



A Comparison of Institutional Arrangements for Road Provision

Staff
Research Paper

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Abbreviations

Abbreviations

AAA	Australian Automobile Association
ABS	Australian Bureau of Statistics
BOOT	Build-Own-Operate-Transfer
CEO	Chief Executive Officer
COAG	Council of Australian Governments
CPA	Competition Policy Agreement
CTC	Competitive Tendering and Contracting
DoT SA	Department of Transport South Australia
DoT Tas	Department of Transport Tasmania
GTE	Government Trading Enterprise
MR Qld	Department of Main Roads Queensland
MRWA	Main Roads Western Australia
NSW	New South Wales
NT	Northern Territory
NTDTW	Northern Territory Department of Transport and Works
OBM	Output-based Management
OECD	Organisation for Economic Co-operation and Development
Qld	Queensland

RAG	Roading Advisory Group (New Zealand)
RTA	New South Wales Roads and Traffic Authority
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia

Overview

Roads play a crucial role in Australia's economy.

Australia's roads are of crucial importance to the economy. Compared to many OECD countries, Australia has one of the largest road provision and road freight tasks. Australia's roads are a significant national asset. The 800 000 km road network has been valued at over \$100 billion. Annual outlays on maintenance and construction are over \$6 billion.

Evidence indicates that there have been substantial improvements in road-related safety, social and environmental outcomes in Australia.

Recent Federal Parliamentary Inquiries have highlighted the need for finding ways of improving road provision.

Evidence presented at two recent Federal Parliamentary Committees of Inquiry into road provision argued that there was room for improvement in the way Australian governments provide road infrastructure. In particular, governments could set clearer road-related objectives and improve long-term planning and investment decisions. Within this context, a better understanding of the institutional arrangements for road provision could be useful in finding ways to further improve road-related outcomes.

This paper involves a comparison of four institutional approaches to road provision.

This paper compares four institutional approaches to road provision: the traditional 'departmental' approach, output-based management, an effective road fund and a public utility model. The merits of each approach is compared in terms of some key governance characteristics, including accountability, responsibility, autonomy and transparency.

Traditional departmental arrangements are characterised by Ministerial discretion...

Most Australian State road agencies are characterised by *traditional departmental* and *output-based management* arrangements.

Under *traditional departmental* arrangements, the Minister has the authority to make decisions that directly affect road-related outcomes. As well as deciding upon the aggregate level of funds to be invested in road infrastructure, the Minister may exercise discretion over where these funds will be invested.

...but actual decisions are the result of various considerations and expectations.

However, in practice road-related investment decisions are constrained and influenced by a mixture of political and institutional considerations, as well as by community expectations.

Output-based management devolves some input and process decisions to the road agency...

Output-based management involves funding government entities on the basis of an agreed notional price for specified outputs. Under output-based management, providers are free to find the least cost ways of delivering specified outputs.

Accountability and the associated performance monitoring regimes can be improved under output-based management. This is because output-based management seeks to clarify the Minister's and road agency's roles as purchaser and provider, respectively.

...but output-based management faces implementation issues because roads are long-lived assets.

However, because roads are a long-lived asset involving large capital outlays, output-based management presents a number of implementation issues. These include the ability to develop robust performance indicators and the extent to which an arm's length agreement between the Minister and road agency can be maintained.

Effective road funds represent a significant devolution of responsibility away from the government.

An *effective road fund* approach involves devolution of responsibility for key road provision tasks to a representative board of management. In particular, the representative board decides both the aggregate level of expenditure on roads and where these funds will be invested.

In undertaking these responsibilities, the road fund must have regard to the government's stated road-related safety, economic, social and environmental objectives. These objectives can be detailed in legislation, terms of reference or an agreed statement of intent.

A stable source of funds is crucial to the functioning of an effective road fund.

An effective road fund approach requires a stable source of revenues to finance spending programs. This is achieved through the representative board deciding upon the level of road user charges (or at least recommends them to government) which are levied by the government. The government then distributes these revenues to the road fund.

This may improve road-related investment decisions...

One of the main advantages of the effective road fund approach is that the representative board may have better information and autonomy to balance the benefits of increased road expenditure against the cost of provision.

...but this is likely to be influenced by the board's composition and accountability.

However, several important issues have been raised surrounding the use of a representative board to provide road networks. They include the ability of the representative board to balance the interests of all affected parties and the tradeoff between maintenance and new investment in road networks.

Underpinning these issues, the representative board must face appropriate rewards and sanctions to encourage improved performance.

The public utility model involves yet another step in the devolution of responsibility.

Under a public utility approach, the government can still pursue clearly specified road-related safety, social and environmental objectives.

A public utility providing road infrastructure may require regulatory oversight.

To date, there is limited experience with the effective road fund and the public utility model in road provision.

The *public utility model* involves yet another step in the devolution of responsibility. Under this approach, the utility charges directly for the use of roads and provides road services on the basis of being able to earn a reasonable rate of return on its investments.

However, the public utility model does not preclude the government from pursuing clearly specified (and funded) road-related safety, social and environmental objectives. The government could pursue such objectives by modifying the legislative environment within which the utility operates or by purchasing road outputs directly from the utility.

A public utility providing road infrastructure may have the potential to exploit ‘monopoly’ power in some instances. In particular, the utility may overcharge for road use. Regulatory oversight may therefore be required. This is to ensure that the road-related outcomes achieved by the utility are consistent with those that would be achieved in a competitive market (subject to the government’s specified road-related safety, social and environmental goals).

In addition, in the case of road provision, regulatory oversight may need to extend beyond the traditional areas of asset valuation and price setting. The road utility should also be subject to strong mandatory consultation and disclosure requirements.

The use of the effective road fund approach is a relatively recent innovation. The closest practical version of an effective road fund in the developed world is found in the operations of Transfund New Zealand.

While the public utility model for road provision has been proposed in Australia and overseas, it is yet to be fully implemented in any developed country.

