australia*, Address to the Australian Conference of Economists Business Symposium, 2 October 2003, [<http://www.treasury.gov.au/documents/699/RTF/Speech021003.rtf>].

- Who should pay for infrastructure assets – present taxpayers financing capital spending or future taxpayers repaying public debt?
- What sorts of infrastructure should involve government funding, and what should be left to the private sector?

Dr Henry also noted that Commonwealth-State relations is an important topic; both with respect to roles and responsibilities and the financial mechanisms supporting them.

In the context of infrastructure being recognised as an important issue, the debate surrounding Commonwealth-State financial relations has taken a new turn. Several States have expressed strong concerns about the imbalances between the costs of providing economic development assistance (particularly in the form of infrastructure) and revenues from development. In 2002, Ross Garnaut and Vince Fitzgerald prepared a report for the governments of New South Wales, Victoria and Western Australia to report on the methods of allocating Commonwealth grants to the States and Territories.

The Review of Commonwealth-State Funding Final Report (The Garnaut Report) was a considered analysis of the difficulties and anomalies of the current treatment of revenues and expenditures between the Commonwealth and the States and Territories. While the scope and complexity of the Garnaut Report was such that many topics – including infrastructure provision – received only passing attention, it does provide an opportunity to understand the effect that Commonwealth-State relations can have on particular aspects of economic development.

While the focus of this report is on the role of governments in providing infrastructure for economic development, it does not start with the premise that governments must provide it. The report examines the issues surrounding investment attraction and infrastructure provision, particularly by the private sector, and identifies policy issues which inhibit investment. In many cases, addressing these issues may be the priority for governments.

Infrastructure for major developments involves large upfront costs, significant risks for providers, and the coordination and commitment of several parties. Understanding how infrastructure is – and could be – developed in these situations enables the policy issues to be illuminated. This report looks at specific case studies to illustrate the issues.

The Technology and Industry Advisory Council hopes that this report, *Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues*, generates informed debate on this most important policy area. A second TIAC report, *Initiating and Supporting Major Economic Infrastructure for State Development: Options for Government*, will examine possible approaches for State and Commonwealth governments to better facilitate infrastructure provision for major projects.

1.1 Report Overview

This report examines the issues surrounding the role of governments in providing support for major economic development activities such as new resources projects.

Chapter 2 outlines the economic development opportunities and issues facing Western Australia and the nation. It highlights the important role that major projects – based on Australia’s rich resources endowment – will continue to play in the economy. It also:

- highlights the opportunities for new developments in Western Australia;
- summarises the challenges for Australia in attracting often locationally mobile investment in major projects;
- outlines opportunities and challenges faced by project developers; and
- discusses the issues surrounding regional development.

Chapter 3 briefly examines the characteristics of infrastructure for major projects – what the term encompasses in this context; its relationship to economic development; how it is funded; and the changing nature of infrastructure provision.

Chapter 4 examines 10 case studies of actual projects in Western Australia and elsewhere to look at the role of infrastructure and how it was or will be provided; the economic benefits of the project; and the involvement of various levels of government.

Chapter 5 provides analysis from the case studies and other sources and examines the role of governments in facilitating investment, and in policy setting for investment in both projects and infrastructure. This chapter in particular looks at the situation in Western Australia with respect to the treatment of costs associated with supporting development activities.

Chapter 6 examines international practice, most closely in Canada, Germany and the United States. These represent federation governments where there are similar issues around the support of economic development activities.

Chapter 7 concludes the report with a brief discussion on the key issues to emerge from the case studies and the discussion in other chapters.

2 Economic Development Issues

2.1 The Australian Economy

The Australian economy has enjoyed a long period of high growth, outperforming most other advanced countries in recent years. During the last 10 years, annual GDP growth averaged just under four per cent, despite the Asian financial crisis of the late 1990s and the global economic downturn from which the world economy is just emerging.

The International Monetary Fund ³ (IMF) attributes Australia's ability to generate robust economic growth with low inflation to the enhanced resilience of the economy, brought about in turn, by steadfast pursuit of prudent macroeconomic policies and structural reforms within transparent policy frameworks. There is no doubt also that Australia's economic performance has been enhanced by the resilience of the merchandise export sector, which is dominated by resource exports and processed products such as alumina and LNG.

While growth slowed in 2002-03 and there are several risks present, the IMF judges Australia's near and medium-term economic growth prospects to be favourable.

2.2 The Economy of Western Australia

Western Australia leads the nation in several economic measures. It has the fastest growth and is the most export-oriented.

The economy of Western Australia is in large part driven by the resources sector, which comprises both small and large-scale projects and includes downstream processing. This sector dominates exports. Agriculture is also a significant exporter. Other States and Territories – notably Queensland and the Northern Territory – also have economies in which the resources sector plays a major role.

Western Australia comprises one-third of the Australian continent and contributes 28 per cent of the nation's exports, yet its population makes up less than 10 per cent of the Australian total. Its towns are widely spaced and its infrastructure is typically sparse away from major centres. The larger regional centres in Western Australia have economies typically based on the resources sector.

The resources sector, with its growing value-adding component, is expected to continue to underpin the economy of Western Australia for many decades to come and can be expected to remain the largest exporter of goods in the nation.

2.3 The Role of Major Projects

The resources sector is dominated by large, world-scale projects. To compete in global markets, agriculture and resources production and processing has to be very efficient. This usually necessitates world-scale operations to achieve the required economies of scale.

³ International Monetary Fund *Country Report 03/337*, 29 October 2003.

This is often achieved through a combination of Western Australia's natural advantages and good project design and management. For example, the Western Australian alumina industry is as efficient as any in the world, and a global recession would affect other countries' alumina industries more than Western Australia's.

World-scale resources-based projects will continue to play an important role in the Australian and Western Australian economies in future.

2.4 Opportunities for New Developments in Western Australia

Building on the current world-scale projects in products such as iron ore, LNG, alumina, gold and nickel, Western Australia's resources endowment presents further opportunities for resources development and processing. World demand for many of the products that Australia produces, or could produce, is growing. Growth is particularly strong in the Asian region for iron ore, nickel, alumina and energy products. Australia's proximity to Asia helps to keep freight costs low. The high level of investment in LNG, iron ore, coal, direct reduction of iron (DRI), alumina and aluminium reflects investor confidence in market demand. The opportunities in Western Australia include:

- new gas processing industries producing ammonia and urea, gas to liquids (GTL) diesel, methanol, di-methyl ether and petrochemicals;
- expanded and new LNG production facilities;
- major expansions to iron ore production and export capacity, and new mines;
- development of direct reduced iron plants, which add value to previously low value iron ore fines;
- new sulphide and laterite nickel mining and processing capacity;
- continued development of the South West as the world's largest producer of alumina through major refinery expansions;
- potential development of an aluminium smelting industry; and
- development of a large-scale paper pulp mill, adding value to the growing quantities of plantation timber in the South West.

To be competitive in international markets, these developments need to be at world-scale, and built and operated to world's best practice. They also need to overcome the inherently high costs of construction and very limited infrastructure available in the rural and remote areas of Western Australia and the other export-oriented States.

2.5 The Changing Economics of Investment

In the past, Western Australia's – and the nation's – rich resource endowments ensured that resources development would proceed. Mining and petroleum projects often included major infrastructure such as railways, roads, airports and townships. While governments also provided infrastructure such as roads and community facilities, companies had little option but to provide much of the essential infrastructure for their projects.

However, the nature and economics of resources developments have changed during recent years.

- Project developers in the resources sector face a steady decline in real prices for most products.
- Development in other countries is placing further competitive pressure on current and would-be Australian producers:
 - A case in point is LNG, where potential supply exceeds forecast demand by a considerable margin. There is thus an imperative for Australian LNG producers to be able to sell at a price that will both capture market share and be profitable;
 - China is the world's fastest growing market for aluminium, but is also the fastest growing producer – providing opportunities for Australian alumina producers but intensifying competition for aluminium smelters.
- The availability of alternative project locations and new projects around the world, together with a steady downward trend in real commodity prices have led to greater competition in supply of minerals and energy products. This means that project economics are often less robust than in past times.
- The growth of resources companies operating around the globe has led to greater competition within companies for investment funds.

From the perspective of Australia and its governments, there is a discernable shift from a project investment 'sellers market' to a 'buyers market'. Australia now has to compete much more than previously for investment.

2.6 Challenges for Investment Attraction

While traditionally, Australia's advantages relative to other countries have resulted in attracting many projects, competition between countries is intensifying.

Australia is inherently an attractive destination for investment in major projects. It has abundant natural resources, skilled labour, efficient service industries, a stable legal and political system and reasonable regulatory certainty.

Countering these advantages are high construction costs, particularly in rural and remote locations, a general perception of higher labour costs than many competing countries, and complex and sometimes uncertain approval processes. In some Australian locations, community concerns about industrial development are believed to inhibit investment.

Infrastructure is often lacking in the rural and remote areas of such a large and sparsely populated continent. Industrial sites are under-developed compared with some other locations, which provide flat, fully serviced land with essential infrastructure in place.

Australia's corporate taxation system is also perceived as relatively unfriendly to capital intensive, long-life projects, which is the nature of most major resources developments and infrastructure projects.

There is now much greater competition between countries in attracting investment than in the past:

- more petroleum and mineral exploration in other countries have led to new discoveries;
- developing nations have implemented more certain regulatory and fiscal regimes; and
- investment incentives – including infrastructure – provided by many developing nations have created more attractive investment destinations.

While some other countries may carry a reputation for greater sovereign risk than Australia, this is often not the deciding factor when multinational companies make investment decisions.

Downstream industries such as gas processing and minerals smelting are inherently more 'footloose' than extractive industries, typically having a choice of locations in which to invest. The proponents of projects that are not tied to particular resources, such as gas processing projects, tend to seek the lowest cost/lowest risk location for their developments.

Even projects that depend on a resource for their location (e.g. oil and gas production and mining and minerals processing projects) are by no means certain to proceed, as they must be globally competitive to do so and often compete for capital funds with similar projects being proposed elsewhere by their owners.

In order to continue to attract major project investment, Australia must be at, or close to world best practice with respect to costs, approvals, regulation, energy supply and infrastructure.

This does not mean that Australia should enter into 'subsidy competition' with other countries, as this is counter to industry and national interests, and is at odds with at least the spirit of World Trade Organisation (WTO) rules. These rules preclude payment of subsidies to export or import-competing industries, limiting the manner by which Australia or other WTO member nations can provide investment incentives.

The availability of infrastructure such as ports, roads, electricity and water supply are important determinants whether or not a project locates in Australia.

2.7 Policy Issues for Regional Development

Australia's population is concentrated in major cities on the coast. Only about 35 per cent of the Australian population (27 per cent of Western Australia's) live in regional areas. Yet regional Australia produces a much larger proportion of GSP/GDP than the relative size of its population. State and Commonwealth governments are therefore keen to ensure that regions continue to grow in both production and population. They have adopted policies and implemented programmes to promote regional development.

The Commonwealth recognises the critical role that infrastructure plays in regional development and emphasises the need for policy settings that will facilitate this:

Regional development is about regional communities improving their economic, social, cultural and environmental well-being by fully developing the potential of the region and its people. Key elements underlying successful regional development include cooperation between all levels of government in building community capacity to adjust to change, retaining and developing existing businesses, diversifying regional economies and working cooperatively on public and private sector infrastructure development and regional investment.⁴

⁴ Commonwealth, State and Territory Regional Development Ministers and the Australian Local Government Association, *Framework for Cooperation on Regional Development* May 2001.

The vision for the government of Western Australia's Regional Development Policy⁵ says in part:

Regions will have robust, vibrant economies based on the sustainable use of economic, social and environmental resources and a strong partnership approach within and between regional communities, industry and Government.

While governments are seeking to broaden the economies of regions, they recognise that the resources sector and agriculture will remain the dominant industries for many years to come. An important way of diversifying regional economies and capturing more of the benefits of major projects is to facilitate greater servicing by local businesses. This not only boosts local employment and business activity, but also builds capacity that helps businesses to service others within and even outside their regions.

High living costs in some regions (particularly in remote and hot areas) also provide disincentives to people living there. Companies typically have to subsidise housing and living costs. The alternative is to operate projects with 'fly-in fly-out' labour forces, which reduces overall costs to operators.

2.8 Commonwealth-State Financial Relations

Recently announced projects and discussions about provision of infrastructure have highlighted the fact that, for Western Australia, the bulk of additional tax revenues from major projects flows to the Commonwealth, through Petroleum Resources Rent Tax (for most offshore projects) income taxes on employees, and company taxes.

The State government generally receives much smaller tax revenue from royalties from onshore resources extraction, stamp duties and payroll tax from the development and operation of projects. The additional Goods and Services Tax generated by more economic activity is shared with other States.

The Western Australian government maintains that about 90 per cent of royalty revenues from projects that occur in Western Australia are redistributed to other States through adjustments to GST Grants under Grants Commission formulae. That is, while the revenue benefits from the strong Western Australian economy are redistributed to poorer performing States, the costs of attracting resource projects and providing infrastructure to support State and national economic development remain essentially unrecognised in the grants process. This problem is exacerbated in the case of offshore oil and gas projects, where the Commonwealth receives both Petroleum Resource Rent Tax and company tax payments directly, while the State incurs most of the costs of onshore infrastructure to support such projects.

In August 2002, the Treasurers of three States (New South Wales, Victoria and Western Australia) released a report titled *Review of Commonwealth-State Funding* (The Garnaut Report). The Garnaut Report identified that equalising the fiscal effects of a State's good or poor economic performance dulls incentives for growth-promoting policies and distorts decision-making.

⁵ Government of Western Australia, Regional Development Policy, *Regional Western Australia - A Better Place To Live*, November 2003, [<http://www.dlgrd.wa.gov.au/rdpmain.html>].

In its recommendations for reform, the report said:

The central aim of Australia's system of Commonwealth – State funding should be equitable outcomes for Australian individuals or households. The system should be simple and efficient, and allow all Governments to meet the basic costs of administering a State, while *maintaining incentives for utilising Australia's capacity for economic growth.* [emphasis added]

This process appears to set up perverse incentives for governments in high growth States with heavy requirements for infrastructure to support economic development. In some cases, the net return on alternative investment (e.g. social infrastructure in Perth) may be higher, at least in the short-term, than the return on economic infrastructure.

The Commonwealth Grants Commission (CGC) recently conceded that Western Australia's costs of providing services to be above average, with reasons including:

- the structure and nature of the economy, including the effect of the large mining and primary industry sectors on the need for regulation and research;
- a dispersed population, which results in higher costs of communication, roads, freight, allowances for staff working in remote areas and diseconomies of scale in service provision;
- above average indigenous proportion of the population; and
- relative scarcity of water.

The CGC assessed Western Australia to have an aggregate financial capacity to provide services that are below average. However, it found that above average costs of providing services are partly offset by a high relative capacity to raise revenue. The CGC recommended that Western Australia be granted an increase of \$231 million in its share of grants for 2004-05.

3 The Nature and Role of Infrastructure

The term ‘infrastructure’ is usually understood to mean basic facilities which are necessary for the successful functioning of the economy and society. Infrastructure is not an end in itself; it comprises intermediate facilities and services that support economic activity.

Infrastructure is commonly taken to include roads, transport systems, communications, water and sewerage, electricity, gas and ports. These physical facilities are often collectively termed ‘hard infrastructure’ or ‘economic infrastructure’. Infrastructure is also taken to include what is sometimes called ‘soft infrastructure’ or ‘social infrastructure’ – schools, universities, research facilities, hospitals, libraries, public buildings and parks.

There are major features which most infrastructure shares. First, households and companies often benefit from effective infrastructure, whether they directly pay for it or not. These are situations where ‘public goods’ have been created from which it is difficult for anyone to be excluded. For example, anyone can use a park once it is created. Second, there are economies of scale in building infrastructure and in using it. This is because infrastructure is often large and expensive. For example, on a per household basis, the cost of building a 100 kilometre road from one location to a 100,000 household community is much less than the cost of doing the same for a single household or small hamlet. Importantly, these economies of scale are often delivered through large scale, lumpy, long-life capital structures, often requiring long payback periods.

A third important feature of infrastructure is the way that the ideal composition of this infrastructure changes over time. The long-life character of much traditional infrastructure can foster a divergence between actual and ideal structures. Different forms of infrastructure can (sometimes imperfectly) substitute for each other to meet emerging demands. Telecoms and the Internet provide alternatives to some of the services previously sought from transport and postal infrastructure; technology in the form of wireless communications can substitute for wire networks; smart technology in exchanges can sometimes deliver broadband through ‘old technology’ copper wires, rather than requiring wholesale expansion to the wires networks.

Fourth, there are often substantial risks to the development of infrastructure. The risks differ depending upon the type of infrastructure, who will use it and its location. Who provides the infrastructure also can affect the risks, which is one of the reasons why, sometimes, the traditional provision of certain infrastructure by governments is provided by private firms or jointly by the private and public sectors. This is discussed in more detail below.

These features of infrastructure give rise to four key challenges in effective infrastructure provision:

- ensuring infrastructure funding and provision reflects demand for the type as well as the quantum of infrastructure;
- enabling maximum leverage from infrastructure investment into the wider economy;

- effective planning so infrastructure is matched to changes in population and commercial development; and
- effective arrangements for providing infrastructure so that risks are allocated to parties that are in the best position to bear them.

Some of these aspects are discussed in more detail later in this paper, where they will be illustrated through case studies.

This paper concentrates on infrastructure that directly facilitates major development, principally of resources projects because of the State's economy. In general, such infrastructure is 'hard infrastructure' such as roads, railways, ports, and water and energy supply. However, community infrastructure is often important also, particularly in remote locations, where it is required for the towns that service major projects.

3.1 Dealing with Risk

Risk is an important element to consider when examining infrastructure policy. When talking about project finance, the term 'risk' commonly refers to the ways in which the project may turn out to be worse than planned.

Risks need to be taken into account in all investment decisions by both government and the private sector. Risks in infrastructure provision are often significant because the investments are often large and their costs can only be recouped over long periods of time. The main risks for parties providing infrastructure to support major development are outlined in Table 1.

When considering how infrastructure is to be provided, the ability of different parties to bear risk is a key consideration. Much of the attraction of public private partnerships is that the net costs of undertaking a project are minimised if governments are responsible for risks that they are best able to bear and the private sector are responsible for projects that they are best able to bear. In the CityLink toll road development in Melbourne, for example, the private sector bears construction, operating, financing and some of the revenue risks, while there is a contract that protects the private operators against regulatory risk (which is therefore borne by the Victorian government) and revenue risks that result from changes to road networks.

The increasing involvement of the private sector in areas previously the domain of governments shows that risk identification and allocation is improving. However, when it comes to economic infrastructure to support major economic development – where there are often only one or two primary users and where it is located in remote areas – the risks are larger and more complex. This can make the process of private involvement more difficult or more costly.

These elements should be taken into account in determining the issues that affect the provision of infrastructure for major development. The risk profile of infrastructure is discussed further in Chapter 5 in relation to specific case studies.

Table 1 RISKS ASSOCIATED WITH INFRASTRUCTURE PROVISION

Risks commonly associated with infrastructure	Where infrastructure for major commercial users	Where infrastructure in remote location
<p>Construction risk – that the expected construction costs and timelines will be greater than planned.</p>	<p>No reason to be higher</p>	<p>Higher</p> <p>The logistics of construction are often more involved and therefore exposed to changing circumstances.</p>
<p>Operation and maintenance risk – that the operating costs will be higher than expected, or that the maintenance requirements will be more frequent or more costly than expected.</p>	<p>No reason to be higher</p>	<p>Higher</p> <p>Likely to be a wider range of costs and additional maintenance will be more expensive.</p>
<p>Revenue risk – that the revenue generated as a result of the infrastructure development will be less than planned. This can be related to demand for the users' own products or services and financial performance.</p>	<p>Higher</p> <p>Risks will be much higher where revenue depends on one or very few companies, and frequently proportional to the risks associated with the prices of the commodity being produced.</p>	<p>Higher where it is based on growth expectations that are more difficult to predict where population or commercial activity is thin.</p>
<p>Financing risks – that the cost of funding the infrastructure will be greater than expected. This can occur when interest rates differ from expectations or, when foreign investors are involved, foreign exchange rates do.</p>	<p>No reason to be higher.</p>	<p>No reason to be higher.</p>
<p>Regulatory (sovereign) risk – that governments change legislation, regulations and agreements which materially change outcomes.</p>	<p>Higher</p> <p>Changes that affect one user will have a greater overall impact.</p>	<p>Higher if the project was initially more dependent upon government support, as is often the case in remote areas.</p>
<p>Implicit bearing of other risks – sometimes a government or other party may bear other risks as they may have to bail out the owners if things go bad – this is so where the critical or political nature of the infrastructure makes it difficult to let it fail.</p>	<p>Higher if politically sensitive project.</p>	<p>Potentially higher if project dominates a regional economy and failure would have major local economic and social implications.</p>

4 Major Economic Developments in Practice

To understand what issues affect the provision of infrastructure in Australia, it is useful to review actual cases of major economic development projects. Through these case studies, the roles that governments and the private sector play in the provision of infrastructure can be better understood.

The extensive resource reserves in Western Australia mean there are many local examples of major economic developments to draw upon. Major resource developments include:

1. The North West Shelf Venture on the Burrup Peninsula;
2. Several other major projects on the Burrup Peninsula, such as Burrup Fertilisers, Methanex and Japan DME;
3. HIs melt project at Kwinana;
4. Ravensthorpe Nickel; and
5. Beenup Mineral Sands.

These projects differ in terms of whether they are the sole major project in a location, or one of a number; their proximity to large population centres; the type of infrastructure required; the nature of the involvement of the State government and the Commonwealth government; and, importantly, in the overall success of the project.

In order to understand the issues beyond the borders of Western Australia, there are also resource developments elsewhere. Two Queensland examples, with different characteristics and outcomes, are drawn upon:

6. Several major projects in the Gladstone/Calliope region; and
7. Australian Magnesium Corporation at Stanwell.

While resource developments provide interesting examples, it is also useful to add non-resources examples, which add another dimension to the exploration of the issues.

8. Australian Marine Complex at Jervoise Bay;
9. Australian Resources Research Centre; and
10. Alice Springs to Darwin Railway.

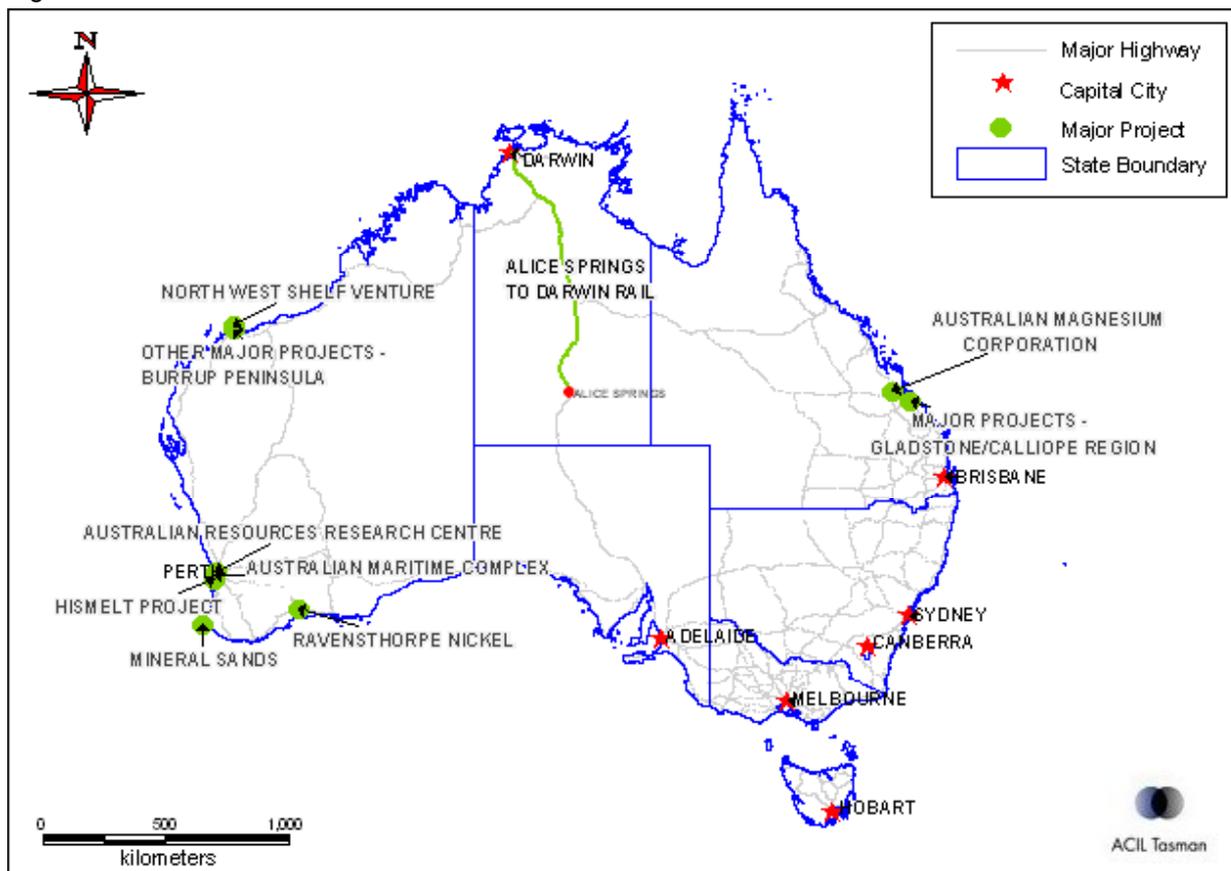
These 10 major projects are described in this chapter. Their locations are indicated in Figure 1.

4.1 Major Western Australian Industrial Developments

4.1.1 North West Shelf Gas Venture – Burrup Peninsula, Western Australia

The Burrup Peninsula is located 16 kilometres north of Karratha in the Pilbara region of Western Australia. The North West Shelf Venture (NWSV) is Australia's largest ever resource development, a joint venture operated by Woodside. It is based on the North Rankin and Goodwyn gas fields, and the Wanaea and Cossack oilfields, and supplies gas domestically and LNG for export. It also produces condensate, LPG and crude oil.

Figure 1 LOCATIONS OF MAJOR PROJECT CASE STUDIES



Gas was discovered in 1971 and the first gas was sold domestically in 1984. Condensate exports began in 1985 and LNG exports commenced in 1989. Expansion of LNG production commenced in April 2001, involving the development of the A\$1.6 billion LNG Train 4. In December 2001, development began for the A\$800 million second sub sea trunkline linking the offshore production facilities to the onshore gas plant on the Burrup Peninsula. It is scheduled to be completed in April 2004 to coincide with the completion of Train 4. The NWSV has environmental approval for Train 5.

Large-scale economic benefits of the impact of the original development were estimated. Economic modelling of the Phase 4 expansion in 1997 indicated several thousand extra jobs over the long-term, increased exports by \$1.7 billion a year (1997 prices), and increased GDP by \$2 billion.

The NWSV provided much of its own infrastructure, including substantial community infrastructure in the town of Karratha. It was assisted by both Commonwealth and State governments through several mechanisms:

- A Commonwealth excise concession was granted such that excise is not payable on condensate production.
- The State government funded construction and took ownership of the Dampier to Bunbury Natural Gas Pipeline with support from a major gas customer. The State government also supplied large amounts of community infrastructure for Karratha.

The venture proceeded only when the State government subsidised the State Energy Commission to purchase more gas than it could initially sell, at an estimated cost of \$245 million (in 1985 dollars). The Grants Commission quarantined some of the royalties from its assessment in order to make payments to offset the State Energy Commission's remaining loss.⁶ The Western Australian government also identifies the construction of the Dampier-Bunbury pipeline in 1985 as necessary to achieve flow-on benefits from the NWSV.

4.1.2 Other Industrial Projects – Burrup Peninsula, Western Australia

While the North West Shelf Venture is the largest and best-known industrial development on the Burrup Peninsula, there are other significant projects located there. The Burrup Peninsula has industrial sites covering an area of 1,395 hectares over five industrial precincts.⁷ The Burrup Peninsula is serviced by the Port of Dampier, one of Australia's largest tonnage ports.

Some of the industrial developments include:

- **Dampier Salt** – is the world's largest exporter of consistent high quality bulk solar salt. Since the first shipment in 1972, annual sales of salt from the Dampier field have increased to around seven million tonnes per year. Dampier Salt provided almost all of its own infrastructure, including specialised port facilities.
- **Burrup Fertilisers** – is developing a \$630 million plant which will produce 760,000 tonnes of liquid ammonia per annum exported to India and other world markets for the manufacture of fertilisers. Construction commenced on 30 April 2003 and production is planned to start in mid-2005. Burrup Fertilisers will utilise common user infrastructure on the Burrup, including the new common user wharf and water supply.
- **Hamersley Iron** – during 2002 Hamersley Iron shipped more than 68 million tonnes of ore to steel mills across Asia and Europe. Hamersley Iron is currently examining options to increase capacity across its operations to meet growing demand for seaborne traded iron ore, particularly China. The company has provided its own infrastructure, including railway and port facilities.
- **Japan DME Ltd** – a joint venture of Japanese companies plans to develop a world-scale dimethyl-ether (DME) plant. DME is used as an aerosol propellant and is a likely future environmentally clean fuel for the power generation and transportation industries. The consortium has commenced work on obtaining environmental approval and investment incentives and expects to decide to proceed in the first half of 2004 with the plant operating by late 2007. Japan DME wishes to use a considerable amount of common user infrastructure, including water and electricity supplies.
- **Dampier Nitrogen** – several international partners are conducting a study to assess a \$900 million ammonia and urea plant. Urea is used as a fertiliser, while ammonia is used in fertilisers, explosives and as chemical feedstock. Dampier Nitrogen will require access to common user infrastructure.

⁶ Western Australian Department of Treasury and Finance, *Western Australia's Submission to the Commonwealth Grants Commission: 2004 Review*, April 2002, p.33.

⁷ Other land on the Burrup Peninsula which is set aside for recreational purposes, conservation, and the preservation and promotion of Aboriginal cultural and heritage values is approximately 5000 hectares.

Until recently, another proposed development was by Canadian company Methanex for a methanol-producing plant which was expected to generate \$2 billion in royalties. The scale of the plant was changed from two million tonnes per annum to 1.3 million and then, in September 2003, Methanex announced that it would not be proceeding with the project. It attributed its decision to proposed capital costs escalating to an unacceptable level.

The major hurdles to development of industry in the Pilbara are the linked issues of cost of construction and lack of industrial infrastructure. Project proponents report that construction costs are 20-30 per cent above those of locations in the Middle East and the United States Gulf Coast. Locations in the Middle East also come complete with level land and major infrastructure such as energy supply, water, roads and ports.

The Western Australian government has approved and is implementing an infrastructure package worth over \$183 million, aimed at attracting down-stream petroleum processing projects to the Burrup. This package includes: a \$79 million payment to the Water Corporation that funds the capital component of seawater pumping services and discharge pipelines, \$72.6 million for port facilities including dredging and a bulk products jetty, \$25.3 million in service corridors, and \$6 million to fund road works.⁸

The Commonwealth government has determined support on a project-by-project basis. The Commonwealth originally offered Methanex \$100 million when it was locating in Darwin, which was reduced to \$85 million when the project was relocated to the Burrup Peninsula. The Commonwealth decided to re-assess its support when plant scale was reduced to 1.3 million tonnes per annum.

Arguably, the cancellation of the Methanex project has led to a shortfall in infrastructure in the area. The Commonwealth's \$85 million support for Methanex was conditional on the infrastructure it was used to fund being made available to other users on commercial terms.

4.1.3 HIs melt – Kwinana, Western Australia

Kwinana is located 30 kilometres south of Perth. In the 1950s, BP established an oil refinery there. There are now several industrial operations based at Kwinana, including a nickel refinery, a superphosphate fertiliser and ammonium nitrate producer, a titanium dioxide pigment plant, a sodium cyanide plant, an alumina refinery and smaller industry. While there is limited remaining land for development, a recent important development – and one that has had government involvement – is the HIs melt iron project.

Expanding upon a pilot project, the Kwinana project is the first commercial application of HIs melt technology, a new way of producing pig iron which is capable of processing ore unsuitable for other iron and steel technologies. The HIs melt project is majority-owned and operated by Rio Tinto.

⁸ Western Australian Department of Treasury and Finance, *Western Australia's Submission to the Commonwealth Grants Commission: 2004 Review*, April 2002, p.35.

Approximately 800,000 tonnes per annum of commercial pig iron, with a value of \$400 million, will be produced. Construction of the new plant commenced in January 2003 and is planned to be completed by the end of 2004 and reach full production by the first half of 2006. There is also the potential for a second stage, involving increasing the plant size and constructing a steel plant.

The HIs melt project will employ around 320 people at the peak of its two-year construction phase and will create up to 65 full time jobs when in operation. Construction will involve a \$400 million capital investment. The second stage would bring total investment to \$1.2 billion. It is expected there will be flow-on benefits to the already significant local economic activity (the Kwinana Industrial Area has direct sales of some \$4.3 billion and employs 3,636 people) and allow additional iron ore reserves in the Pilbara to be used.

Major additional infrastructure requirements for the HIs melt development may include a cogeneration power plant, an industrial gas plant, waste water recycling infrastructure and raw material handling infrastructure. It will also involve upgrading existing port facilities previously used by BHP.

Federal government support comprises \$50 million in initial support funding and a further \$75 million incentive. The incentive, to be paid over three years from 2004-05, will be used to develop multi-user infrastructure and the development of HIs melt technology at Kwinana. Some is dependent on doubling plant size and the intellectual property and licence fees remaining with an Australian entity. In addition to Commonwealth assistance, the Western Australian government is spending \$30 million for acquisition of land and port facilities in Kwinana to assist the HIs melt project.

4.1.4 Ravensthorpe Nickel – Ravensthorpe, Western Australia

The Ravensthorpe Nickel Project is located 35 kilometres east of Ravensthorpe. The processing plant will employ an enhanced pressure acid leach process, to produce a mixed nickel and cobalt hydroxide intermediate product (MHP). The MHP will contain up to 50,000 tonnes per annum (tpa) nickel and 1400 tpa cobalt and will be packaged and shipped through the Port of Esperance to Townsville for final refining at the QNI Yabulu Refinery.

Project go-ahead was announced in March 2004. Construction is expected to commence in Ravensthorpe and Yabulu by late 2004, with first nickel metal production from the expanded Yabulu refinery expected in late 2007.

It is expected to generate \$300 million worth of output annually and create approximately 1000 jobs during the peak of construction and 300 jobs (and \$33.2 million in wages annually) once operating. A further 900 people are expected to be employed throughout the State as service providers.

The economic value added to the regional economy is estimated to be \$1.1 billion, which results from the project, associated infrastructure and subsequent private investment.

If the workforce is locally based, it is estimated the project will increase Ravensthorpe Shire's population by 50 per cent within four years. As a result, significant infrastructure is required. The Department of Industry and Resources, in partnership with the Shire of Ravensthorpe, the proponent, and other key State government agencies, has identified that \$55 million for key social and physical infrastructure is required to support a locally-based workforce and to help the project operate efficiently.

This infrastructure package covers the provision, amongst others, of the following items:

- a new all weather airstrip;
- an upgrade of local and State roads;
- improved water and power supplies and a new wastewater treatment plant in Hopetoun;
- a new primary school in Hopetoun; and
- provision of Shire administrative infrastructure and service facilities.

The State government will contribute \$18.4 million over four years towards this, subject to the company engaging its workforce locally and the balance of the package being funded by the company. BHP Billiton has committed \$8 million to the package. Federal Cabinet is understood to have rejected a \$23 million package to upgrade the Port of Esperance and roads in and out of the project.

4.1.5 Beenup Mineral Sands – Beenup, Western Australia

Heavy minerals like rutile, ilmenite, zircon and monazite are mined in Western Australia. They are found in beach locations around the State's western and south western coastline. The Beenup deposits in the south western corner of Western Australia were discovered in 1988. The deposit was significant for its size as well as occurring in sediments of greater age than previously considered viable.