Many issues related to the effective road fund approach and public utility model are yet to be resolved.

A key feature of the effective road fund approach is the use of a representative board of management. This raises important implementation issues, such as what groups should have a representative on the board? How should these representatives be appointed and held accountable for their performance? A crucial element of the public utility model is the regulation of the utility's activities — especially its price setting powers. Further research is required to examine how (and if) the activities of a public utility providing road infrastructure can be effectively regulated.

Any institutional changes for road provision need to be considered within the context of the involvement of each level of government.

In Australia, all three levels of government are involved in the provision of road infrastructure. Any changes to institutional arrangements would therefore need to be considered within the context of each level of government's (often overlapping) road-related responsibilities and ability to raise revenue to finance spending programs.

There may be gains from adopting elements of alternative approaches to current Australian institutional arrangements.

Apart from considering the usefulness of a movement towards a new set of institutional arrangements in Australia, there may be value in exploring options to improve the functioning of current institutional arrangements. In particular, there may be accountability and transparency elements of the effective road fund approach and public utility model that could be readily applied to Australian road agencies. For example, directions from the Minister to a road agency could be made in writing and tabled before parliament. Road agencies could be made subject to the same mandatory disclosure laws proposed for the public utility model. These are some of the issues worthy of further analysis.

1 Introduction

A safe, reliable and efficient road network is vital to the functioning of a modern economy. People rely on roads for many activities — such as travel to and from work, visits to friends, shops and entertainment venues. Road transport is the principal mode used by businesses to obtain raw materials and to deliver finished products.

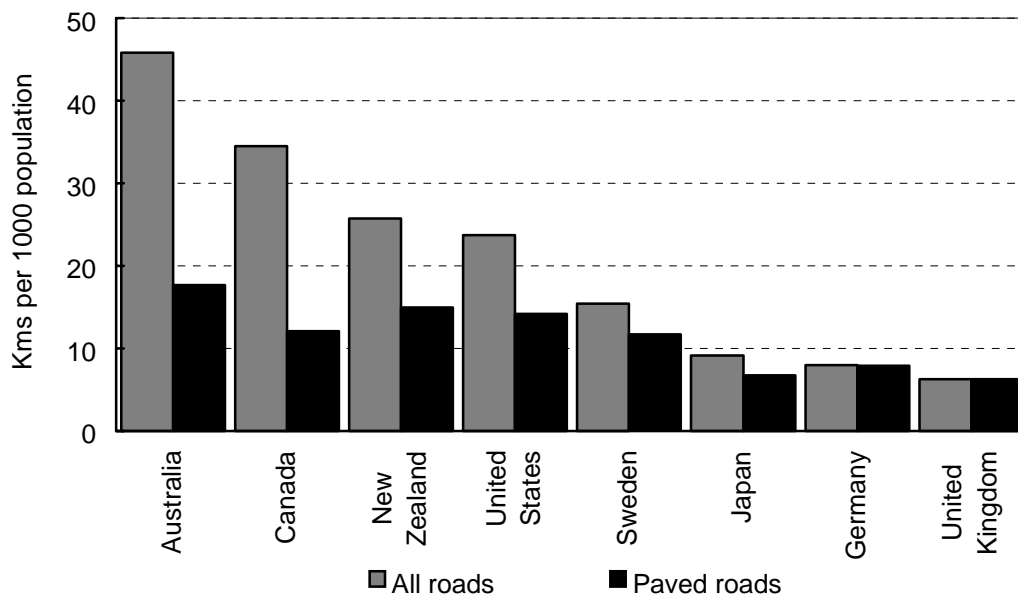
1.1 The significance of roads

Compared to other OECD countries, in relative terms, Australia has one of the largest road provision and transport tasks. As shown in figure 1.1, statistics collected by the International Road Federation indicate that on a per person basis, Australia has more roads than several other OECD countries (IRF 1996). Figure 1.1 also indicates that the Australian (and Canadian) road networks are distinguished mainly by their large quantity of unpaved roads.

As shown in figure 1.2, on a per person basis, Australia undertakes one of the largest freight tasks at over 5 500 tonne–kilometres per year (IRF 1996, ABS 1996 and Transport Canada 1996). Figure 1.2 also indicates that the relative road freight task in Australia (and the United States) is around twice that of many other OECD countries.

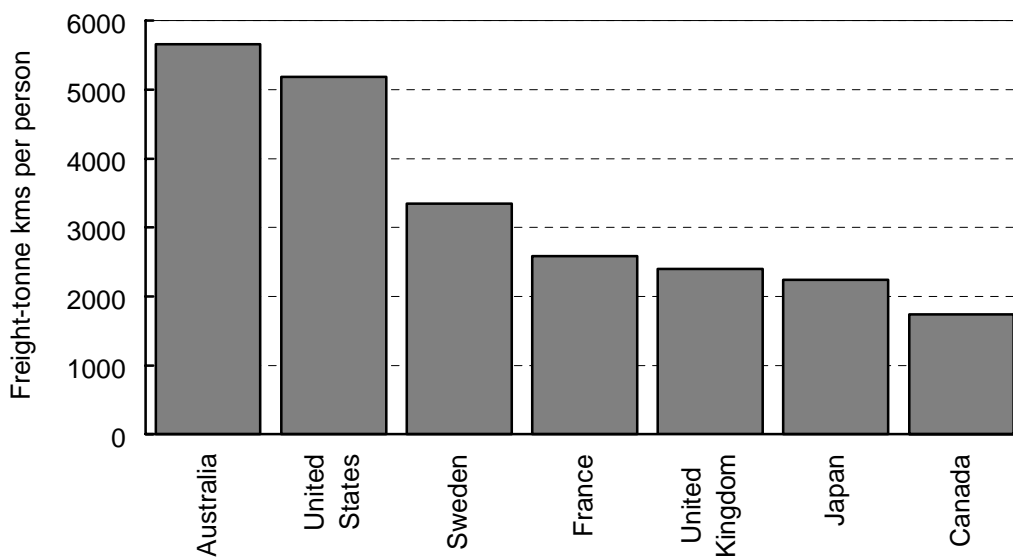
Australia's road network is a significant asset. The ABS (1997) has valued Australia's 800 000 km of paved and unpaved roads at around \$50 billion (excluding the value of land under roads). However, Cox (1997) has estimated the replacement cost of national and State highways at over \$100 billion. Annual outlays to maintain and improve Australia's road network are estimated to be around \$6 billion (BTCE 1998).