The Beenup mine site is located in the South-West of Western Australia, approximately 17 kilometres north east of Augusta. BHP decided to develop the deposit at Beenup and to export the heavy mineral concentrates. The project, at that stage, involved construction of storage/outloading facilities on Flinders Beach and provision of a power supply as well as the mining operation. The final project encompassed the mine and concentrating facilities, a new power supply, an upgraded transport route to the port of Bunbury. In 1997, the area to be mined was extended.

BHP paid all of the cost of a 132 kilovolt power line from Manjimup to Beenup, while the cost of upgrading of a road network associated with the project was split between the company (\$18 million) and the Western Australian government (\$43.4 million). The Bunbury Port Authority spent \$30 million to extend its inner harbour facilities to accommodate the company's port requirements for the Beenup project. This included dredging and construction of a land backed berth, preparation of a site for the storage shed and a ship loader system.

Mining operations at Beenup commenced in January 1997, more than a year behind schedule, using an electrically powered dredge to feed ore to a floating wet plant using gravity concentration to separate heavy minerals from sand and clay. The heavy mineral concentrate was transferred to a dry mill, then undergoing a separation process and being trucked to Bunbury Port for export.

Difficulties were encountered during mining with the high clay content of the ore body. Extensive studies of the technical problems associated with the consolidation of the clay fines were unable to identify an economically viable alternative to rectify this problem and allow mining plant to reach satisfactory levels of production. BHP decided to defer the project until markets can be established for large-scale production of ilmenite of relatively low-grade, and closure was announced on the 26 February 1999. At the time of closure, a total area of 335 hectares of land had been disturbed. The majority of this was associated with the dredge pond and above ground storage facilities.

This proposal was unusual in that while the Commonwealth wished to assess the mine and associated infrastructure as one project, the State, for practical reasons, divided the total project into three separate projects each with a different proponent.

4.2 Major Queensland Industrial Developments

4.2.1 Various Industrial Projects – Gladstone/Calliope, Queensland

Gladstone and Calliope are adjacent localities 550 kilometres north of Brisbane with a population of 47,000 and Australia's fourth-busiest port. The Gladstone Region continues to accommodate significant industry development with total planned investment estimated at some \$9 billion over the next three to five years.

A continued focus for the Queensland government is the development, management and promotion of the Gladstone State Development Area (GSDA) now comprising 21,000 hectares of land specifically allocated for large-scale industrial development. Gladstone and Queensland face similar infrastructure issues to Western Australia (see Box 1).

In recent years there has been several major industrial projects committed, including the Comalco Alumina Refinery, the first alumina refinery to be established in Australia since 1985, and Aldoga Aluminium Smelter.

Comalco Alumina Refinery

Construction began in early 2002. Stage 1 capacity will be 1.4 million tonnes per annum of alumina (an intermediate good in the development of aluminium), while further expansions could increase capacity to 4 million tonnes per annum. The first alumina shipments will occur in 2005.

Capital cost for Stage 1 is \$1.4 billion. The workforce during construction will peak at 2,300 and there will be an ongoing workforce of 400. With most of the workforce based locally⁹ and significant local investment,¹⁰ Comalco estimates that the project will indirectly generate an additional 2,500 jobs throughout Queensland during construction and an extra 700 jobs once in operation.

⁹ In 2002, 67 per cent of the construction workforce was local.

¹⁰ In 2002, more than \$100 million was spent in the Gladstone region.

Economic infrastructure being developed includes wharf facilities; conveyors for transporting alumina and bauxite; pipelines for caustic soda and sea water; a residue storage dam and an associated slurry pipeline and return sea water pipeline and power transmission line; a rail loop to deliver coal; infrastructure for water and electricity provision; and upgrading and realigning nearby roads. Comalco has got involved in additional infrastructure – for example, via Bechtel, signing leases to assist the construction of 100 homes.

The Federal government granted Comalco an interest-free \$71 million, 20 year loan on the condition that \$53 million go towards energy efficiency and capturing greenhouse gases. It also contributed funds to developing common-user energy infrastructure and a minerals industry foundation for a total contribution of \$137 million.

The Queensland government pledged \$150 million funding for common user infrastructure: 2 wharves, 2 conveyors and one caustic tank; a rail loop and coal unloading facilities; a fibre optic telecommunications cable and telephone connections; a road loop to the site; a haul road for heavy equipment during construction; and heavy lift barge unloading facilities.

Aldoga Aluminium Smelter

The new Aldoga Aluminium Smelter is under construction in the Gladstone State Development Area. When the first stage is fully operational by 2006, it will produce 420,000 tonnes of aluminium per year, primarily for export. The annual export value of production will be \$1.5 billion at today's world aluminium prices, and is planned to have a life of 30 years.

There will be up to 2,200 people employed during construction, with an estimated 3,300 jobs created in related activities. Once it is operational, there will be 900 jobs in the smelter, which is estimated to generate more than 5,000 extra jobs in Gladstone and Central Queensland. The Gladstone Port will be the primary loading and unloading port for raw materials and finished aluminium product.

Other Projects

There are several other projects in the Gladstone region:

- Southern Pacific Petroleum is currently commissioning Stage 1 of the Stuart Oil Shale Project. Stage 1 is a full scale R&D plant with a capacity of more than 1.4 million barrels of oil per year. Stage 2 will be a scaled-up version expected to cost more than \$350 million, bringing production to 20,000 barrels per day. Stage 2 is currently in the environmental assessment stages.
- Boyne Smelters Limited is reviewing a 50 per cent expansion of its operations, increasing output to some 710,000 tonnes. An EIS has been completed.
- Astral Calcining Corporation is developing a two-stage \$250 million plant to produce petroleum coke for anodes used in aluminium smelters.

Box 1 **INFRASTRUCTURE FOR THE FUTURE**¹¹**Statement by the Gladstone Economic and Industry Development Board, September 2003**

The future development of global large scale industries will be dependent on the availability and competitiveness of infrastructure to support development. Development of the Gladstone area as a site for major industry will occur in an optimal manner if common user infrastructure can be provided. For this to be effective, infrastructure provision needs to be based on optimum outcomes in terms of costs and benefits, rather than provided on a project-by-project basis.

In some cases, this will require a strategic investment in the infrastructure required for an initial project, to provide additional capacity so that it and later projects can benefit from the economies of scale that result.

Representatives from key regional infrastructure providers have estimated that approximately \$170 million will be required to finance the level and type of infrastructure to accommodate those industries investigating Gladstone as an investment location.

In July 2002 the Queensland government modelled the overall employment effects of these projects. It estimated direct employment would be 3,300 in late 2003, rising to 6,090 in late 2004 as many projects are in construction phases. As they become operational, the direct workforce would be 2,500 to 3,500, with an indirect workforce of 2,000 to 2,500 people.

Invest Australia has provided assistance on a project-by-project basis, some of which has been for common-user infrastructure. The State government has initiated several responses including a housing action plan and a training strategy. The infrastructure developments identified in these documents include upgrading roads; new dwellings for public housing stock; funding for recreational facilities; and additional health, police and library services.

4.2.2 Australian Magnesium Corporation – Stanwell, Queensland

Following the discovery of magnesite deposits north of Rockhampton in the 1980s, the Australian Magnesium Corporation (AMC) proposed to develop Australia's first magnesium refinery. AMC proposed to refine the magnesium with a new, environmentally friendly and technically demanding process.

The development of the Stanwell project followed a pilot project at Gladstone to refine the technology used. Construction on the pilot plant began in 1998, with the first metal ingots produced in August 1999. The Stanwell project was found to be technically and economically feasible in early 2000, and plans developed for construction to commence. First production was planned to be in 2004, with the plant achieving full output by 2006.

The refinery at Stanwell was to be the world's largest, producing 90-100 thousand tonnes per annum. It would employ 1,350 people during the engineering and construction phase, and an ongoing 350 people during operation.

¹¹ Gladstone Economic and Industry Development Board Newsletter, September 2003.

The Queensland government supported the project from an early stage as part of its Light Metals Strategy. Significant project status was conferred on the proposal in October 1999 with State Development coordinating the approvals process across local, State and Federal government jurisdictions. In 2000, AMC was granted a \$5 million stamp duty assistance package, and at the same time the Queensland government contributed \$50 million toward the development of common-user infrastructure at the Stanwell Energy Park. A further \$128 million repayable assistance was made available to fund the equity distribution support arrangements. In addition a waste water pipeline was to be provided, together with upgrading a treatment facility at cost of \$24 million. This infrastructure had potential to service other commercial and industrial users in the Stanwell Energy Park, who would have paid commercial rates for its use.

The Commonwealth government contributed \$50 million to the development of the process technology, jointly owned by AMC and CSIRO. The State government had previously given \$5 million toward developing process and the construction of the pilot plant.

AMC attempted unsuccessfully to raise capital in 2001, leading the Federal government to become guarantor for a \$100 million dollar loan. The State government loaned AMC \$100 million to ensure that AMC could pay dividends in the years before production commenced. After restructuring its equity raising, AMC successfully raised \$525 million in late 2001.

After continual cost overruns leading to loss of support of its creditors for the project, AMC was forced to indefinitely suspend the project in mid-2003. Arrangements were reached with the Commonwealth and Queensland governments in March 2004 for them to exit their involvement in the project.

4.3 Major Non-resource Developments

4.3.1 Australian Marine Complex – Jervoise Bay, Western Australia

Jervoise Bay is located 13 kilometres south of Fremantle at the northern end of Cockburn Sound. It is home to the Australian Marine Complex, which houses a shipbuilding and repair and maintenance industry. It has been developed to service the offshore oil, gas and other resources industries. More than 400 companies are based there, involved in marine engineering and support.

The Australian Marine Complex houses a shipbuilding and repair and maintenance industry. It will eventually comprise four adjoining precincts:

- Shipbuilding Precinct, including a Marine Support Facility;
- Support Industry Precinct;
- Fabrication Precinct (a Common User Facility and Fabricators' area); and
- Technology Precinct.

The Jervoise Bay Infrastructure Development project entails the development of the Fabrication Precinct. The project will establish protected sites with direct waterfront access; a heavy capacity wet berth and load out wharf; and access to navigable deep water. Total cost is expected to be \$200 million.

The project involved the construction of two breakwaters to increase a harbour entrance; dredging the harbour; land reclamation to develop a common-user area and a 60-hectare waterfront area for construction of berths, wharves and onshore fabrication areas; developing freehold lots for support industry and associated services; and realignment of a major road to allow heavy load access and separate local industrial traffic from other traffic in the area.

The Commonwealth committed \$80 million from the Federation Fund, conditional on environmental clearances. The Western Australian Department of Industry and Resources and statutory body, LandCorp, have been involved in development, and LandCorp receives a subsidy of \$7.5 million from the Western Australian government to develop the area.¹² A facilities management committee was established in August 2002 to oversee the establishment of arrangements between government and a private sector facility manager for the common user facility. JBFM-Babcock is the provisional facility manager as contracts are being finalised.

It is anticipated that Jervoise Bay will accommodate new construction projects valued at \$100 million annually and additional work generated by support, repair and maintenance activities in the region of \$160 million per year. It is estimated there will be 1,600 direct site employees and over 3,000 additional indirect jobs. There will be 400 jobs generated during the construction phase.

4.3.2 The Australian Resources Research Centre – Perth, Western Australia

The ARRC is a significant collaboration between the State government, CSIRO and Curtin University that has brought together leading researchers in petroleum, minerals and mining from around Australia. The purpose of establishing it was to substantially increase the State's technological capability in the petroleum and minerals sectors and its capacity to support the sustainable development of these sectors, to such an extent that it becomes the centre of expertise in petroleum and minerals for the South East Asian region.

The Centre brings together CSIRO's Petroleum and Exploration and Mining Divisions, Curtin University's Departments of Exploration Geophysics and Petroleum Engineering and State Centres of Excellence for Petroleum Research, Petroleum Geology, and Exploration and Production Geophysics. In addition, it hosts a node of the Western Australian Interactive Virtual Environments Centre and nodes of three Cooperative Research Centres: the CRCs for Landscape Environments and Mineral Exploration, Predictive Mineral Discovery, and Australian Petroleum.

The total cost of establishing ARRC was \$47.3 million. The State contributed \$34.9 million, CSIRO about \$7 million and Curtin University about \$5.5 million. Details on the funding are summarised in Table 2 as follows:

¹² Western Australian Government, 2003, 2003-04 Budget Paper No. 3, p. 226.

Table 2 **FUNDING TO ESTABLISH ARRC**

Source of Funds	Amount of Funds	Purpose of Funding
State Government	\$864,000	Detailed design
	\$26 million	Construction
	\$5 million	Staff relocation/equipment
	\$2 million	R&D project funding
	\$1 million	High performance capacity
CSIRO	\$6. 979 million	Construction
Curtin University	\$5.462 million	Construction
TOTAL	\$47.305 million	

There are several hundred people working at the ARRC, comprising people from CSIRO, Curtin University and other organisations. A key benefit is the greater interaction and exchange of information between scientists and the opportunity to forge closer links with industry.

Other benefits include the direct and indirect economic activity that flows from the construction and operation of the Centre; from the increased production and reduced costs of firms and industries adopting innovations developed through ARRC research; and the increased demand for minerals and petroleum research in Australia arising from improved productivity and cost savings in such research.

4.3.3 Alice Springs to Darwin Railway – Northern Territory

The idea of a north-south transcontinental railway has been a feature of debate in South Australia and the Northern Territory. In 1995, after decades of failed attempts to implement the project, the South Australian and Northern Territory governments signed a memorandum of understanding aimed to finally make the project a reality.

In 1997 the governments formed the AustralAsia Railway Corporation and tenders were called for to build the railway as a BOOT operation: meaning that a private company will ‘Build, Own, Operate and Transfer’ back ownership of the rail line after some period (here 50 years). The Asia Pacific Transport Consortium were selected as preferred bidders in June 1999, and construction commenced in July 2001. Construction was completed in December 2003.

The project was expected to yield significant economic benefits for South Australia and the Northern Territory by reducing freight rates. This reduction in transport costs makes more projects and exports viable, and allows lower government on road infrastructure as usage is reduced.

Booz Allen & Hamilton were engaged by the Northern Territory Department of Transport and Works to assess the viability of the project, finding that every dollar of investment should yield \$1.88 in economic benefits. These benefits included savings of \$913 million in transport costs, \$574 million in road infrastructure, and \$181 million from fewer road accidents over a 50-year period. Further savings will derive from reduced greenhouse gas emissions and fewer freight transfers between rail and road.

Access Economics forecast that during the operational phase from 2003/4 to 2024/5 National GDP will increase by \$4.5 billion, South Australia GSP will increase by about \$3 billion and North Territory GSP will increase by about \$3 billion. During construction, over 1500 jobs have been created.

The key principles of governmental support for the project have been to provide an up-front payment to ensure the commercial viability of the railway, but to pass the construction and operating risks to the private sector.

Government funding, finalised in 1999 involved the Northern Territory government providing \$165 million, the South Australian government \$150 million and the Commonwealth \$165 million from its Federation Fund. In January 2001, another \$79 million in stand-by funding was provided by the three governments on commercial terms.

4.4 Summary of Case Studies

Table 3 summarises the case studies in terms of their capital investment, employment in operation, whether they are stand-alone or clustered with other operations, and State and Commonwealth government contributions.

Table 3 SUMMARY OF CASE STUDIES

Project	State	Location	Capital Investments	Operational Employment	Clustered	State Government Involvement	Federal Government Involvement
North West Shelf	WA	Remote	Over \$9bn	2000	No	Yes	Yes
Dampier Salt	WA	Remote	NA	NA	Yes	Yes	No
Burrup Fertiliser	WA	Remote	\$630m	60	Yes	Yes	No
Japan DME	WA	Remote	\$1bn	150	Yes	Yes	TBA
Dampier Nitrogen	WA	Remote	\$900m	130	Yes	Yes	TBA
Hismelt	WA	Urban	Stage 1: \$600m Stage 2: \$800m	80	Yes	\$30m to acquire land and port facilities	\$50m plus \$75m for technology and infrastructure
Ravensthorpe Nickel	WA	Regional	\$950m	300	No	\$18.4m subject to Federal matching	TBA
Beenup Mineral Sands	WA	Regional	NA	NA	No	NA	NA
Australian Marine Complex	WA	Urban	\$200m	1600	It is a cluster	Yes	\$80m
Stanwell Magnesium	QLD	Regional	\$1.7bn	350	Yes	\$160m for infrastructure, technology and loans	\$50m plus \$100m loan guarantee
Aldoga	QLD	Regional	\$3.8bn	900	Yes	NA	NA
Comalco Alumina	QLD	Regional	Stage 1: \$1.4bn	400	Yes	\$150m for infrastructure	\$137m including \$71m interest-free loan
Australian Resources Research Centre	WA	Urban	\$47.3m	200 scientists plus support staff	It is a cluster	\$34.9m	\$7m through CSIRO
Alice Springs to Darwin Railway	SA/NT	Regional/Remote	\$1.3bn	NA	NA	NT \$165m SA \$150m	\$165m

5 Insights on Infrastructure

The case studies in Chapter 4 provide a representation of the types of major projects being undertaken in Western Australia and elsewhere in Australia. Looking at the role played by infrastructure provided for these projects enables some direct insights to be drawn to better understand the issues involved.

5.1 Infrastructure and Economic Development

The case studies demonstrate the importance of infrastructure in allowing major economic developments to occur. Infrastructure is required to both service the needs of major projects directly (such as at the Burrup Peninsula) and to service the communities which house project workforces (such as at Ravensthorpe and Karratha). It is also required to service the population growth, business development and increased economic activity resulting from development. By its nature, this need is often community-wide.

The importance of infrastructure for economic development is most apparent when the absence or inadequacy of the infrastructure provided has negative consequences. These consequences are commonly:

- Congestion on roads, rail or other networked facilities, raising the cost of doing business and limiting growth;
 - Coal exporters in Gladstone's early days as an export port experienced rail congestion until major rail re-routing and upgrades were undertaken.
- New activities being inhibited because basic infrastructure is not in place, such as land for development, access to a port, and electricity and water supply;
 - This has been an issue on the Burrup Peninsula for development of gas processing industries; and is also an issue for development of the nickel operations at Ravensthorpe, where community infrastructure is needed if the town is to support an increased population.
- Current business activities being undermined because of inadequate infrastructure;
 - A major minerals processor in the Pilbara has reported that it is difficult to attract and hold technically skilled and experienced staff because of inadequacies of secondary education in the region.

The Burrup Peninsula and the Gladstone Region both have needed infrastructure to service the needs of a number of major projects. State governments have embarked on planning exercises to endeavour to deliver infrastructure that meets the needs of several projects – common user infrastructure. The Commonwealth government has also contributed to infrastructure, but on a project-by-project basis.

The original stages of the North West Shelf Venture (NWSV), compared with developments today, illustrate how project economics has affected the ability of some proponents to pay up-front for major infrastructure. The NWSV itself provided most of the infrastructure for the project, including channel dredging, jetties, access roads, and water and electricity supply. It also made major contributions to construction of Karratha Airport and to community infrastructure in Karratha. Community infrastructure expenditure totalled some \$85 million in nominal terms. The Pilbara iron ore producers provided similar infrastructure, constructing whole towns, railways, ports and electricity and water supply.

While some newer projects in the Pilbara have made significant infrastructure contributions (notably the contributions of BHP Billiton's Boodarie Iron project to South Hedland community infrastructure) the quantity of infrastructure now able to be provided by projects is much less than in earlier days of the Pilbara's development.

5.1.1 How much infrastructure should be provided?

While infrastructure can provide economic benefits, it does not follow that all infrastructure should be funded by governments. The resources put into providing a piece of infrastructure always have an opportunity cost – that is, by being used for that purpose they are not able to be used for another purpose.

This concept holds that investments in infrastructure should be made only if they deliver higher returns than the expected returns from other projects competing for public funds. It demands that priorities among competing projects should be established.

There are several ways for determining these priorities. Private companies (and Government Business Enterprises), when considering what infrastructure to construct, generally apply strict commercial criteria. Governments have to take into account broader issues, and frequently apply cost-benefit analysis to understand the economic value of infrastructure. It allows a systematic assessment of economic and social benefits against the direct and indirect costs of providing infrastructure.

At a macro level, for example, across a region, returns are very hard to estimate. For this reason, cost-benefit analysis is best undertaken at a more micro level, assessing each major piece of proposed infrastructure separately.

Cost-benefit analysis was used in many of the preceding cases. For example, cost-benefit analysis was undertaken for the Alice Springs to Darwin Railway, which showed a positive return. The Western Australian government has a project analysis system to assess the costs and benefits of government assistance. It undertook economic modelling of the costs and benefits of providing multi-user infrastructure for the Burrup and established that the net economic results were positive. This contrasts to the decision process to provide infrastructure (principally roads) to service the Beenup Mineral Sands project, which did not involve cost-benefit (or risk) analysis.

Cost-benefit analyses are often debatable. For example, there has been some discussion about whether the benefits from the Alice Springs to Darwin railway will be actually as large as assessed in the study that was conducted prior to construction. However, cost benefit analyses and other forms of assessment do at least provide a framework and allow specific rationales to be reviewed.

A related concept to cost-benefit is opportunity cost – the return forgone in using resources to provide, for example industrial infrastructure rather than spending on the most valuable alternative use, say community infrastructure in a metropolitan area. This concept holds that investments in infrastructure should be made only if they deliver higher returns than the expected returns from other projects competing for public funds. It enables priorities among competing projects to be established.

The issues of opportunity cost have come into sharp focus in relation to Burrup infrastructure and other government funding priorities.

5.2 The Role of Governments

A general proposition emerging from case studies is that present developers should, on economic efficiency and equity grounds, pay for their infrastructure needs either directly or indirectly. If the infrastructure is shared with other users they should also pay. However, government contributions may be justified if a development would not proceed otherwise (or would proceed on a smaller scale) and there are substantial wider economic and social benefits.

There is also an argument for government involvement if the infrastructure project is too large or difficult for the private sector. However, the strengthening of private sector financing and engineering capabilities has weakened this traditional argument. Some very large projects have been built by the private sector.

It also seems that State governments tend to prefer provision of facilities, whereas the Federal government will usually give direct financial assistance to the project proponents. In order to secure the development of the HIs melt project in Kwinana, the Western Australian government spent \$30 million to acquire land and develop port facilities. The Commonwealth government contributed \$50 million as an investment incentive, and an additional \$75 million over three years towards the development of technology and infrastructure.

5.2.1 Government Motivations

Inputs into production processes – machinery or intermediate goods – are normally paid for by whoever owns the production process on the basis that they will reap the rewards of the creation and subsequent sale of the finished product. This payment is made through markets, where the price reflects the value placed on these inputs.

Infrastructure, as an input whose provision is pivotal to the success of much economic activity, should be supplied by such markets. Why then do governments fund infrastructure? There are a range of answers to this question, involving market failure, investment attraction and strategy.

Market Failure

Markets sometimes fail to provide infrastructure that reflects its overall value (and the aggregate willingness to pay for it). There are several situations where markets for infrastructure can fail. These are when:

- the infrastructure is a ‘public good’: it is not practical to exclude some users and therefore charge them;
- there are significant externalities: there are non-market benefits which, if they are not taken into account, leads to an under-provision of infrastructure;
- the infrastructure is a natural monopoly – that is, it is cheaper to have one supplier than several – and high prices will be charged (and large profits made) if provided privately; or
- they are of a large scale, hence challenging to construct and to finance.

Government funding of projects such as the Alice Springs to Darwin Railway could be justified upon market failure grounds as the construction of the railway contains significant positive externalities in employment and investment attraction. As these benefits are felt by society as a whole, and not the individual developer, government funding may be justified. An extended discussion of market failure is set out in Appendix A.

Investment Attraction

All tiers of government, in particular the Commonwealth, have stated goals of attracting investment through the provision of infrastructure. By providing infrastructure, the government makes investment in Australia more attractive compared to foreign competitors. Rio Tinto, owners of the HIsmelt plant at Kwinana, previously assessed locations in the United States before deciding upon Western Australia. The provision of assistance by government was critical to attracting the project.

Strategic Development

Governments, particularly at State level, often pursue investment attraction strategically, seeking to build upon natural strengths and to develop clusters of similar industries. The HIsmelt project in Kwinana was seen as being complementary to other industries in the area, providing opportunities for capacity building and development. To maximise these benefits, a large part of the assistance given by the Commonwealth government is contingent upon doubling the plant size and vesting the intellectual property with an Australian entity.

The Queensland government offered large amounts of assistance to the Stanwell Magnesium project based upon its Light Metals Strategy, aimed to develop a cluster of Light Metals processing and associated manufacturing. As part of the assistance, the government developed the Stanwell Energy Park, located close to the Stanwell Power Plant and designed to house energy-intensive industries.

5.3 Options for Providing Infrastructure

There are several different ways in which common user infrastructure can be provided and funded. The main options are discussed below.

5.3.1 Public Sector Provision through Debt Financing

Governments can borrow money to pay for infrastructure, repaying the loan using future tax revenues. A project that enhances economic activity should normally increase tax revenues to an extent that allows government to make its debt repayments over the life of the infrastructure asset without increasing the tax burden in relative terms. As discussed, a key question is whether this occurs in practice, and whether the opportunity cost of not proceeding with alternative expenditure is outweighed by the returns.

The Burrup Peninsula infrastructure in part is being funded by public sector debt and in part through Government Business Enterprise (GBE) debt. Gladstone region multi-user infrastructure is funded in a similar way. The Queensland government also contributed \$50 million toward common-user wharves, conveyors, rail loop and unloading facilities for Comalco's Gladstone Alumina refinery.

A variation is to implement user pays arrangements. The Queensland government, for example, planned to recoup at least part of its \$50 million investment in construction of the Stanwell Energy Park to encourage Australian Magnesium Corporation's Stanwell magnesium project through user charges, but this seems unlikely following the project's suspension.

Community infrastructure in towns that service developments are also provided by governments. The Western Australian government's \$18.4 million contribution towards multi-user hard and soft infrastructure to support the Ravensthorpe Nickel project is an example.

5.3.2 Provision by Government Business Enterprises

Government Business Enterprises (GBEs) such as the Dampier Port Authority, Water Corporation, Gladstone Port Corporation and Queensland Railways can provide infrastructure and charge for its use on commercial terms, repaying debt from income. This form of financing has been utilised in many infrastructure projects, including in the Burrup Peninsula, Gladstone region and Mid West gas pipeline. In the Mid West case, the loss of the major customer for the pipeline will reduce returns substantially. The Western Australian government's SECWA constructed the Dampier to Bunbury Natural Gas Pipeline, underpinned by a capital contribution from Alcoa and long-term gas haulage contracts by Alcoa and SECWA. Queensland Railways constructed and continues to operate the coal rail network, supplying both export coal and coal for energy generation in the Gladstone Power Station and Queensland Alumina plant.

A variation to this approach is for GBEs to provide infrastructure, and for their government owners to fund any revenue shortfalls in the early years, when infrastructure may be underutilised. This is usually done through community service obligation payments or credits.

5.3.3 Taxation

Instead of taking on debt, governments can increase taxation revenues or transfer expenditure from elsewhere to pay for the infrastructure in the year the cost is incurred. Governments with large incomings and outgoings have this option for most infrastructure projects. The issue of opportunity cost arises strongly here.

5.3.4 Levies and Charges

Levies and charges can be more targeted and are generally of a less permanent nature than taxes. Users can be charged directly (such as with tolls for a bridge) or indirectly (such as registration fees for vehicle owners). Typically, roads are funded in this way. An example is the roads to service the Beenup mineral sands project.

5.3.5 Private Financing

Responsibility can be taken by the private sector for common user infrastructure where they can charge users and gain an adequate financial return over the length of the project, or where they benefit from the infrastructure to the extent that it is worthwhile funding it privately. Much project-specific infrastructure is funded in this way – for example, the port facilities for the North West Shelf Venture and the rail and port facilities for the Pilbara iron ore producers were provided by the project owners.

Other infrastructure is provided by specialist private sector operators. Gas pipelines in the Pilbara and Central Queensland typify third party financing arrangements. In future, more rail infrastructure for industry will be provided in this way.

5.3.6 Public-Private Partnerships

There can be a division of responsibility between governments and the private sector for providing common user infrastructure. A partnership has to deliver the private proponent with a commercial return and allow a government to meet their social or development goals. They can operate in a number of ways. One model involves private companies building and operating common user infrastructure and charging for its use for an agreed period of time, after which ownership is transferred to the government ('Build-Own-Operate-Transfer' or BOOT). Another involves ongoing franchises with regulated tariffs.

The Alice Springs to Darwin Railway was constructed by a private consortium under a BOOT arrangement. This allows government to avoid risks involved with construction and operation, but to retain public ownership of the infrastructure.

The Goldfields Gas Pipeline, while not strictly a PPP project, received government sanctions to be constructed – in effect a franchise.

Involvement by the private sector can also bring commercial disciplines to the operation of infrastructure. The Australian Marine Complex at Jervoise Bay contains substantial government-owned common user infrastructure, managed by a private contractor.

Public-private user-pays arrangements also can be put in place. The capital contributions by Alcoa to the DBNGP and a structured gas supply contract have underpinned pipeline economics.

There is some debate about the real value of PPPs to governments and some jurisdictions are not pursuing them with any enthusiasm.

Table 4 EXAMPLES OF OPTIONS FOR INFRASTRUCTURE PROVISION

Project	Type of Provision	Details
Comalco Alumina	Public	Wharves, rail and roads provided by government, operated by Comalco.
Ravensthorpe Nickel	Public	Government to provide education facilities, road and airport upgrade.
Stanwell Magnesium	Public	Government provided common-user infrastructure, user-pays.
Australian Marine Complex	Partnership	Common-user facility owned by government, managed by private contractor.
Darwin – Alice Springs Railway	Partnership	Private consortium to build, operate and transfer ownership after 50 years.

5.4 The Impact of Government Policy

The Australian environment and existing government policies have a major impact on the economics of major projects, their need for others to provide infrastructure and the economics of infrastructure. This section highlights the effects of the operating environment in Australia and of government policies that either inhibit or help economic development and provision of infrastructure.

5.4.1 Remoteness, Infrastructure and Costs

Parts of regional Australia are inherently expensive places in which to invest due to the remote location of many projects and the consequent paucity of infrastructure such as roads, energy and water supplies, and ports. The harsh climate of northern Australia increases both project and infrastructure costs. The Pilbara and Kimberley exemplify this, while Gladstone and the South West of Western Australia have stronger infrastructure bases.

Arguably, Western Australia experiences a greater demand for, and cost of infrastructure provision for major developments than the Australian average due to the nature of its economy, the size of the State and the low density of its population. The Northern Territory and Queensland share this characteristic.

Furthermore, construction costs for both projects and infrastructure in remote parts of Australia such as the Pilbara are 20 to 30 per cent higher than comparable locations in other countries.

5.4.2 Approvals and Regulation

Complex and uncoordinated approvals processes cause delays and increase costs in establishing infrastructure and major projects. Development on the Burrup Peninsula was delayed by native title negotiations, while project proponents that require both Commonwealth and State approvals have reported some lack of coordination between the two. Agreement was recently reached between the Commonwealth and several State governments, including Queensland and Western Australia, for accreditation of State environment assessment processes, which should enhance cooperation between Commonwealth and State agencies. Implementation across the Western Australian government of most of the 56 recommendations of a review of approvals processes in Western Australia (the Keating Review) will reduce complexity and enhance coordination between State approvals agencies.

Infrastructure operators are expressing strong concerns about regulatory policies and processes which can lead to increased risk and lower returns for third party infrastructure providers. Prominent amongst these are pipeline owners and electricity companies. The Commonwealth has moved to examine pipeline issues by commissioning a Productivity Commission review of the regulations applying to gas pipelines in Australia, which is examining the benefits, costs and effects of the Gas Access Regime, including its effect on investment in the sector and in upstream and downstream markets.

The draft report of the Commission said that the current Gas Access Regime, in effect, is a form of cost-based price regulation and its significant costs include deterring and distorting some investment. An alternative less costly form of regulation is warranted, the report said.

5.4.3 Taxation

The changes to corporate taxation announced in the 1999 New Tax System reduced corporate tax rates at the expense of the accelerated depreciation system for assets. This reduced depreciation allowances and consequently the financial attractiveness of long-life projects, including infrastructure projects, relative to other investments. At the time, the government said:

Recognising the potential impact of removing accelerated depreciation on large capital intensive projects with long lives, the Government will be prepared to consider such projects in the context of an expanded strategic investment coordination process, including consideration of the option of targeted investment allowances.¹³

Subsequently, the government introduced a system of depreciation for specific classes of assets, for example upstream, midstream and downstream petroleum assets, based on effective life. However, this has not fully compensated for the scrapping of accelerated depreciation. Neither has the Strategic Investment Coordination process provided effective incentives for many projects (see section 5.4.5).

As discussed in Section 5.7, infrastructure for major projects faces greater risks than general infrastructure. In addition, major project infrastructure often has a shorter economic life, governed by the life of the project(s) it supports. Yet such specialised infrastructure generally is treated the same as other infrastructure for depreciation purposes, when arguably it should be allowed to be depreciated more rapidly.

5.4.4 Sovereign Risk

Australia is viewed as a location of relatively low sovereign risk, with stable systems of government and law. However, Australia is not seen by all as having very low risk. Difficult approvals processes and the propensity for governments to “change the rules” are two issues for investors in Australia. Such perceptions can only be overcome by improved government performance in this regard.

5.4.5 Government Assistance

As the case studies have highlighted, both State and Commonwealth governments have policies and programs designed to provide either infrastructure or investment incentives to new projects. The fundamental problem with the current system appears to be the lack of coordination between the two levels of government.

This problem is most starkly illustrated on the Burrup Peninsula, where the State is looking to provide multi-user infrastructure in advance of project development, while the Commonwealth has attempted to provide incentives direct to project developers.

¹³ *The New Business Tax System: Benefits of Tax Reform for the Mining Sector*, [<http://www.rbt.treasury.gov.au/>].

The issue is less apparent in Queensland, where the packages provided by each level of government for the Comalco and Australian Magnesium Corporation projects were designed to be complementary. Unlike the packages for Burrup Peninsula development, they were all project-specific, although the infrastructure funding was for multi-user infrastructure.

Strategic Investment Coordination

The Commonwealth government Strategic Investment Coordination (SIC) process is designed to offer investment incentives to major projects. Through the SIC mechanism, *Invest Australia* (an agency within the industry portfolio) assists the government in deciding whether to provide investment incentives in the form of specific purpose funding. The objectives of the process are to attract to Australia projects with significant net economic and employment benefits and to increase sustainable investment in Australia.

Incentives provided through the SIC mechanism are considered by the government on a case-by-case basis after projects have been assessed as meeting strict SIC criteria. There is no budget allocation for project incentives.

Despite assurances by the Commonwealth government in 1999 and 2001 that the incentives would be expanded, the government has in fact more tightly interpreted the SIC criteria, which theoretically rules out some projects from receiving incentives. In particular, infrastructure projects do not meet SIC criteria.

There is also some doubt about the future of the SIC process.

All government incentives are severely limited by World Trade Organisation rules which prohibit direct subsidy to individual export projects and require that infrastructure provided or funded by government be multi-user in nature.

One-off Arrangements

The Commonwealth government sometimes engages in one-off arrangements to provide incentives to projects and/or fund infrastructure.

The initial phase of the North West Shelf Venture was supported by both the Western Australian and Commonwealth governments in cooperation. Concessions on excise were granted to the NWSV by the Commonwealth, the State constructed domestic gas infrastructure and entered into domestic gas contracts. The Commonwealth government agreed to share royalty revenue with Western Australia in recognition of its contribution to facilitating the project.

Several projects were funded through the \$1 billion Federation Fund in 2001. These projects were judged to be of national significance and included several infrastructure projects. The most prominent of these were the Alice Springs to Darwin railway in the Northern Territory, the Australian Marine Complex at Jervis Bay in Western Australia and the Cooboolture Motorway in Queensland. Each was also supported by the relevant State/Territory government and funding arrangements were closely coordinated.