Figure 1.1 Road length per 1000 population, 1995



Data source: IRF (1996).

Figure 1.2 Road freight-tonne kilometres per person^a, 1991–1995



^a The road freight task is expressed as the average freight-tonne kilometres for the period 1991 to 1995.

Data sources: ABS (Survey of Motor Vehicle Use, Cat. no. 9202.0), IRF (1996) and Transport Canada (1996).

1.2 Roads – a form of economic infrastructure

Economic infrastructure refers to a number of long-lived assets that provide a stream of services over time for both personal and business uses. Examples of economic infrastructure include rail, ports, airports, gas and electricity. Roads can also be considered as economic infrastructure. This is because roads and other forms of economic infrastructure share many similar production and demand characteristics. Most importantly, the provision of roads involves the management of long-lived assets. In addition, roads complement many forms of social infrastructure. For example, roads provide an important form of access to social infrastructure services such as schools and hospitals.

Reform of provision of economic infrastructure: a brief review

Historically, the provision of economic infrastructure in Australia has been dominated by the public sector. However, concerns over the efficiency with which governments have provided economic infrastructure has prompted continuing reform including increased participation by the private sector.

Important general policies aimed at improving the efficiency of all sectors of the Australian economy (including economic infrastructure providers) proceed from the recommendations of the Hilmer Committee in 1993 (Hilmer, Rayner and Taperell 1993). In April 1995, the Council of Australian Governments (COAG) agreed to implement a package of measures to extend competition policies to all business activity, including those of all levels of government (see box 1.1).

In Australia, road-related reforms have tended to focus on lowering the cost of approved road construction and maintenance projects. This has been encouraged by the application of competitive tendering and contracting in accordance with National Competition Policy Agreements. In addition, Cox (1994) notes that at the State level, reforms have occurred in the specification of objectives and performance monitoring by governments. Reorganisation of management structures and changes to delivery systems are likely to have further improved the efficiency of road infrastructure provision.

However, there has been a continuing debate in Australia (and overseas) regarding the need for further changes in the way governments provide road infrastructure (see Heggie (1995), Cox (1994), Newberry (1994) and ISC (1990)). These changes include improving the governance structure of road agencies, making providers more directly accountable to road users and increasing the level of competition in the supply of road services.

Box 1.1 **National competition policy principles**

In April 1995, the Federal government and all the States and Territories ushered in a new era in competition policy when they signed the Competition Policy Agreement (CPA) and other associated agreements. The CPA committed them to:

- applying competitive neutrality principles to all government business activities;
- evaluating structural reform for public monopolies where competition could be introduced;
- reviewing legislation that restricted competition;
- establishing regimes for access to essential infrastructure facilities; and
- considering the establishment of independent price overview for government trading enterprises.

The related Conduct Code agreement committed all jurisdictions to ensuring that the *Trade Practices Act 1974* applied to all business activities, including those of local government.

Reforms flowing from the Hilmer Committee and CPA include:

- administrative changes to the operation and management of enterprises (including corporatisation);
- when appropriate, removing barriers to competition in the markets formerly supplied solely by a government agency;
- the implementation of access regimes for certain segments of industry; and
- increasing use of competitive tendering and contracting (combined with the adoption of competitive neutrality principles) in the delivery of infrastructure projects.

Source: COAG (1995).

Specific issues and features of road provision

The extent to which Australia's road network provides adequate road services to the domestic economy depends in part on the level and mix of road investment undertaken. This is because road-related investments undertaken affects the productivity of the road network (and the entire transport system) and the desired safety, social and environmental outcomes.

In considering issues related to road provision¹, this paper recognises two interrelated features of road provision in Australia. They are:

- the issues that have been raised in relation to road provision by Australian governments; and

¹ For the purposes of this report, 'road provision' refers to the planning, provision and funding of road infrastructure as well as the pricing of road use.

-
- the supply and demand characteristics of road provision.

There have been two recent Federal Parliamentary Committees of Inquiry into road provision in Australia (see box 1.2). A recurrent theme of the submissions to these Committees of Inquiry suggested that the current patterns of road investment in Australia are not maximising potential benefits to users. That is, road expenditure could potentially better match the demand for (and benefits from) road infrastructure by road users.

In addition, the Productivity Commission's (PC 1996) *Stocktake of progress in microeconomic reform* also made recommendations to improve the efficiency with which road infrastructure is planned and delivered (see box 1.3). For example, the Productivity Commission endorsed the principles proposed by the EPAC Private Infrastructure Task Force (EPAC 1995) for allocating road funds. These principles included accounting for the social and environmental effects of investment in infrastructure (EPAC 1995).

Box 1.2 Key issues raised at Parliamentary Committees of Inquiry

Two recent Federal Parliamentary Committees of Inquiry — the Morris Committee (1993) and the Neville Committee (1997) have been held in relation to the provision of road infrastructure by government. Several submissions to these Committees of Inquiry argued that:

- governments have not set clear objectives in relation to road provision;
- overall investment is too low and current investment patterns have not maximised the quality of service to road users; and
- political imperatives and funding uncertainty have hampered long-term planning.

For example, the Morris Committee's report, *Driving the Dollar Further*, noted submissions claiming that:

... lack of clear objectives for the road network has resulted in ineffective and inefficient road construction and maintenance (Morris Committee 1993, p. 31).