State Governments and Infrastructure

The government of Western Australia has stated that it has a role for subsidising multi-user infrastructure when:

- Funding infrastructure at the start of uncertain revenue flows decreases risks to a commercial project that may otherwise prohibit it from proceeding;
 - Government provision of infrastructure may be a catalyst for significant investment in projects that increase economic output and enhance government revenue.
- Government provision may avoid duplication by several companies, improve the economies of scale, cater for future demands and take into account long-term strategic planning.¹⁴

The Western Australian government has also identified that direct industry assistance – which may consist of providing infrastructure – should be provided where there is a need to redress distortions in the international governments’ and other States’ policies in order to enable the efficient allocation of productive activity.¹⁵ In terms of economic efficiency, it should be noted that addressing distortions elsewhere through the creation of equivalent distortions in Western Australia is an argument that has limited tenability, if any at all.

Projecting experience of the mid-1990s through to 2010, the Western Australian government estimates that it will need to spend \$30 million per annum on infrastructure for resource development and downstream processing projects. Half of this will come from government trading enterprises while half will come from budget funds. If major new industrial estates were developed, the infrastructure costs would be much higher.¹⁶

The Queensland government, through the Gladstone Economic and Industry Development Board, has recognised that the future development of large-scale industries will be dependent on the availability and competitiveness of infrastructure. Optimal development requires provision of common user infrastructure based on optimum outcomes in terms of costs and benefits, rather than provided on a project-by-project basis.

The government says that in some cases, this will require a strategic investment in the infrastructure required for an initial project, to provide additional capacity so that it and later projects can benefit from the economies of scale that result.

Other States have similar responsibilities and undertake similar activities in the provision of common user infrastructure, but few if any face the issues of providing infrastructure in such remote locations as Western Australia.

¹⁴ Western Australian Department of Treasury and Finance, *Western Australia’s Submission to the Commonwealth Grants Commission: 2004 Review*, April 2002, pp.34-35.

¹⁵ *ibid*, p.33.

¹⁶ *ibid*, p.36.

Local Governments and Infrastructure

Local governments provide infrastructure vital to economic development. They maintain much of Australia's road system, frequently operate ports and airports, maintain and repair environmental assets, provide health and community services and manage waste disposal.¹⁷

Like State and Territory governments, local governments expenditure responsibilities are greater than their revenue-raising capabilities. In addition to raising their own revenues municipal rates and user charges, local governments rely on Commonwealth and State funding.

Local governments normally face difficulties in funding major infrastructure themselves. They are more commonly responsible for incrementally increasing social infrastructure in response to more people residing in their municipality, which involves less time between expenditure and gaining additional revenues than other forms of infrastructure.

Local government bodies in the Pilbara believe that there is a gap between their revenues and expenditures on providing and maintaining community infrastructure.

5.4.6 Consistency of Policy and Approach

Perhaps the most striking observation to come out of the case studies is the policy inconsistency between governments and even within government. Governments take different approaches to project incentives and the provision of infrastructure, both in terms of how much they provide, and in what form they are provided.

While a 'one size fits all' approach to facilitating economic development is not appropriate, greater policy consistency itself would lead to improved investor certainty.

Table 5 **EXAMPLES OF STATE AND COMMONWEALTH GOVERNMENT FUNDING**

Project	State Funding	Commonwealth Funding	Approximate Ratio
Hismelt	\$30 million	\$125 million	1 : 4
Comalco Alumina	\$150 million	\$137 million	1 : 1
Darwin – Alice Springs Railway	*\$315 million	\$165 million	2 : 1
Australian Resources Research Centre	\$34.9 million	\$7 million	5 : 1

* Shared between South Australia and Northern Territory

Project assistance by the Commonwealth can take various forms, presumably with the intention of providing assistance to projects while not breaching guidelines for SIC incentives or World Trade Organisation rules.

¹⁷ Australian Local Government Association, *Submission to the Senate Economics Reference Committee*, 9 May 2003.

The policy difference is most stark between the Commonwealth and Western Australian governments, where it has led at least to frustration by project developers at the infrastructure ‘gaps’ that have been left – particularly on the Burrup, and now at Ravensthorpe. This problem is not as apparent in Queensland, where better coordination has been achieved.

Also frustrating and confusing for proponents has been the attendant lack of coordination between Commonwealth and Western Australia on provision of incentives and infrastructure funding.

5.5 Infrastructure, Incentives and Project Viability

Each major project has different economics, but most require infrastructure. As described in the previous section, however, the different approaches by Commonwealth and States can lead to distortions and inconsistency in the way in which infrastructure and incentives are provided.

The strict criteria of the SIC process, particularly the criterion which requires that projects must have a genuine alternative location offshore, can push proponents towards artificial economic and commercial arguments and even bluff. Other worthy projects, particularly those tied to Australian resources, do not meet SIC criteria and either may not be granted incentives or are forced into political lobbying to achieve them outside the SIC process.

The Commonwealth approach of funding of individual projects to provide ‘common-user infrastructure’ has also been found wanting. Firstly, other proposed projects, such as two di-methyl ether projects and a GTL project were initially denied their own incentives and were forced to try to negotiate with a project that had already received funding. In one case, this negotiation for access was with a direct competitor.

The collapse of the proposed Syntroleum project on the Burrup and then the Methanex project demonstrated the flaws in such an approach, as the other projects were then forced to seek infrastructure funding themselves.

The approach adopted by the government of Western Australia to provide common-user infrastructure up front is more ‘project neutral’, with infrastructure provided in this way being genuinely available to all users.

5.6 Private Sector Reluctance to Invest

Potential private sector infrastructure providers and GBEs (e.g. Port Authorities) are sometimes reluctant to invest in infrastructure, due to:

- the lack of certainty of projects proceeding and insufficient critical mass of projects likely to proceed within a reasonable timeframe, thereby making returns uncertain or potentially very low in early years;
- taxation and regulatory policy settings that have acted to reduce returns and increase risk to infrastructure providers; and
- an expectation that governments are likely to step in to provide infrastructure funds to project proponents in any case.

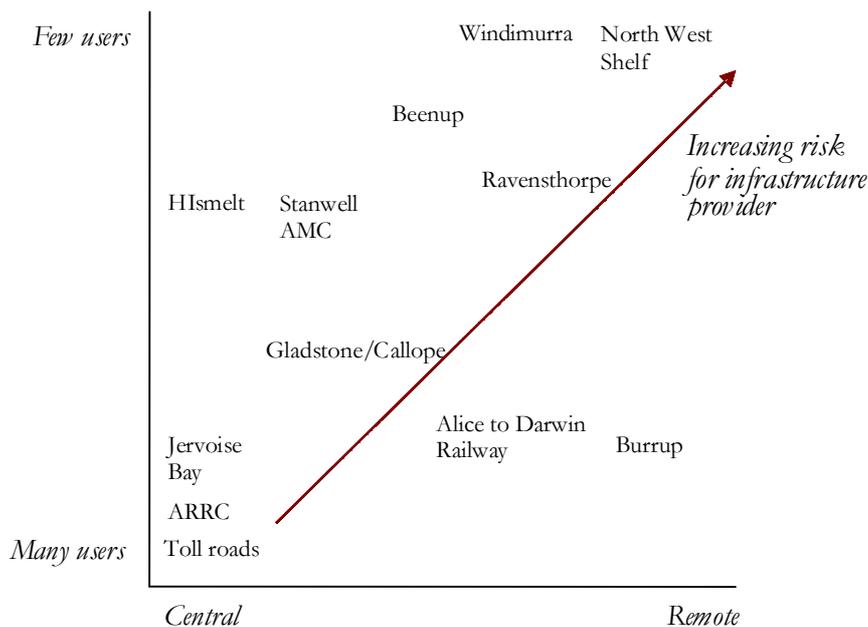
As discussed, the loss of accelerated depreciation and its only partial replacement by the effective life regime has reduced cash flow and returns to investors, particularly in crucial early years of high-cost and often long-life investments. Regulation of access to infrastructure, particularly gas pipelines has in the perception of pipeline owners, reduced returns and increased risks.

5.7 Risks

An objective of providing incentives and infrastructure is to reduce company risks – as well as improving returns – so as to facilitate investment. But this can have the effect of increasing risks to government, and hence to the taxpayer. Private sector infrastructure providers also face risks, and these can be heightened by some of the policies described in earlier sections.

As discussed, risks are often higher for project-specific infrastructure than for general infrastructure such as city freeways and electricity infrastructure. Figure 2 illustrates how the number of infrastructure users and remoteness affect risk for private sector and government infrastructure providers.

Figure 2 **INFRASTRUCTURE RISK, NUMBER OF USERS AND REMOTENESS**



Where infrastructure is provided and returns are delayed by projects being postponed (as could occur on the Burrup), government is required to pick up the shortfall.

A worse outcome would be when projects fail to proceed at all, or close prematurely, leaving infrastructure ‘stranded’ and underutilised, with few returns to government. The stark example is the Beenup Minerals Sands project, where the project closed less than a year after commissioning, leaving the excellent government funded road network to be used, for now, by several farmers. However, future mining projects may use these roads.

Another example is the Windimurra Vanadium Project, which was supported through subsidy of the Mid West gas pipeline by the State government through Western Power. The commitment has a value of some \$20 million. The project opened in 2000 and closed in late 2002 due to low vanadium prices, leaving Western Power with its commitment to the gas pipeline.

In cases where infrastructure is provided in advance of project commitment to proceed and to use it, expectations can arise that it will be used. This can result in overt or covert coercion of project developers to use such infrastructure, even where this may harm project economics over use of alternative infrastructure. While a cost-benefit analysis may show a positive return (through employment and local business development for example), this can be at a cost to the users. “Solutions looking for problems” thus present a risk and potential disincentive to developers.

An early Western Australian example was the Goldfields water pipeline, which was constructed at huge cost to the State and opened in 1903. Mining companies in the Kalgoorlie and Coolgardie region were then expected to purchase the water provided through the pipeline at higher cost than they could provide it themselves through distillation plants they had already established.

A contemporary example is the Australian Marine Complex (AMC), which was funded by State and Commonwealth governments in the absence of commitments by any major economic development projects to utilise its fabrication capacity. While it has other purposes, such as shipbuilding and repair, there are high expectations that it will be used for fabrication of modules for new resources projects. AMC and the companies it hosts will need to be very competitive in their costs and quality to compete with overseas fabricators. Governments need to allow AMC to compete on its merits in the international marketplace, just as its potential customers have to do.

5.8 Project and Infrastructure Costs in Remote Areas

5.8.1 Construction Costs

High construction costs in the Pilbara are a constraint on investment competitiveness. According to project proponents, Pilbara construction costs are 20 to 30 per cent higher than competing locations. Construction costs do not appear to be a significant issue in other locations.

Costs differentials are driven by several factors, some of which are not controllable:

- there are technical requirements for additional cooling capacity in the Pilbara’s hot climate with warm seawater temperatures;
- remoteness from major centres of high population and existing large-scale industrial development and their engineering capacity and labour sources increases costs;
- high labour costs due to being in a remote location in a developed country, and perceptions of uncompetitive work practices; and
- lack of existing industrial and social infrastructure on the Burrup (and in regional Western Australia generally), compared with some competing locations which provide flat, cleared sites with services such as water supply close to major cities.

While a number of the reasons for high construction costs cannot easily be addressed, some may be able to be ameliorated.

5.8.2 High Living Costs

High living costs in some regions (particularly in remote and hot areas) also provide disincentives to people living there. To attract staff, employers often need to pay higher than average wages as well as subsidising housing and energy costs. This issue again appears to be most severe in the Pilbara. Past housing shortages in the Gladstone area have been addressed and rents are reportedly close to those of cities of comparable size.

The government of Western Australia has expressed concerns that the Tax Zone Allowances Scheme does not adequately compensate people for the additional costs of living in remote areas. The government says that the real value of zone rebates has fallen by 15 per cent since 1993. It says that restoring the real value of zone tax rebates would encourage more families to make a permanent commitment to regional living.

5.8.3 Gas Prices

Gas prices in the gas rich but relatively oil poor Pilbara are economically marginal for price-sensitive customers compared with gas prices in some other locations. Locations such as Nigeria and the Middle East have lower gas prices where gas is produced as a by-product of oil production and is often marginally priced. Gas prices in the Pilbara are also influenced by the higher cost of offshore production compared with onshore production in some other locations.

That said, the Burrup Peninsula and the Pilbara coast more generally offer the most competitive locations for sourcing gas, due to their proximity to the gas fields and consequent low transportation costs. Gladstone, for example, does not share the same advantage.

Gas market reforms have driven reductions in gas prices throughout Australia. It appears that there is little that government can do to further reduce prices, other than working on reductions of impediments to new gas production projects and pipelines.

6 Insights from Other Countries

Issues to do with providing major infrastructure for economic development are not limited to Australia. Understanding something of the situation in other countries – and particularly countries with similar economic activity and government structures – is a useful step in defining the issues.

It is important to look at measures that may indicate how successfully different countries are matching their infrastructure to their economic development opportunities. Major developments hinge on various factors – as is evident in the preceding case studies – which make any measures limited. Despite this, investment attraction or, more specifically, foreign direct investment offers an opportunity to compare countries' relative success in attracting mobile capital.

Of course, if countries are different in respects such as labour costs or mode of government then it is difficult to attribute differences in foreign direct investment to approaches to infrastructure. The Garnaut Report examined the broad effects of federalism in Canada, the United States and Germany. The experiences of these countries are therefore also the most useful to consider here.

6.1 Foreign Direct Investment (FDI): Potential and Performance

In 2002, according to the United Nations Commission on Trade and Development (UNCTAD), Australia was the 14th largest foreign direct investment recipient. Germany (4th), United States (5th) and Canada (9th) had larger FDI inflows.

As differences in the sizes of national economies account for much of where countries are placed in these rankings, UNCTAD conducted further analysis to provide truer measures of the performance of the countries in attracting FDI.

First, they created the FDI Performance Index by calculating the ratio between each countries' share in global FDI to its share of global GDP. Second, they constructed the FDI Potential Index, using a set of structural variables to assess the potential for countries to attract FDI.¹⁸

These two indices were then used to split countries into one of four categories:

- front-runner – high FDI potential and performance, consisting of developed countries utilising their potential;
- above-potential – low FDI potential but high FDI performance;
- below-potential – high FDI potential but low FDI performance; and
- under-performer – low FDI potential and performance, consisting of developing countries limited by poverty or instability.

¹⁸ The structural variables used to assess a country were: real GDP growth, GDP per capita, total exports, telephone mainlines; mobile phone coverage, per capita energy use; R&D expenditures as a percentage of GDP; tertiary students as a proportion of population; country risk; exports of natural resources; imports of intermediate goods; export in services; and inward FDI stock.

The second and third categories are most interesting, as countries in the first and fourth categories are performing to expectations. The second category is drawing more than their potential warrants, while the latter group has shortcomings that are preventing their structural FDI from being realised.

Table 6 **INWARD INVESTMENT PERFORMANCE AND POTENTIAL (1999 – 2001)**

<i>High FDI Performance</i>
<i>Low FDI Performance</i>
<i>High FDI Potential</i>
Front-runners
Includes: Canada, Germany, United Kingdom, Malaysia, New Zealand
Below-potential
Includes: Australia, United States, China, Qatar, Japan,
<i>Low FDI Potential</i>
Above-potential
Includes: Albania, Brazil, Honduras, Papua New Guinea, Vietnam
Under-performers
Includes: Bangladesh, India, Iran, Nepal, Sri Lanka, Turkey

Data source: UNCTAD

For the period 1999 to 2001, Australia was rated as a country that performed below its potential. Moreover, it was one of three countries that had been front-runners in the previous period (Costa Rica and Mexico were the others). Canada and Germany are front-runners, while the United States sits in the same below potential category as Australia.

Investment inflows are determined by multiple factors, however infrastructure and the role it plays in project development means that it is worth considering these differences in outcomes as more detail of the each of the countries is provided below.

6.2 Canada

Canada is a key comparator for Australian public policy given its parliamentary and federal system of government and other important parallels, such as its economy, population and large and relatively isolated resource reserves.

6.2.1 Government in Canada

The Canadian federation is made up of 10 provinces and three territories, which have personal and corporate income tax rates (set as a proportion of the rate charged by the Federal government) and sales taxes (collected by the Federal government). The provinces are also able to levy and collect revenue from natural resources. The territories and provinces are constitutionally responsible for delivering health care and education, and province and territory governments spending comprises 62 per cent of all spending on programs in Canada.

Despite this, there is some vertical fiscal imbalance and Canadian constitutional documents do provide for the payment of funds from the Federal to the provincial governments. This is done following a form of horizontal fiscal equalisation, so payments “provide reasonably comparable levels of public services at reasonably levels of comparable levels of taxation”.¹⁹ The two main transfer programs are:

- The *Canada Health and Social Transfer* (CHST): provides the largest federal transfer. It provides funding for health care, post-secondary education, social assistance and social services programs.²⁰
- The *Canadian Equalisation Program* is an unconditional block transfer mandated in the Constitution. It provides assistance to revenue-poor provinces, so that they can raise their revenue level to the national average.

Equalisation payments are calculated based on a province’s tax capacity (the per capita revenue a province could raise by applying national average tax rates to its tax bases). This is then compared to the average fiscal capacity of the five middle-income provinces (British Columbia, Manitoba, Saskatchewan, Ontario and Quebec), with the difference determining the resulting payment.²¹

6.2.2 *Infrastructure Provision*

Core public infrastructure is primarily the responsibility of the provincial governments, though the Federal government created *Infrastructure Canada* in 2002 as a federal department in charge of managing and leading federal participation in meeting Canada’s modern infrastructure needs.

It was allocated \$2.65 billion in funding over six years for two components – municipal infrastructure and highways funding. Individual agreements detailing how the Program will be implemented and managed have been negotiated with each province and territory.

Furthermore, *Infrastructure Canada* provides strategic advice and research and is responsible for coordinating and managing infrastructure funding programs, and one of its aims is to promote sustainable economic development.

The Canadian Chamber of Commerce believes public infrastructure funding is a problem in Canada, as funding is postponed as a result of shortfalls in financial support and there is no tax relief used to encourage private provision of infrastructure.

6.2.3 *Attracting Major Investments and Infrastructure*

The Canadian government assesses major foreign direct investment in terms of its “net benefit” to Canada. At the federal level, investment facilitation is done by Investment Partnerships Canada. In 2001, it had 58 employees and a budget of CA\$4.9 million.

¹⁹ McLean 2003, 3.

²⁰ In 2001-2, the CHST provided 74 per cent of all transfers to the provinces and territories; this equalled CA\$34.6 billion of the total CA\$47 billion of total federal transfers (Garnaut Report).

²¹ In 2001-02, CA\$10.4 billion was distributed from federal to provincial level (Garnaut Report 2002).

From the federal perspective, Canada is an attractive location because of close economic ties with the United States, low business costs, a skilled labour force, competitive industrial sectors, low corporate tax burden and generous research and development support. A recent comparison of business costs across North America, Europe and Japan by KPMG bore that belief out, when it estimated that Canada has an average 14.5% cost advantage over the United States.

In terms of infrastructure, they believe efficient transportation infrastructure and extensive information and communication infrastructure are also advantages to Canada, and that the main challenge faced in investment promotion is lack of awareness and accurate knowledge of Canada.

In addition to the federal efforts, there are also provincial agencies involved in investment attraction. For example, the Atlantic Canada Opportunities Agency pursues opportunities for the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick. Its role does include providing financial assistance. These provinces in turn have other departments involved in investment facilitation, which offer a range of incentives, such as rebates for provincial corporate tax, payroll tax and municipal property taxes. There is some provision of infrastructure, though it does not seem to be a strong emphasis. The largest of the province investment attraction agencies have budgets larger than Investment Partnerships Canada.

6.2.4 Economic Development in Practice

Like Australia, there are large resource development opportunities in Canada. It is useful to understand more about a couple of major projects that are developing those resources.

Athabasca Oil Sands Project

The Athabasca Oil Sands Project is a CA\$3.5 billion joint venture between Shell, Chevron Texaco and Western Oil Sands to produce bitumen and process it into high-quality synthetic crude products. The Athabasca Oil Sands Project is expected to create 4,000 construction jobs and add over CA\$2 billion to Alberta's GDP during construction. Around 1,000 permanent jobs will be directly created and, over the 30-year life of the project, it is expected to contribute over \$5 billion in taxes and royalties to all levels of government.

A number of infrastructure developments are required. These include:

- Pipelines – two pipelines will be built to transport diluted bitumen; one will be funded by a \$600 million private investment while the second will involve an \$800 million private investment (it will be multi-user, accommodating production from several shippers).
- Power – a gas-fired cogeneration plant will provide steam and electricity to the mine and extra electricity to others at a cost of \$200 million.
- Gas – a natural gas pipeline will transport the natural gas requirements of the cogeneration plant and will cost \$37 million.

The infrastructure is financed largely by the private sector companies involved. The Federal government provided a small amount of economic development funding to the First Nation indigenous group.

Sable Offshore Energy Project

The Sable Offshore Energy Project (SOEP) is a natural gas recovery project near Sable Island, Nova Scotia. The \$3 billion project involves the development of six major natural gas fields that lie 10 to 40 kilometres off the Scotian Shelf. The partners in this project are Mobil, Shell and several smaller partners. The gas fields have 85 billion cubic metres of gas reserves.

The project consists of two main components. First, the development of six gas fields²² near Sable Island and the construction of an offshore processing facility and pipeline to transport the gas to a processing plant near Goldboro, Nova Scotia. The second component is the construction of the Maritimes and Northeast Pipeline to carry processed gas from Goldboro to a transfer point at the Canada-United States border.²³

It is expected to produce a 25-year supply of natural gas of around 500,000 Million British thermal units of market gas per day.²⁴ The main economic benefits expected to accrue from the SOEP, other than the direct results on the economy from the extraction of the natural gas, are increased employment and enhanced business to the construction industry. Of the economic benefits, employment increases the benefits experienced will mainly be in Nova Scotia, Taxation benefits will accrue to the governments. For example, the Maritimes and Northeast Pipeline will provide a new tax base of more than \$25 million each year to Federal, provincial and municipal governments.

Pipelines are the most important form of economic infrastructure required for the SOEP, to transport processed gas to markets in Nova Scotia, New Brunswick and New England. The pipelines have again been established privately

6.3 The United States

The United States provides another example of federalism, albeit a less structured one than Australia's model. Like Australia and Canada, it also is developing resource reserves and dealing with the issues that that entails.

6.3.1 Government in the United States

The United States has 50 states and one territory. Federal and state taxes are independent and there is no formal revenue-sharing arrangement between the federal, state and local levels. States have independent taxing powers and substantial expenditure responsibilities, particularly in the area of education.²⁵

Since the late 1970s, there has been significant decentralisation in terms of fiscal federalism. States have taken on extra responsibility from the Federal government, while local government responsibility has also increased. State and local governments are now the

²² Venture, South Venture, Thebaud, North Triumph, Glenelg and Alma.

²³ Canadian Environmental Assessment Agency.

²⁴ [http://www.cric.ca/en_html/focus/focus_archives/focus_v1n7.html]

²⁵ Bird and Tarasov 2002.

primary providers of services and state governments now administer two of the three major income-redistribution programs in the United States – Temporary Assistance for Needy Families (TANF) and Medicaid.²⁶

Intergovernmental transfers in the United States usually address specific functions or programmes, but this does not generally result in a high degree of fiscal equalisation.²⁷ There is more emphasis on needs-based equalisation – including at the local level – than there is in Canada, particularly in the health, education and welfare sectors.²⁸ There are no specific transfers for dealing with horizontal fiscal equalisation.

6.3.2 Providing Infrastructure

The states and local government bodies provide most of the infrastructure in the United States. At the federal level, the United States Department of Commerce has an investment agency, called the Economic Development Administration (EDA). The EDA provides assistance for developments where the attraction of private sector investment is maximised and would not otherwise proceed without EDA; have long term benefits; have successful characteristics such as local, state, or private matching funds; high skill, high wage jobs are created; and the funding will deliver a high return on investment. There are also large projects – such as a recent one for roads – that the Federal government funds.

6.3.3 Attracting Major Projects and Infrastructure

While there seems to be less coordinated efforts at a federal level to attract investment, the states and localities use reduced taxes or financial assistance to attract investment. Many justify direct public assistance to overcome structural deficiencies in their local economic climates.

There is varying state assistance, with states in the south and the midwest allocating more funds to projects than the other states. There are tax incentives, which amounted to US\$4.6 billion in foregone state revenues in 1998, and other incentives – including grants directly to businesses and indirectly to communities – of US\$6.3 billion in that same year.

There is some provision of infrastructure involved in this funding, though it is not a common practice. Most of the non-tax incentives are paid direct to companies, though they are rarely specifically for infrastructure. However, some states and localities do attach development objectives to their support.

6.3.4 Economic Development in Practice: S Pad Oil Project

The S Pad Oil Project at Milne Point is a viscous oil deposit situated off the North Slope, Alaska. The project, financed entirely by British Petroleum, is worth US\$179 million. The project involves the construction of 14 production wells and 20 injection wells to extract the oil.

²⁶ Cigler 1993.

²⁷ Oates 1999.

²⁸ Bird and Tarasov 2002.

The main economic benefit that will result from the S Pad project is a long-term supply of oil to the Alaskan region and the United States. Long-term job prospects for Alaskan workers will also be enhanced as a result, and there will be greater business opportunities for Alaskan companies. The state and local governments will receive revenue in the form of taxation.

Roads and pipelines of various types are the main forms of economic infrastructure needed for the S Pad project. A 4.4 mile water injection pipeline has been built, as has a 3.3 mile oil production pipeline. Power and fibre optic cables and ice roads are also required. A 4.4-mile gas injection pipeline from the central facilities pad to S pad will also be built in 2004-2005.

The private sector companies that own oil and gas fields in Alaska appear to fund the construction of infrastructure initiatives like pipelines. However, the Federal and state governments act in partnership with industry to maintain pipeline standards, and have a common regulatory structure that aims to reduce the regulatory burden involved in pipeline management. The government is involved in the operation of roads and rail in Alaska.

- Roads. The Industrial Roads Program (also known as the 'Roads to Resources' initiative) began at the state level in March 2003, implemented on the basis that the speed and quality of economic development would be enhanced in the still-developing regions by improved roads.
- Rail. The government-funded Alaska Railroad also supports critical resource industries such as coal, oil and gas through transportation.

6.4 Germany

Germany has sixteen states (Länder), including the five former East German states. The integration of the former East German states has highlighted the economic disparity between the two parts of the Federation, so fiscal imbalance and equalisation is an important issue in a now unified Germany.

6.4.1 Government in Germany

The Federation and Länder are interlocked constitutionally and the Länder play a more active role in federal decision-making than in any other federation.²⁹ While the Federal government has a broad range of exclusive legislative powers, the Länder are constitutionally responsible for implementation.

Legislation allows for Federal, state and local governments to share personal income tax, while the Federal and Länder levels share corporate taxes and the proceeds from value added tax (VAT). The VAT is the central part of Germany's vertical intergovernmental financial relations, with approximately half going to states and 2.2 per cent going to municipalities. Three quarters of the distribution to the states is based on population while the rest goes to raising states' financial capacity to 92 per cent of the national average. Additionally, the Federal government covers 50 per cent of the cost of higher education and regional economic programs, 60 per cent of support for agriculture and 70 per cent of shoreline preservation.³⁰

²⁹ Garnaut Report.

³⁰ Bird and Tarasov 2002.

There are also German horizontal fiscal equalisation policies (*finanzausgleich*) financed from state revenue. With the aim of getting state financial capacity to at least 95 per cent of the average, states with higher-than-average capacity are taxed, while states with lower-than-average capacity are subsidised.

The eastern Länder – the former East Germany – receive additional equalisation grants under the three intergovernmental transfer programmes in Germany. There are other transfers which compensate western states for loss of transfers resulting after unification, and assistance to smaller states, such as Bremen and Saarland, with budget restructuring issues.

6.4.2 Developing Infrastructure: The Case of Railways

The complexity of the arrangements and the complications raised by reunification means it is best to look at how infrastructure development is managed through specifically looking at railways, which involves the private sector and the different tiers of German government.

Federal-state arrangements have altered in recent years, as a result of the rail restructuring and partial privatisation. The state maintains an important role in the German railways system supported by the Constitution, which stipulates that railways will be owned by the state. However, unlike with other infrastructure, such as waterways, roads and highways, rail networks are no longer entirely state-funded.

In 1994 Deutsche Bahn AG (DBAG) was formed as a private-sector company through the merger of the West German Deutsche Bundesbahn and the East German Deutsche Reichsbahn. Infrastructure and transport was separated by splitting DBAG into four subdivisions, with the rail network's assets transferred to one of these subdivisions, TrackNetwork.

Constitutional provisions allow the government to retain the majority of shares in Track Network, which bears the costs for operating and maintaining the infrastructure. Track Network, in turn, levies charges for the use of tracks and facilities such as stations. As a result of the reforms, more financial responsibility has been transferred to the Länder. During the reform process the Länder demanded strong controls on operational activities, based on a belief that railways are essential for economic development.³¹ The Länder ensured any sale would require the consent of the Länder through the Bundesrat.

The German rail system was regionalised during the reforms. This led to the transfer of political and financial responsibility from the federal to the state level.

6.5 International Experiences in Summary

6.5.1 Canada

The approach in Canada has some of the same similarities – and difficulties – as Australia. For example, some see public infrastructure as under-funded. A 2001 review of Investment Partnerships Canada found that parties involved in investment attraction wish they had more resources and coordination between levels of government was improved.

³¹ Lodge 2003.

In addition, two Canadian economists, Vining and Richards, edited a book on infrastructure in Canada and suggested that there needs to be a mature debate about infrastructure policy; government reporting results of evaluation studies to the public prior to embarking on major projects; and a wariness to further public funding.

There are also differences. There seems to be less emphasis on supporting major developments via infrastructure spending than in Australia. Instead, there seems to be greater use of rebates and lowering tax rates. There is also a reliance on the overall costs of the Canadian business environment being low enough to ensure that economic developments occur even when lumpy infrastructure investments are involved.

6.5.2 United States

With revenue-raising responsibilities spread amongst a large number of different government bodies in the United States, it is difficult to draw common patterns out of the approaches taken to major projects. However, when support is given it seems to be less in the form of infrastructure funding and more in terms of tax breaks or other forms of financial support. Commonly, this is on the basis that they will overcome limitations that project proponents may face – including dealing with issues such as difficulties in charging other users for common user infrastructure – and fund the necessary infrastructure privately.

The use of infrastructure as incentives has generally been accepted, though there are recent calls for better analysis of their impacts for reasons that include their significant cumulative costs, as a result of poorly designed studies and a perception that incentives are given to corporations who do not need the assistance.³²

This is not unexpected given intense competition between locations for major projects. There are examples where more than 50 locations within the United States have bid for a major project. This level of competition is likely to lead to projects proceeding without using public resources, rather than projects not proceeding because of the infrastructure requirements.

6.5.3 Germany

Germany does not have the same type of major projects. However, there is a willingness to support different arrangements such as research and development initiatives.

The new arrangements in rail have led to a clearer division of costs regarding infrastructure from that in Canada and the United States. There is a clearer delineation between the responsibilities of the Federal and state governments and also a greater involvement by the private sector.

³² Poole et. al., 1999, *Evaluating Business Development Incentives*.

6.5.4 Other Countries

While this report looks principally at how federations deal with industry development policy and federal-state financial relations, the approach of other countries to investment attraction and infrastructure provision is most relevant to consideration of approaches in Australia. For example, countries such as Singapore and Qatar have providing development-ready sites for major industrial development, complete with most infrastructure requirements.

The *Options for Government* report will look at international approaches in more detail.

7 Defining the Issues

The case studies and the experiences of other nations in dealing with how infrastructure should be provided for major projects, provide a myriad of issues that are relevant.

Amongst these issues, there are some that are consistently important to the commitments that governments make or the outcomes of major economic development. There are also some that are approached less well than they should be. The issues of primary importance are as follows:

1. The cohesiveness of the approach to government involvement – where there are several governments involved (as there always will be in Australia), the extent to which they integrate their approaches, communicate with each other and have common approaches to information required and timing of commitments:
 - Importantly, this also includes consistency in terms of form of commitment – in Australia, the practice of the Commonwealth government providing funds to the proponent for common user infrastructure while the State governments tend to fund infrastructure directly can and has led to poor outcomes.
2. The consistency and transparency of governments' rationale for involvement – the certainty with which the public and proponents can understand how governments will become involved in and why:
 - This includes the use of methods to assess the value of infrastructure at a micro level – such as cost-benefit analysis – and that information being made available to the public.
3. Management of risks – how support can be provided and policies implemented that:
 - Do not result in government funding infrastructure or projects directly that do not proceed or do not deliver the expected benefits;
 - Assist private sector infrastructure providers to achieve returns commensurate with risks.
4. The use of direct support versus the use of incentives – as is the case in Canada, governments can provide support through generic incentives rather than targeted assistance, with project proponents and private sector infrastructure providers fully responsible for project specific infrastructure:
 - Accelerated depreciation for certain asset classes, regulatory regimes that provide incentives for investment are two examples.
5. The importance of policy and the business environment in influencing the attractiveness of investment in major projects and infrastructure – with negative examples in Australia including:
 - Approvals processes that remain complex, time consuming and costly, despite government efforts to streamline them;
 - High construction costs in remote parts of Australia, notably the Pilbara;
 - Regulatory policies and processes relating to infrastructure such as gas pipelines that have increased risks and reduced returns for investors;

Any discussion on funding of infrastructure for major economic development must also take into account the wider policy issues affecting investment in projects and infrastructure in Australia.

6. The need for Commonwealth-State financial relations which provide incentives to States and Territories to foster major development for national benefit.

8 Bibliography

Alaskan Department of Transportation, accessed at www.dot.state.ak.us, accessed on 27/10/03.

Auerbach, A. J., “Quantifying the Current US Fiscal Imbalance”, *National Tax Journal*, 50:3, September 1997, 387-98.

Bird, R., Tarasov, A. V., “Closing the Gap: Fiscal Imbalance and Intergovernmental Transfers in Developed Federations”, Working Paper, Georgia State University International Studies Program, Andrew Young School of Policy Studies, March 2002, accessed at <http://isp-aysps.gsu.edu/papers/ispwp0202.pdf>, accessed on 26/10/03.

Canadian Chamber of Commerce, 2003, *Policy Resolutions: Transport*, Canadian Chamber of Commerce, Ottawa.

Canada’s Provincial and Territorial Ministers of Finance, “Canada’s Fiscal Imbalance: Resolving this issue is key to sustaining health care and other social programs”, April 2002, accessed at http://www.fin.gov.bc.ca/tbs/FiscImbalanceAp25_02.pdf, accessed on 13/10/03.

Canadian Deputy Ministers of Investment Canada & International Trade, 2001, *Organizational Review of Investment Partnership Canada and Associated Departments and Agencies*, May 2001.

Canadian Environmental Assessment Agency, “Federal Funding Allocated to Participate in Review of Proposed Horizon Oil Sands Project in Northern Alberta”, accessed at www.ceaa-acee.gc.ca/0009/0001/0001/0021/nr030807_e.htm, accessed on 23/10/03.

Chaundy, D., 2002, *Foreign Direct Investment in Atlantic Canada*, May 2002, Atlantic Provinces Economic Council.

Chevron Texaco, “Athabasca Oil Sands Project A “Go”, accessed at www.chevrontexaco.com/news/archive/chevron_press/1999/1999-12-07.asp, accessed on 23/10/03.

Cigler, B. A., “Challenges Facing Fiscal Federalism in the 1990s”, *Political Science and Politics*, 26:2, June 1993, 181-186.

Commonwealth Grants Commission, “Economic development policies: How should equalisation account for their costs and benefits”, Discussion Paper CGC 2002/6, August 2002.

Commonwealth Grants Commission, “Capital grants”, Discussion Paper CGC 2002/11, November 2002.

Gournaut Report, Review of Commonwealth-State Funding: A Review of the allocation of Commonwealth Grants to the States and Territories, August 2002.

Joint Pipeline Office, accessed at www.jpo.doi.gov/what_is_the_jpo.htm, accessed on 29/10/03.