The Neville Committee's report, *Planning not Patching*, received submissions from numerous groups about current levels and patterns of road investment. For example, the Australian Road Federation stated:

Although almost \$6 billion is currently being expended on roads throughout Australia each year there is no guiding policy to ensure that the money is being spent to best advantage and that community aspirations are being taken into account (ARF 1997, p.126).

Sources: ARF (1997), Morris Committee (1993) and Neville Committee (1997).

The issues raised above indicate that there is room for improving the way in which Australian governments provide road infrastructure. However, this does not imply that Australia's current road network results in unacceptable road-related outcomes. As summarised by Cox:

To answer the question whether roads are doing their job at the present time is therefore a mixed bag. Social outcomes have continued to be enhanced by the road transport system ... There have been significant improvements in environmental and safety outcomes, but concerns still remain and further improvements are required (Cox 1997, p.289).

Box 1.3 Recommendations relating to roads in the *Stocktake of progress in microeconomic reform*

The Productivity Commission's (1996) *Stocktake of progress in microeconomic reform* included recommendations on infrastructure in general and roads in particular.

In relation to infrastructure, it identified the key elements of the strategy for improving infrastructure provision as:

- rigorous application of the national competition policy, including structural separation of public monopolies where appropriate;
- continuing with administrative reforms including measures to improve pricing, identify and directly fund community service obligations and increase contracting out of non-core services;
- supporting competition policy through labour market and tax reforms;
- for competitive or contestable infrastructure services, assessment of the need to retain public ownership; and
- improvements to infrastructure planning and investment processes.

In relation to roads, it recommended the following specific reforms:

- governments should improve the allocation of road funds by adopting the principles proposed by the EPAC Private Infrastructure Task Force (EPAC 1995). They should also examine the need for additional public funding or private financing to deal with any backlog of road projects with high social benefit–cost ratios.
- road agencies should increase contracting out of maintenance, subject to meeting the guidelines spelt out in the Industry Commission's (1996) report on competitive tendering and contracting.
- road agencies should introduce electronic road pricing within congested city networks, as technology permits.

The Commonwealth, State and Territory governments should quickly finalise nationally uniform road laws.

Source: PC (1996).

Characteristics of road provision

When considering the issues that have been raised in relation to road provision and the appropriateness of proposed reforms, it is important to recognise a number of characteristics that influence the provision of road networks (see box 1.4). For example, some roads display natural monopoly characteristics. One reason why roads have natural monopoly characteristics is because in many cases it is more efficient to have one road providing road services to all vehicles (known as economies of scope) rather than multiple roads for different vehicle classes.

Road provision and road transport can result in environmental externalities such as air and noise pollution. Government intervention may be warranted to deal with these external costs.

Another important feature of road provision is that there is little direct charging for road use. As a consequence, there is a lack of pricing signals to guide optimal road use and road-related investments. The lack of direct charging in turn means that governments cannot readily use traditional financial measures of performance, such as revenues and return on assets, to monitor directly the returns from investing in roads.

Other features of road infrastructure, such as network externalities, highlight some of the special characteristics that affect the provision of road networks.

1.3 What this paper is about

This paper analyses the institutional arrangements Australian and overseas governments have created to provide road infrastructure. In addition, the paper also examines proposed alternative institutional arrangements that have been highlighted both in Australia and overseas. In doing so, the paper's primary aim is to:

- describe existing arrangements for road provision in Australia;
- outline possible alternative arrangements; and
- discuss the strengths and limitations of each arrangement.

In addition, the paper also seeks to:

- explore the scope for improving the existing Australian arrangements; and
- identify areas for further research.

Box 1.4 **Characteristics of road provision**

The provision of road infrastructure is affected by its production and demand characteristics. Some of these characteristics include:

- natural monopoly characteristics;
- network issues;
- difficulties in charging for use;
- performance measurement issues; and
- environmental externalities.

A natural monopoly exists when one firm can supply the entire market at less cost than can two or more firms. Friedman and Boorstin (1994) and Newberry (1994) argue that roads display natural monopoly characteristics. However, the extent to which a road has natural monopoly characteristics also depends upon potential competition from other transport modes, such as rail, water and air transport.

Each stretch of road is just one part of an entire road network. Changes made to one road have the potential to affect traffic flows on all parts of the network. For Australia, network issues create further challenges in providing road infrastructure. This is because roads are provided by all three levels of government. Coordination between each level is therefore required to maximise the benefits derived from the entire road network.

Governments usually impose taxes and charges on motor vehicles and road use. This is because efficient direct charging by either government agencies or the private sector is hampered by high transaction costs. For example, Zietlow (1996) states that a minimum traffic level of 1500 vehicles per day is required to keep costs below 30 per cent of the tolls collected. Because of this situation, governments in both Australia and overseas use their taxation powers to charge indirectly for the use of roads. Examples include taxes such as registration charges (a type of road access charge) and fuel levies (a type of user charge). However, in many cases the revenue collected from road user charges are not directly related to road use and are often paid directly into the government's consolidated revenue.

In many cases, the performance of government owned agencies providing economic infrastructure can be judged by using a range of financial (such as revenues and return on assets) and non-financial indicators. However, because of the difficulties in charging directly for the use of roads, traditional measures of performance cannot be used directly to assess the returns which governments have received from investing in road infrastructure. Performance monitoring currently focuses on a number of areas which include overall road-related outcomes (such as, safety, vehicle productivity and environmental outcomes) and the extent to which approved projects have been delivered on time and within budget.

Road infrastructure and road transport can also result in environmental externalities. Examples include air and noise pollution and land and soil degradation.

In the case of road provision, an understanding of institutional arrangements is considered useful in finding ways to promote improved road-related outcomes. This is because many of the issues raised in relation to road provision appear to be related to the institutional arrangements in which roads are provided. For example, it has been argued that:

The notion that roads have to be operated as a traditional government department is presently under challenge and is being replaced by the concept that the road sector should be commercialised in order to bring market forces and market discipline to bear on this sector (Cox 1994, p.112).