KPMG, 2003, *Competitive Alternatives: Comparing business costs in North America, Europe and Japan*, KPMG.

Link, H., “Financing Rail Projects in Germany: Creating Modern Infrastructure”, *Japan Railway and Transport Review*, April 1997, 30-39.

Lodge, M., “Institutional Choice and Policy Transfer: Reforming British and German Railway Regulation”, *Governance*, 16: 2, April 2003, 159-178.

McLean, I., “Fiscal Federalism in Canada”, Nuffield College Politics Working Paper 2003-W17, accessed at <http://www.nuff.ox.ac.uk/Politics/papers/2003/McLean%20Canada.pdf>, accessed on 17/10/03.

Oates, W., “An Essay on Fiscal Federalism”, *Journal of Economic Literature*, 37:3, 1999.

Poole, K.E., Erickcek, G.A., Iannone, D.T., McCrea, N., & Salem, P., 1999, *Evaluating Business Development Incentives, Prepared for U.S. Department of Commerce Economic Development Administration*, August 1999, National Association of State Development Agencies.

Ruggeri, J., “Fiscal Imbalances and the Financing of National Programs”, Caledon Institute of Social Policy, July 2002, accessed at <http://www.caledoninst.org/PDF/553820258.pdf>, accessed at 14/10/03.

Shell Canada, “The Athabasca Oil Sands Project is ‘Making Success Happen’”, accessed on www.shell.ca/code/products/oilsands/intro/oilsands.html, accessed at 24/10/03.

Stephan, A., 2002, “Assessing the contribution of public capital to private production”, *DIW Discussion Paper No. 315*, December 2002, DIW Berlin.

United Nations Conference on Trade and Development, 2003, *World Investment Report 2003, FDI Policies for Development: National and international perspectives*, United Nations, New York.

Vining, A., & Richards, J., 2001, “Smart infrastructure decisions crucial to economic development, says CD Howe Institute study”, *CD Howe Communique*, 31 May 2001, CD Howe Institute, Canada.

Western Australian Department of Treasury and Finance, *Western Australia’s Submission to the Commonwealth Grants Commission: 2004 Review*, April 2002.

Western Australian Government, *Western Australia Budget Papers: 2003-04*, May 2003.

A How Markets for Infrastructure may Fail

There are several situations where markets for infrastructure can fail. These are when:

1. the infrastructure is a ‘public good’: it is not practical to exclude some users and therefore charge them;
2. there are significant externalities: there are non-market benefits which, if they are not taken into account, leads to an under-provision of infrastructure;
3. the infrastructure is a natural monopoly – that is, it is cheaper to have one supplier than several – and high prices will be charged (and large profits made) if provided privately; and
4. they are of a large-scale, hence challenging to construct and to finance.

Government provision has been more common at certain times in Australia’s history. It is important to understand these characteristics and their relative importance today. They are explored in turn.

Public Goods

To be considered a public good, infrastructure must possess two characteristics. First, several people or companies should be able use it without affecting the use of others – or, as economists say, consumption must be ‘non-rival’. Second, people or companies must not be able to be prevented from using it – or, in economics jargon, it is ‘non-excludable’.

The issue that non-excludability creates is that no one will be willing to pay for the infrastructure, as they can use it whether or not they contribute to it. In other words, they can ‘free-ride’. Non-rivalry means that, because even non-payers can use the infrastructure without increasing its cost or diminishing the quality of anyone else’s use, they should use it to maximise efficiency. Valuable infrastructure, which people want and otherwise would be willing to pay for, can fail to be produced because of these characteristics.

There are few examples of ‘pure’ public goods – that is, when it is impossible for one user to affect another and there is no way to exclude users. However, there is some infrastructure that has public good character at the levels of use expected for it. Judging something to be a public good is usually a practical issue – how likely it is that one person’s use affects another’s, and how feasible it is to exclude users. For example, a local road will not be a public good if the number of cars leads to congestion or if toll booths are built and non-payers are not permitted to use the road. However, most local roads are not congested and are not easily tolled.

Externalities

An externality exists when an infrastructure provider’s private costs or benefits differ from the total social costs or benefits – with infrastructure, it is normally benefits – entailed in its use.

This is because the actions of users affect the well-being of others – in ways that need not be paid for according to the existing definition of property rights in the society. For example, the development of a freeway benefits property owners in the area as well as users.

If this positive externality is not taken into account, which it will not be in the market (because it has no means of capturing the extra benefit), there will be less production than that which would maximise social well-being.

Natural Monopolies

There is some infrastructure that can be provided most cheaply by one provider rather than several in competition. Common examples are services involving the creation of physical networks – such as water and gas pipelines, power lines and railway tracks. In these situations, there are large economies of scale relative to demand. This often occurs when providing the infrastructure requires large fixed costs but low variable costs.

In this situation, a single firm monopoly is desirable because one firm can meet the demand at a lower total cost in resources than multiple competing firms could. However, if a private firm has a monopoly position, it can use its dominance to maximise profits by restricting output and raising prices above the level that it would have to charge in a competitive market.

This would lower overall social welfare below what is possible because price would be set above marginal costs of production. Therefore, natural monopolies represent instances of ‘market failure’ and government provision allows the output level and the price to more accurately reflect the marginal costs of production.

Large-scale Infrastructure Projects

Traditionally, governments have often been in a better position than the private sector to construct and finance larger infrastructure projects. Governments have large revenue bases; access to bond financing; a large and diverse workforce; and resources that can be employed to develop major infrastructure. Furthermore, governments are able to handle regulatory and policy issues that such projects often have.

An example is the Snowy Mountains Scheme, perhaps Australia’s best-known large-scale infrastructure project. With its large financing requirements, long payback period, development across jurisdictions and large and complex construction requirements, it is difficult to see how the private sector would have been able to finance and construct such a project, particularly in the 1950s, 1960s and 1970s.

The Occurrence of Market Failure in Australia

The above situations collectively represent a rationale for government involvement in the provision of infrastructure. Yet, looking forward, it is important to take stock of their relative importance and frequency, and therefore the extent to which the development of infrastructure can be left to commercial decision-makers. When it comes to the provision of major infrastructure in Australia, it seems that there are often alternative ways to deal with these situations other than government provision.

Contractual arrangements can sometimes be used to overcome public goods and externalities problems, and instances of ‘natural monopolies’. For example, a positive externality implies a potential opportunity for mutual gains if ‘third parties’ affected can offer compensation to infrastructure providers in exchange for adjusting provision to a more acceptable level.

The transaction costs of negotiating such many-sided contracts may be sufficiently low where externalities affect few, easily identified third parties.

‘Natural monopolies’ can be made subject to competition by tendering out the right to provide a service for a period of time under agreed conditions. Companies have to pay the government an amount, and agree to charge users prices, that reflect the underlying costs if they are going to be awarded that right. In addition, governments can attach conditions to these contracts to deal with issues such as access and quality of services.

Improvements in technology can also resolve these issues. Businesses frequently solve free-rider problems by developing means of excluding non-payers from enjoying the benefits of a good or service. For example, new tolling technology has made it easier to build private roads and charge tolls to road users.

Private companies are increasingly able to undertake major projects. Financial markets have become deeper and are now able to undertake large and complex projects; there now is a broad range of project financing arrangements that can be utilised.

The imperfections of market solutions must be weighed against the imperfections of government solutions. Governments rely on bureaucratic solutions and that may result in inefficient production. The political processes involved can further complicate the issue.

In many cases, government policy-makers need to devote their attention to lowering total transaction costs in areas in which they have a great deal of control, such as in their regulatory approaches and in the design and construction of the legal system. Minimising the costs of enforcing contracts and defining and protecting property rights is important for improving the capacity of markets to provide the appropriate level of infrastructure.

B Commonwealth-State Relations

The Commonwealth has most of the revenue raising capabilities while the responsibility for basic services lies primarily with the States. This creates a ‘vertical fiscal imbalance’ (see Box 2 for explanations of the key terms). Resolving it requires negotiations which, with the Commonwealth prepared to redistribute revenue among the States and Territories and attach conditions to the use of that revenue, are a source of conflict.

The public face of these negotiations is commonly Council of Australian Governments meetings, where the Prime Ministers and the Premiers frequently blame each other for parlous nature of different services and policy outcomes, and accuse each other of intractability in their negotiations.

Box 2 COMMONWEALTH-STATE RELATIONS: SOME KEY TERMS

Vertical fiscal imbalance is where there is a mismatch between the revenue powers and expenditure responsibilities between different tiers of government.

Horizontal fiscal equalisation is a process within a federation to reduce differences in the ability of States to fund the functions for which they are responsible.

The **Commonwealth Grants Commission** is the body that determines the basis upon which payments are made by the Commonwealth governments to the States and Territories in a way that reflects horizontal fiscal equalisation.

Disability factors are characteristics outside of the control of State and Territory governments which affect their expenditure requirements or ability to raise revenues.

Donor States are States and Territories whose share of Commonwealth Grants is less than their share of national population. New South Wales, Victoria and Western Australia are currently donor States.

Recipient (or Claimant) States are States and Territories whose share of Commonwealth Grants is greater than their share of national population.

However it may appear, this is not an esoteric debate. Commonwealth-State financial arrangements can create different tax burdens and access to services which have real impacts on economic performance of Australia and Australians’ quality of life.

Revenue sharing between the Commonwealth and the States has been a feature since Federation. After several different arrangements for allocating this revenue, the Commonwealth Grant Commission was created in 1933. The current arrangement between the Commonwealth and the States consists of two types of grants:

- General purpose grants, which the States can use for any purpose. Since the 1999 Intergovernmental Agreement, these have primarily been GST payments. There are also balancing payments to compensate States for agreed reductions in taxes such as Financial Institutions Duty and for implementing National Competition Policy (NCP).
- Specific purpose payments, which are for a defined policy purpose (commonly health and education) and are based upon individual agreements made between the Commonwealth and a State or States. They have prescribed management rules and reporting requirements, and often require a State to provide matching or minimum co-funding. A small portion of SPPs are made ‘through’ the States to other institutions and to local government.

In a complex process undertaken every five years, the Commonwealth Grants Commission (CGC) assesses horizontal fiscal equalisation taking into account each State and Territory's disability factors and specific purpose payments. The CGC publishes discussion papers on different factors and calculation issues, which State and Territory governments normally offer responses to.

The CGC process is designed to be neutral in regard to State and Territory governments' policies, though there is debate about whether this is an appropriate goal and whether it is indeed the case.

C Constraints on Government Spending

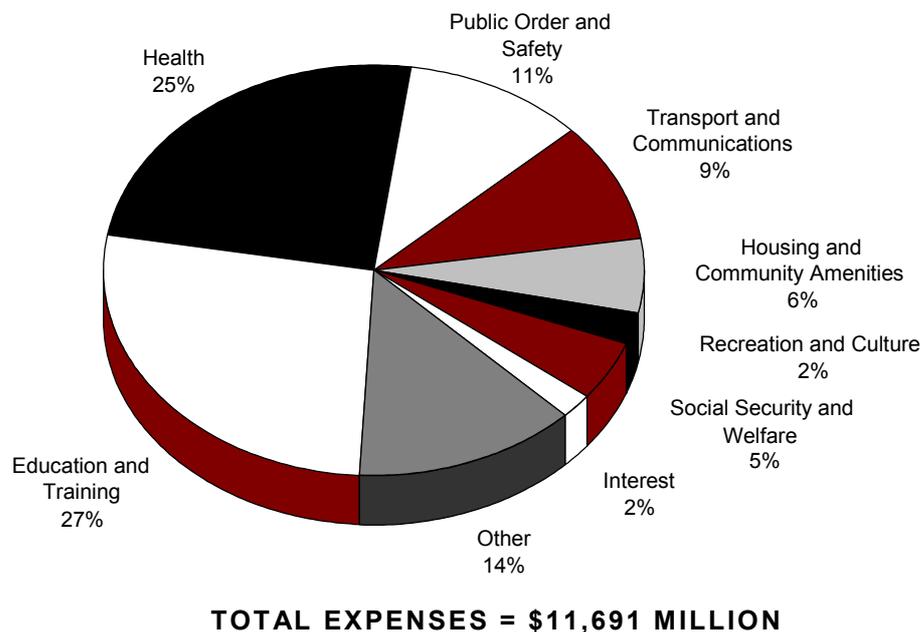
Whenever a government decides to fund a particular activity, it can finance it in three ways:

1. decreasing spending on another activity to keep overall expenditure constant;
2. increasing government debt; or
3. increasing taxes to increase government revenues.

Each of these options can have particular negative consequences or limitations which make it difficult for government to fund new initiatives.

The areas where government expenditure can be cut in practice constitute only a small proportion of overall spending. This is because governments have many areas where recurrent funding is required. Year-to-year, schools and hospitals need to employ staff and maintain their buildings; roads must be kept up to a safe standard; the organs of government such as parliament and the courts must continue to operate. Figure 3 shows how the Western Australian government committed its budget spending for 2003-04.

Figure 3 **WESTERN AUSTRALIAN GOVERNMENT EXPENDITURE 2003-04**

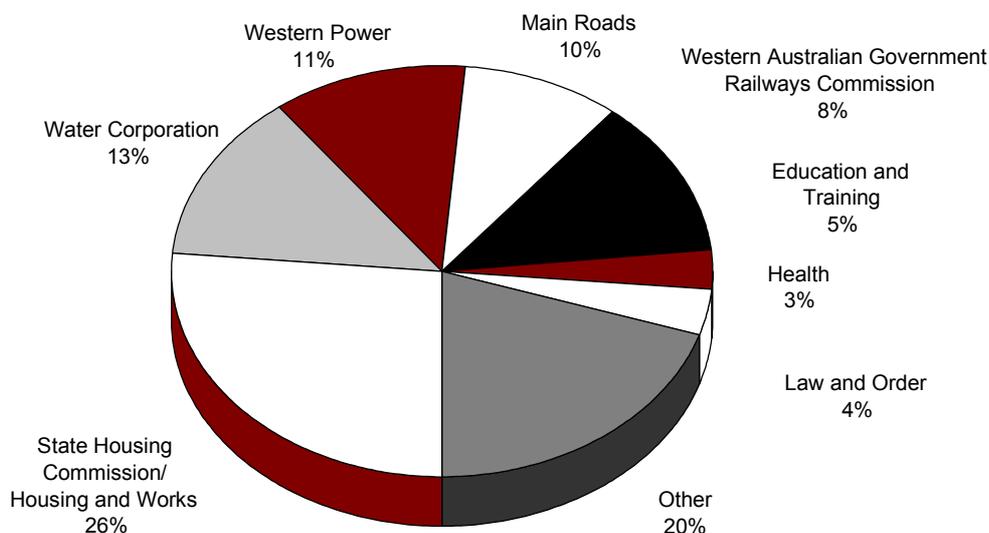


Note: Components do not add to 100% due to rounding.

Data source: Western Australian Government, 2003-04 Budget Paper No. 3.

Figure 4 contains information on the areas of capital expenditure of the Western Australian government over 2003-04, budgeted to amount to a total of \$3,453 million.

Figure 4 WESTERN AUSTRALIAN GOVERNMENT CAPITAL WORKS 2003-04



Data source: Western Australian Government, 2003-04 Budget Paper No. 3.

Among the Western Australian government’s recurrent commitments are community service obligation payments to water, electricity and transport service providers to guarantee that prices faced by regional consumers are the same as metropolitan consumers. This commitment, not fully recognised in the Commonwealth Grants Commission process, means the State government does not face easy choices when it looks at its spending and aims to meet its targets from one area to another.

The Western Australian government’s financial targets are to:

- maintain or increase the net worth of the total public sector;
- achieve an operating surplus for the general government sector;
- retain Western Australia’s ‘AAA’ credit rating, represented by the following two specific targets:
 - maintain the net debt to revenue ratio for the total non-financial public sector ² at or below 47 per cent; and
 - ensure that real per capita expenses for the general government sector do not increase; and
- maintain Western Australia's tax competitiveness.

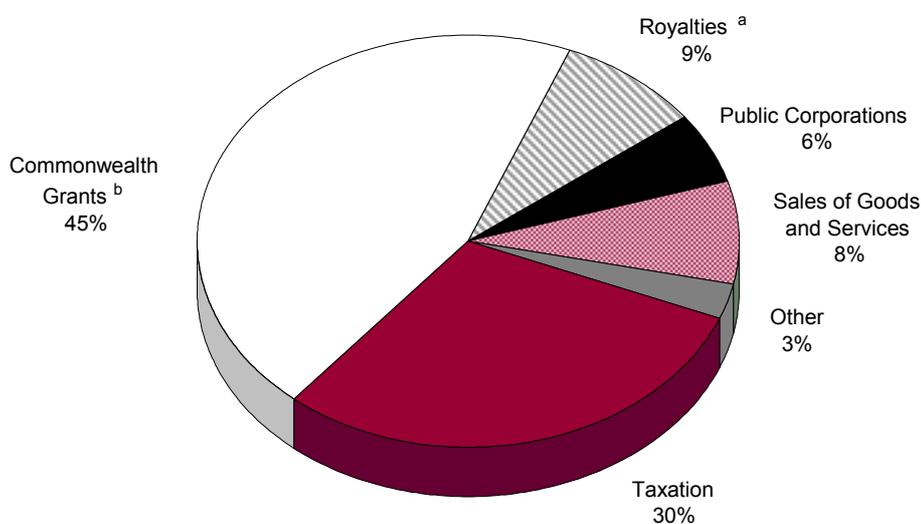
These targets mean that using government debt to fund infrastructure, while traditionally a common approach, is constrained by targets aimed at maintaining credit ratings. A credit rating is a rating agency’s opinion of the creditworthiness of a person, company or government, and importance is placed upon them by governments, financial markets and the media. The two main credit ratings agencies are Standard & Poor’s and Moody’s. When assessing a government, an agency assesses its ability to meet its obligations by looking at characteristics such as its level of financial liabilities and its ability to meet budget targets.

With respect to the most common government credit rating – government-issued debt denominated in domestic currency – both the Australian government and the West Australian government currently have ‘AAA’ credit ratings from both Moody’s and Standard & Poor’s. This is the highest credit rating and means the government has an “extremely strong capacity to meet financial commitments”.³³

These high credit ratings, as measures of credit quality, result in a relatively low cost of capital. Government credit ratings are also a public and easily digestible indicator of financial strength. The spectre of lower credit ratings and the financial and political consequences they entail make governments wary of increasing debt. There are different views on the importance of government debt levels, but there is no doubt that debt funding requires governments to assess the likely implications for their credit ratings.

The third option, increasing taxes to fund infrastructure, can impose burdens or create distortions in the economy. Increasing taxes also frequently has negative political consequences for the government. And the available options for increasing taxes are often limited. Figure 5 shows the revenue sources of the Western Australian government for 2003-04. Direct tax collection constitutes only 30 per cent of total revenue. For all these reasons, governments regard tax funding cautiously.

Figure 5 WESTERN AUSTRALIAN GOVERNMENT REVENUES 2003-04



TOTAL REVENUE = \$11,774 MILLION

(a) Includes North West Shelf petroleum royalties, which are classified as a Commonwealth grant for Government Finance Statistics purposes, reflecting the Commonwealth’s constitutional responsibility for off-shore areas.

(b) Includes specific purpose payments ‘through’ the State.

Note: Components do not add to 100% due to rounding.

Data source: Western Australian Government, 2003-04 Budget Paper No. 3.

³³ Standard & Poor’s website: [www.standardandpoors.com] (Accessed: 5 November 2003).

There is no painless option available to the Commonwealth, State and local governments in Australia for funding common user infrastructure – even when it can be argued, as in the case of debt funding, that it would be reasonably straightforward for another entity to adopt that option for attractive projects.

C.1 Governments and Economic Growth

Western Australia has expressed strong concerns that the current equalisation process is effectively redistributing up to 90 per cent of the State’s royalties to other jurisdictions, while the State’s economic support and development costs have not been properly recognised.

The State government says that this amounts to an inequitable penalty on the State, and creates a disincentive to pursue economic development.³⁴

As the Garnaut Report makes clear, the current approach to equalisation has fundamental problems in dealing with economic development and economic incentive issues. This approach largely accepts the economic situation confronting each State as a policy neutral indicator of revenue capacity, and as a ‘natural endowment’. The Grants Commission generally does not consider the extent to which States’ economies have been affected by past policy settings, or have benefited from past investments made by States.

To what extent do governments only have a marginal impact on their economies? A recent study by Jeffrey Rae, *The Tasmanian Experience: Lessons for New Zealand*³⁵ cites some Tasmania’s poor policy settings and resultant poor performance to demonstrate that State governments’ policies affect long term economic growth:

While size and location factors are likely to have some bearing on a country’s economic performance, the quality of its institutions and policies are vastly more important in explaining the performance of peripheral economies.

State governments therefore have an important role in enhancing economic growth over the long-term.

Western Australian governments have performed this role generally very effectively over the last 40 years by both addressing many of the factors that constrain development, and by encouraging and facilitating economic development.

³⁴ Western Australian Department of Treasury and Finance, *Western Australia’s Submission to the Commonwealth Grants Commission: 2004 Review*, April 2002, p.28.

³⁵ New Zealand Business Roundtable *The Tasmanian Experience: Lessons for New Zealand*, January 2002, [www.nzbr.org.nz].

D Steering Committee and Consultation Team

The membership of the Technology and Industry Advisory Council (TIAC) Steering Committee for this project is listed below:

Dr Brian Hewitt	Project Chair
Ms Sharon Brown	TIAC Member
Mr Rob Meecham	TIAC Member
Mr Mick McGinniss	TIAC Member
Mr Tim Ungar	TIAC Member
Mr Roger Dean	Department of Industry and Resources
Mr Anthony Kannis	Department of Treasury and Finance

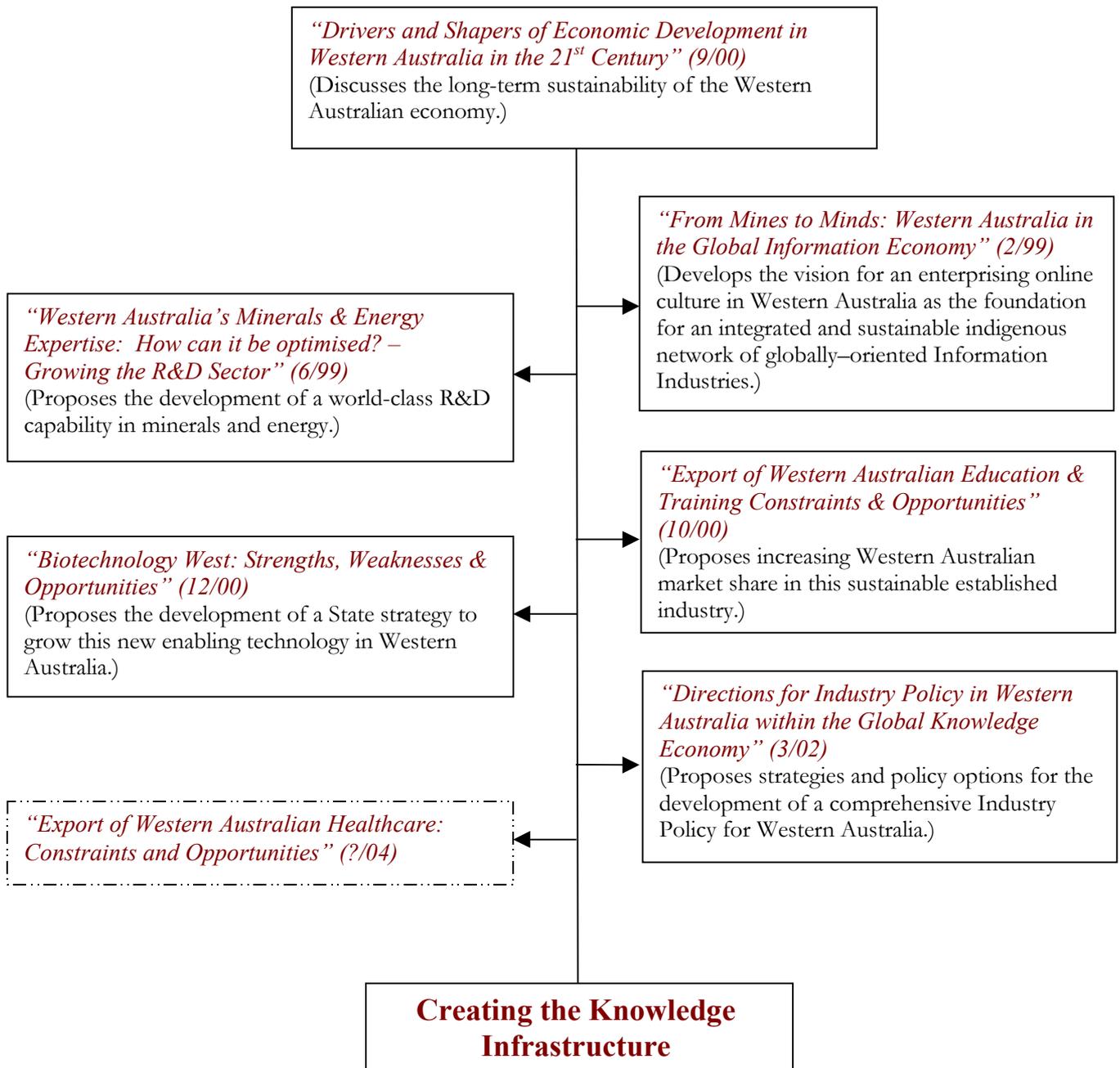
The Steering Committee was assisted in its task by ACIL Tasman Pty Ltd:

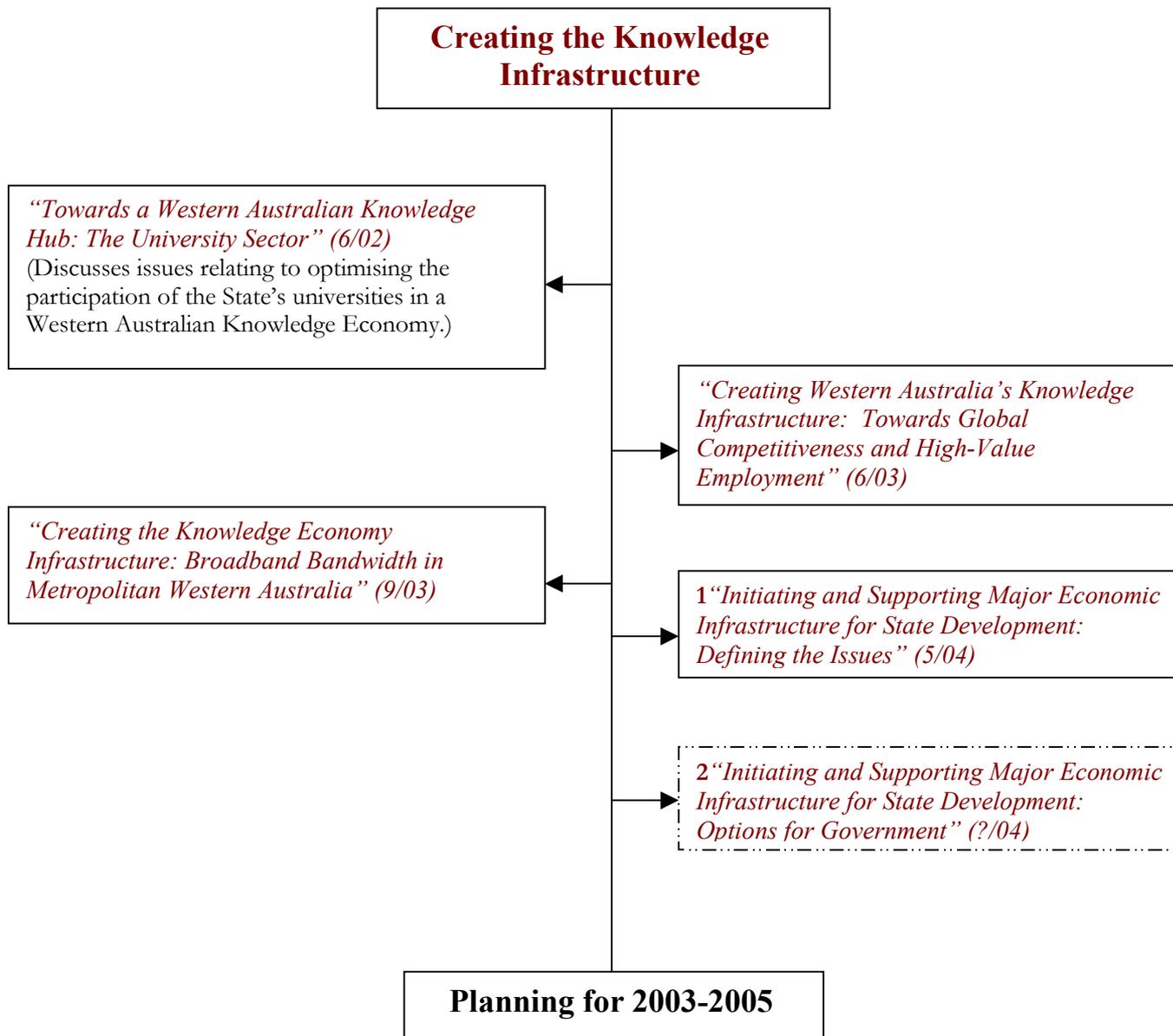
Jeff Rae	Executive Director
Mr Ian Satchwell	Executive Director, Western Australia and Northern Territory
Mr David Greig	Principal Consultant
Mr Tim Moore	Consultant

TIAC Executive Staff

Mr Earl White	Executive Officer
Ms Deanna Fleming	Senior Policy Adviser
Ms Shelley Rush	Executive Assistant

E Towards a Western Australian Knowledge Economy 1999-Present





KEY:	
—————	Completed Reports
- - - - -	Planned Reports

Copies of these reports can be obtained from our website: www.wa.gov.au/tiac

F Western Australian Technology and Industry Advisory Council

Background

The Western Australian Technology and Industry Advisory Council (TIAC) was created by legislation in 1987 (*Technology Development Amendment Act - No. 32 of 1987*) and was continued under Section 20 of the *Industry and Technology Development Act 1998*.

TIAC was preceded by the Technology Review Group 1978-83, and the Science, Industry and Technology Council (SITCO) 1983-87.

Council is made up of representatives from various sectors of the State's economy who, in terms of the relevant Act, use their varied background and experience to provide independent policy advice to the Minister so as to make a significant contribution to the development of strategies relating to the State's economic development.

Members of the Council are appointed by the Minister, under Section 22 of the *Industry and Technology Development Act 1998* so as to be representative of the interests of the people of the State.

TIAC reports through the Minister to Parliament under Section 26(1) and Section 26(2) of the *Industry and Technology Act 1998*.

TIAC reports under the *Financial Administration and Audit Act 1985* through the Department of Industry and Resources under Section 26(3) of the *Industry and Technology Development Act 1998*.

Objectives of the Industry and Technology Development Act 1998

The objectives of the *Industry and Technology Development Act 1998* under Section 3 are to:

- (a) promote and foster the growth and development of industry, trade, science, technology and research in the State;
- (b) improve the efficiency of State industry and its ability to compete internationally;
- (c) encourage the establishment of new industry in the State;
- (d) encourage the broadening of the industrial base of the State; and
- (e) promote an environment which supports the development of industry, science and technology and the emergence of internationally competitive industries in the State.

Functions of the Western Australian Technology and Industry Advisory Council

The Council, under Section 21 of the Act is required to:

- (a) provide advice to the Minister, at the initiative of the Council or at the request of the Minister, on any matter relating to the objects of the *Industry and Technology Development Act 1998*; and
- (b) carry out, collaborate in or produce research, studies or investigations on any matter relating to the objects of this Act, including matters relating to the:
 - (i) role of industry, science and technology in the policies of government;
 - (ii) social and economic impact of industrial and technological change;
 - (iii) employment and training needs and opportunities relating to industrial, scientific and technological activities in the State;
 - (iv) adequacy of, priorities among and co-ordination of, scientific, industrial and technological activities in the State;
 - (v) methods of stimulating desirable industrial and technological advances in the State;
 - (vi) application of industrial, scientific and technological advances to the services of the government; and
 - (vii) promotion of public awareness and understanding of development in industry, science and technology.

The Ministerial advice takes the form of reports and discussion papers which undergo a public consultation phase before submission to the Minister.

Participation on State Advisory and Funding Committees and Councils

Council has accepted invitations for representation and participated in:

- (a) The Federal government's Commonwealth, State and Territory Advisory Council on Innovation.
- (b) The Federal Government's Innovation Festival Committee.
- (c) The Ministerial Education Export Advisory Committee.
- (d) The Information and Communication Technologies Strategic Advisory Group to the Department of Education and Training.
- (e) The Centres of Excellence State Funding Advisory Committee of the Office of Science and Innovation.

Promotion and Public Awareness Raising Activities

Council's promotional and public awareness raising programs consist of two main types:

- (a) The 2020 Breakfast Seminars, commenced in 1990, are short, economic development focused, information dissemination events.
- (b) TIAC's Internet website, to promote and increase the public awareness of its reports and encourage school students to participate in TIAC's virtual Science and Technology Forum. This activity is managed in conjunction with the Science Teachers' Association (STAWA) Talent Search Organisation.

Financial Provisions

The expenses of Council are provided for under Section 15 of the *Industry and Technology Development Act 1998* via the Western Australian Industry and Technology Development Account.

Present Membership

Mr John Thompson

TIAC Chairman

Managing Director SSL & Minerals Australasia
SGS Australia Pty Ltd

Ms Catherine Moore

Global Services Centre Manager
Corporate IT Services
Rio Tinto

Ms Sharon Brown

Strategic Business Manager
AlphaWest

Ms Wendy Newman

Director
Wendy Newman Consultancy

Dr Brian Hewitt

Company Director

Mr Graeme Rowley AM

Executive Director Operations
Fortescue Metals Group Limited

Dr Jim Limerick

Director General
Department of Industry and Resources

Ms Vivienne Snowden

Principal Consultant Geostatistician and
Director – Resource Division
Snowden Mining Industry Consultants

Ms Stephanie Mayman

Secretary
UnionsWA

Professor Lance Twomey

Vice Chancellor
Curtin University of Technology

Mr Rob Meecham

Director of the Business Development Unit
Challenger TAFE

Mr Tim Ungar

Chairman
Telecommunications Services Australia



**PUBLIC COMMENT
REPLY SHEET**

TO: THE EXECUTIVE OFFICER
WESTERN AUSTRALIAN TECHNOLOGY AND INDUSTRY
ADVISORY COUNCIL

SUITE 3 ENTERPRISE UNIT 2
11 BRODIE HALL DRIVE
TECHNOLOGY PARK
BENTLEY WA 6102

TEL NO: (08) 9470 3666

FAX NO: (08) 9470 3558

FROM:

ADDRESS:

TEL NO: _____

FAX NO: _____

EMAIL: _____

NUMBER OF PAGES: _____
(including this cover sheet)

Comments on the Report entitled:

**INITIATING AND SUPPORTING MAJOR ECONOMIC INFRASTRUCTURE
FOR STATE DEVELOPMENT: DEFINING THE ISSUES**

Closing Date: Wednesday, 16 June 2004

(Please tear out and return with your comments.)



**PUBLIC SUGGESTIONS
REPLY SHEET
(refer to Foreword)**

TO: THE EXECUTIVE OFFICER
WESTERN AUSTRALIAN TECHNOLOGY AND INDUSTRY
ADVISORY COUNCIL

SUITE 3 ENTERPRISE UNIT 2
11 BRODIE HALL DRIVE
TECHNOLOGY PARK
BENTLEY WA 6102

TEL NO: (08) 9470 3666
FAX NO: (08) 9470 3558

FROM:

ADDRESS:

TEL NO: _____
FAX NO: _____
EMAIL: _____

NUMBER OF PAGES: _____
(including this cover sheet)

Suggestions for the next report entitled:

**INITIATING AND SUPPORTING MAJOR ECONOMIC INFRASTRUCTURE
FOR STATE DEVELOPMENT: OPTIONS FOR GOVERNMENT**

Closing Date: Wednesday, 16 June 2004

(Please tear out and return with your suggestions.)