Studies of ways to improve road provision in other countries have also focused on institutional arrangements. For example, Heggie argued that the current form of institutional arrangements in a number of countries was contributing to poor road-related outcomes:

Part of the reason for poor maintenance policies is attributable to the institutional framework within which roads are managed (Heggie 1995,p.19).

In considering road-related issues, it is recognised that roads in Australia are provided by all three levels of government. Each level of government often have overlapping responsibilities but varying abilities to raise revenue to finance spending programs. As argued by Docwra:

Unless there is some understanding of the complex of political, institutional and constitutional factors, including the role of the High Court as interpreter of the Constitution, and the existence of institutional failure, as determinants of past and present policies, there is unlikely to be much progress made in narrowing the gap, and thus providing for a more efficient and 'equitable' road expenditure and cost recovery program (Docwra 1993, p.151).

Constitutional (and associated financial relations) between levels of government was considered by both the Neville and Morris Committees of 1997 and 1993, respectively.

The implementation of some of the institutional approaches discussed in this paper may require significant Constitutional, legal and financial changes. However, detailed consideration of responsibility and revenue raising capacity between levels of government is considered to be outside the scope of this paper. Such issues would need to be addressed within the broader context of overall relations between levels of government in Australia and not just those pertaining to the provision of road infrastructure.

In describing and examining generic institutional arrangements for road provision in Australia, this paper's main focus is on the institutional arrangements surrounding State road agencies. State road agencies play a pivotal role in providing Australia's road network. For example, the National Road Transport Commission has classified 15 per cent of Australia's road network as State arterials which provide transport services for around two thirds of all vehicle travel (NRTC 1996). In addition, State road agencies manage road

construction and maintenance projects funded by the Commonwealth Government for the national highway system² (representing 2 per cent of Australia's road length and 12 per cent of all vehicle travel).

In describing and evaluating institutional arrangements in Australia and overseas, the paper covers areas such as governments' road-related objectives, the governance of road agencies, funding sources and the pricing of road use. These areas have been chosen because their evaluation appears to provide the greatest insight into the issues surrounding government involvement in road provision.

While this paper has been influenced partly by the concerns about road funding it does not evaluate particular funding decisions. For example, it has not attempted to determine the appropriate level of road funding for Australia or any particular jurisdiction.

This study does not paper any comparative assessment of the performance of road agencies. Consequently, it does not seek to duplicate the performance measurement work of organisations such as Austroads (1996a). Instead, it concentrates on comparing different institutional approaches to road provision.

1.4 Structure of the paper

The next chapter describes the current Australian institutional arrangements. Included in discussions are Australian road-related objectives, the traditional 'departmental' and output-based management approaches to road provision, the funding of road projects and the pricing of road use.

In Chapter 3, alternative institutional arrangements for providing road infrastructure are presented. Examples are also given of where such arrangements have been applied in overseas countries.

A framework is developed in Chapter 4 to facilitate comparison of the different institutional arrangements. This framework is then used to compare the merits of each set of arrangements. This chapter also discusses briefly implementation issues requiring further work in considering improving current Australian institutional arrangements.

² While the Federal Government provides funding for the construction and maintenance of the national highway system, ownership of the asset resides with the States.

2 Current Australian institutional arrangements

Institutional arrangements cover a range of issues that affect the provision of road infrastructure. The key elements of institutional arrangements for road provision described in this chapter include: governments' road-related objectives; legislative arrangements; the traditional 'departmental' and output-based management (OBM) approaches to providing road infrastructure in Australia; the source of funds for road agencies; and the pricing of road use.

Objectives provide each road agency with their fundamental purpose and guide the type and level of outcomes road agencies attempt to achieve. The ability of agencies to achieve specified road-related objectives is affected in turn by the institutional arrangements (determined primarily by the legislative environment) within which they operate. In addition, the provision and use of roads is influenced by the manner in which the aggregate levels of funds are supplied to road agencies, the way in which project selection takes place and the types of road-related charges levied by government.

2.1 Australian road-related objectives

Clear objectives are crucial not only for the efficient delivery of roads and road services but for reasons of accountability, transparency and other governance issues. As the National Commission of Audit recently noted:

Governments need to satisfy themselves that they are on the right track before worrying about whether the trains are running on time (NCA 1996, p.21).

An examination of the annual reports and enabling legislation for each Australian State and Territory¹ road agency indicates that each jurisdiction's statement of road-related objectives tends to cover similar ground (see box 2.1). Each road agency makes reference to economic objectives (such as trade and commerce, regional

¹ For ease of reading, unless the context indicates otherwise, the term 'States' is used to refer to the States and Territories.

development, and the efficient movement of goods and services), social objectives (including access and safety) and environmental objectives.

Box 2.1 Examples of road-related objectives in Australia

Australian governments set their road agencies a range of both economic and social objectives. The following examples highlight the major themes evident in current road-related objectives.

Austrroads, the association of Australian and New Zealand road authorities, provides the following as generic objectives for a road system:

In contributing to the community's broad economic, social, defence and environmental goals, the principal role of the road system is:

'to facilitate interaction between people and the exchange of goods and services by providing effective, equitable, land-based accessibility to a wide range of places, and by enabling safe, reliable mobility of people and transport of goods with the efficiency required to compete in the global economy' (Austrroads 1996a, p.2).

The Commonwealth Government's Department of Transport and Regional Development states its road-related objectives as:

- facilitating overseas and interstate trade and commerce;
- allowing safe and reliable access by a significant proportion of Australians to major population centres;
- minimising the cost of the National Highway to the Australian community;
- supporting regional development; and
- contributing to ecologically sustainable development (DTRD 1997, p.848).

Australian State governments have similar goals. For example, the Western Australian Government's stated objective in relation to road provision is:

... to provide in an environmentally sensitive way, a safe road network as part of an integrated transportation system for the efficient movement of goods and people (MRWA 1996, p.38).

And in Queensland the objectives are:

... within the government's overall policy agenda, to improve –

- (a) the economic, trade and regional development performance of Queensland; and
- (b) the quality of life of Queenslanders;

by achieving overall transport effectiveness and efficiency through strategic planning and management of transport resources (*Qld Transport Planning and Co-ordination Act 1994*, Section 2).

Sources: Austrroads (1996a), DTRD (1997), MRWA (1996), *Qld. Transport Planning and Coordination Act (1994)*.

Information collected from overseas road agencies provided examples of the road-related objectives pursued by governments outside Australia. While not described in detail in this paper, the types of road-related objectives set by overseas governments are similar to those specified in Australia.

A review of the information gathered indicates that, historically, strongest emphasis has been on economic goals. Until the end of the 1960s, emphasis in most countries including Australia was on expanding the level of road infrastructure to foster economic and regional development. Over the last thirty years economic emphasis has focused increasingly on cost reduction through efficiency gains within road agencies and a greater use of the private sector in road provision. In most developed countries, current economic goals in relation to roads include laying the groundwork for the introduction of intelligent transport systems and for the achievement of seamless connections between different modes of transport (efficient intermodal transport).

Road provision during the past several decades also has seen greater emphasis on social, safety and environmental goals. Social goals include access for travel and social interaction. Safety and environmental goals have resulted from concern about high accident rates and increasing noise and emission levels (PIARC 1995).

2.2 Legislative arrangements

State road agencies in Australia operate under various legislative arrangements. However, the different legislative arrangements do not appear to alter significantly the allocation of responsibility and accountability across most State road agencies. As a consequence, for the purposes of this paper, the following section covering the traditional ‘departmental’ and OBM approaches to providing road infrastructure are considered to describe adequately the key aspects of most State road agencies.

A consistent feature of the current legislative arrangements is the avenues available for governments to exert control over the operations of their road agencies. Ministerial powers of intervention tend to be broadly consistent across States, regardless of the legislative arrangements under which the road agency has been established.

State governments currently use two legislative approaches to establish government agencies. They include:

- establishment as a department under each State’s Public Service Act; and
- establishment under separate legislation.

As shown in table 2.1, road agencies have been set up as departments in Queensland, Tasmania and the Northern Territory.

Other State road agencies fall within the category of a statutory authority or body corporate set up under separate legislation. Under this approach, the powers and responsibilities of these agencies are specified in the establishing legislation.

Under current institutional arrangements in Australia, road agencies established as a statutory authority and body corporate still tend to contain the same avenues for Ministerial intervention. This feature is highlighted by specific sections of each road agency's establishing legislation. For example, in New South Wales, the *Transport Administration Act 1988* specifies that:

The Chief Executive of the Roads and Traffic Authority is, in the exercise of his or her functions, subject to the control and direction of the Minister (section 49).

In Victoria, the *Transport Act 1983* states that:

Each Corporation must exercise its powers and discharge its duties subject to the general direction and control of the Minister, and to any specific directions given by the Minister (section 31).

And in Western Australia the *Main Roads Act 1930* states that:

The Commissioner (of Main Roads Western Australia) shall also –
inspect and report on and construct or supervise roads and works when so desired by the Minister (section 19).

Table 2.1 Legislative arrangements of road agencies

Road agency	Legislative arrangements		
	Department	Statutory authority	Body Corporate
RTA		✓	
VicRoads			✓ ^a
MR Qld	✓		
MRWA			✓
DoT SA			✓
DoT Tas	✓		
NTDTW	✓		

^a VicRoads is established as the Roads Corporation under section(15) of the *Transport Act 1983*. The Roads Corporation is then incorporated as a body corporate under section(27) of the *Transport Act*.

Notes: RTA: New South Wales Roads and Traffic Authority, MR Qld: Department of Main Roads Queensland, MRWA: Main Roads Western Australia, DoT SA: Department of Transport South Australia, DoT Tas: Department of Transport Tasmania, NTDTW: Northern Territory Department of Transport and Works.

Sources: Annual reports and other documents published by road agencies.

2.3 The traditional ‘departmental’ and output-based management approaches

A government department is one of the most common forms of government entity.² Some of the basic characteristics of a government department are shown in box 2.2.

Within a departmental approach, there are a number of features which affect the provision of road infrastructure. The key features of a departmental approach to road provision considered here are:

- who is responsible for making decisions that affect road-related outcomes;
- investment appraisal practices;
- performance monitoring;
- project delivery; and
- the funding and pricing of roads.

One of the most important elements of institutional arrangements for road provision concerns the level at which responsibility for decision making occurs. In particular, the way in which Ministers govern their road agencies influences performance monitoring and how road agency managers are held accountable for outcomes achieved.

How road agencies undertake investment appraisal affects the type and quality of advice provided to governments. Given the lack of direct charging (and hence pricing signals) for road provision, an important aspect of investment appraisal is how user preferences are incorporated into the planning process and to what extent investment appraisal is open to public scrutiny.

As outlined in chapter 1, given the lack of direct charging for road use, governments cannot readily use traditional measures of financial performance to monitor directly the performance of road agencies. Instead, current performance monitoring focuses on the extent to which approved projects have been completed on time and within budget and the quality of service which the road network provides to users.

² In this study, a government *entity* refers to any government owned or funded organisation. A government *department* is one type of government *entity*.

Box 2.2 **Some characteristics of government departments**

Many government agencies providing health, education, law and order and road services have been set up as government departments. Some of the characteristics of government departments include the following:

- they are largely or totally funded from the consolidated budget of government;
- they are subject to Ministerial direction; and
- they are required to prepare annual reports to be tabled in Parliament. Annual reports usually include performance indicators and financial statements which are audited by the Auditor-General.

Source: DTF (1997).

After it has been decided what road projects will be undertaken and the necessary funding is provided, it is then the responsibility of the road agency to deliver the approved projects. State road agencies have adopted a variety of approaches in providing road projects — often using a mixture of in-house capacity and external contractors. The extent to which road construction and maintenance projects are subject to competitive tendering and contracting (CTC) has been further influenced by the signing of competition policy agreements by State governments.

How governments choose to fund their road agencies can influence the provision of road infrastructure. As discussed later in this chapter, in Australia there are disparities between levels of government in terms of their ability to raise road-related revenues to finance spending programs.

Responsibility and decision making

Providing road networks that meet the demand of users involves a number of interrelated tasks. This paper categorises the provision of road infrastructure into seven key tasks. They are:

- setting overall road-related outcomes (or objectives) the institutional arrangement is to pursue;
- development of the institutional framework or operating environment in which road tasks are allocated and undertaken;
- deciding on the aggregate level of expenditure on road provision;
- deciding how that expenditure is allocated between different projects — new construction, rehabilitation and maintenance of existing roads;
- undertaking project appraisals to support the decisions above;
- supervising project delivery to ensure these decisions have been implemented efficiently; and
- charging for the use of roads.

Figure 2.1 shows the broad allocation of responsibility in Australia between the government and road agency in undertaking key road-related tasks. For example, the government is responsible for specifying the road-related outcomes (or objectives) it wishes to achieve.

Under traditional departmental arrangements, the government also has the authority to make those decisions that affect the road-related outcomes achieved. For example, Ministers decide upon the aggregate level of funds to be spent on road infrastructure.

As well as deciding upon the aggregate level of expenditure, the government may also exercise discretion over where these funds will be invested. As argued by Docwra:

... road authorities do not operate in a political vacuum: they are the creatures of government and are required, on various occasions, to pursue objectives dictated by government ... In other cases policy goals are conveyed by the Minister for road works to the road authority's chief executive, an example of which would be a decision by government to meet an election promise to upgrade parts of the road network within a specified time period (Docwra 1993, pp. 23-24).

However, Docwra (1993) further notes that there is rigidity in the allocation of funds across regions within each State. Reasons highlighted that contribute to rigidity in fund allocation include:

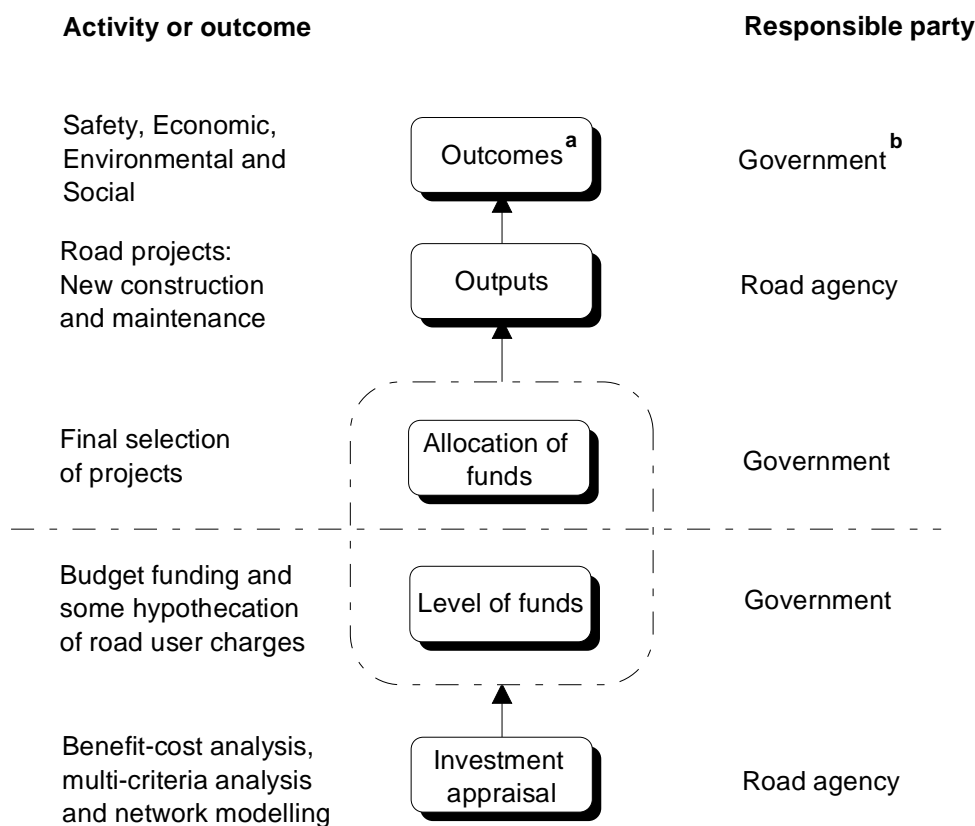
- previous investment decisions;
- the ability of regional planners to show that road 'needs' exceed current expenditure; and
- political pressure exerted by local governments for increased road expenditure.

In addition, rigidity in the allocation of road funds is reinforced by rising community expectations of the quality of service the road network should provide to users (Docwra 1993).

Factors that limit the ability to change road investment patterns within States also act to provide rigidity in the aggregate level of expenditure on roads. Therefore, while technically the Minister has the ability to significantly alter the level and pattern of road funding, actual outcomes achieved are the result of a mixture of political and institutional considerations and community expectations taken over time.

Within this context of funding and allocation, the primary role of road agencies is to undertake investment appraisal and supervise the delivery of approved road projects. The level of autonomy road agencies have in undertaking road construction and maintenance projects is limited by the governance arrangements decided upon by the Minister. In addition, the level of road agency autonomy is tempered by the large costs involved in undertaking some individual road projects (see chapter 4).

Figure 2.1 The traditional departmental approach



^a Desired outcomes are derived from government's overarching social, environmental and economic objectives. ^b There is an element of joint accountability between the government and road agency in achieving road-related outcomes.

Sources: Based on road agency annual reports and IC (1996).

Some States, including New South Wales, Victoria and Western Australia, have created advisory boards or councils to increase and broaden participation in the provision of road infrastructure. The example of the Roads and Traffic Advisory Council in New South Wales is provided in box 2.3. None of the current advisory boards has the ability to modify directly or control the activities of road agencies. However, advisory boards do advise government Ministers who have a high level of autonomy to direct the key functions of road agencies.

A variation on the governance arrangements within the departmental framework discussed below is OBM. The primary purpose of OBM is to strengthen the clarity and accountability of both the government and its agencies in providing goods and services to the community.

Box 2.3 The Roads and Traffic Advisory Council in New South Wales

The Roads and Traffic Advisory Council is established under the *Transport Administration Act 1998*. The Council consists of four ex-officio members and five

members appointed by the Minister from various road interest groups. The Council provides advice to the RTA on a number of road-related issues. These include:

- promotion of traffic safety;
- improvements in the movement of traffic;
- improvements in the movement of freight;
- protection of the environment in relation to roads and traffic; and
- provision of advice on any other matter relating to roads and traffic that the Council considers appropriate.

The Council may also give any such advice to the Minister if it considers that it is appropriate to do so or the Minister so requests.

Source: Transport Administration Act (1988).

Output-based management

OBM involves funding government entities on the basis of an agreed notional price for specified outputs. This contrasts to the traditional departmental approach which funds them on the basis of their inputs (see box 2.4). The model underlying OBM was first developed in New Zealand, although similar approaches are evident in the United Kingdom and the United States (WA Treasury 1996).

The allocation of responsibility under OBM is similar to that of the traditional departmental approach as described in figure 2.1. The important differences between OBM and the traditional departmental approach occur in clarifying the allocation of responsibility and strengthened accountability and performance monitoring (see chapter 4).

In the case of road provision, OBM involves the government specifying road-related outcomes (similar to objectives) that it desires to achieve. The Minister then purchases 'outputs', in this case road construction and maintenance projects, from both government and non-government providers to pursue specified outcomes.

Box 2.4 **Output-based management**

Output-based management (OBM) is an activity based information approach to assist agencies and governments in purchasing and providing outputs (that is, the goods and services) required to achieve outcomes desired for the community. Under OBM, the government purchases outputs from either government or non-government providers to pursue desired outcomes. This contrasts to the traditional budgetary approach where, effectively, the department is funded on the basis of its inputs.

The steps in the OBM budgeting framework are:

- government decides upon desired outcomes (objectives) and then purchases specified outputs to achieve these outcomes;
- government and non-government sector providers compete to provide outputs in a contestable environment;
- outputs are then produced by providers (in the case of road provision, road construction and maintenance projects); and
- outcomes are the effects on the community of an output or a set of outputs (examples of road-related outcomes include the number of road-related accidents and noise and air pollution by motor vehicles).

Three essential features of OBM are that it:

- provides government providers with clear operational objectives — an annual list of well specified outputs to be delivered;
- clarifies the respective roles of government and providers by making government primarily responsible for outcomes and the providers for outputs; and
- allows greater flexibility in the use of inputs by ensuring the focus of government agencies is on the efficient production of outputs.

The OBM framework can also enhance the accountability of government to the community. It does this by focusing on the:

- identification and specification of desired outcomes;
- identification, specification, measurement and pricing (full costing) of outputs;
- linkages between outcomes desired and outputs to be produced including linkages that cross provider boundaries; and
- purchase of only those outputs necessary to achieve government's desired outcomes, from the most cost-efficient and effective government or non-government providers in a contestable environment.

Source: WA Treasury (1996).

In Australia, most State governments have or are implementing variants of the OBM framework in relation to road provision. For example, the Tasmanian Government purchases the ‘Capital Investment Program’ from the Department of Transport (Parliament of Tasmania 1997). The current Capital Investment Program is a schedule of individual road construction projects and an overall road maintenance program.

Investment appraisal

The manner in which road agencies undertake investment appraisal affects the type and quality of advice (in terms of ways to maintain and improve the current road network) provided to governments. The Neville Committee (1997) has noted that State road agencies possess extensive technical knowledge of Australia’s road network and have a close contact with the community and the road transport and construction industries.

This paper focuses on three aspects of investment appraisal that affect the type and quality of advice given to government. They are:

- the tools or techniques used to assess and rank potential road infrastructure projects in terms of economic efficiency, safety and other social objectives;
- the use of community consultation to incorporate the preferences of users and community groups into road planning and delivery; and
- the extent to which investment appraisal is open to public scrutiny.

Project selection tools and techniques

State road agencies use a range of tools to identify and rank potential road projects. These are summarised in box 2.5. The list is not exhaustive but covers the main types of analysis employed. The use of these tools does not mean that they are the sole basis for project selection. In particular, under departmental arrangements the government ultimately has the authority to decide which road projects will be undertaken.

Each State road agency uses benefit–cost analysis as part of its road planning process. Austroads (1996b) has published a benefit–cost manual to facilitate its consistent application across Australia. Main Roads Western Australia uses benefit–cost analysis as an input to multi-criteria analysis when undertaking investment appraisal. Each State also uses network models to track the condition of the road network and to forecast the impact of proposed projects on the type and quantity of traffic flows.

Community consultation

The provision and use of road infrastructure affects a wide range of individuals, groups and businesses within the community. Externalities that can result from road provision include noise and air pollution as well as changes to property values that adjoin roads. Because of these features, governments and State road agencies have established mechanisms to explore user and community preference in the absence of direct

pricing signals. The mechanisms used include the provision of various material to the public outlining the strategies and projects being pursued; advertisements informing the public of routine maintenance and rehabilitation; and the start of new projects; surveys, advisory and consultation groups; and direct consultation with interested parties and representative bodies.

In Victoria, Queensland and Tasmania, legislation requires that the road agency engage in community consultation when planning road projects. For example, in Victoria, the *Transport Act 1983* requires that VicRoads must:

provide mechanisms and full information to enable effective and timely participation by the community in decision making about facilities, services and road works (section 16).

Other State road agencies publish details in their annual reports of their community consultation policies and programs. State road agencies usually determine the details of these policies and programs on an administrative basis.

Public scrutiny

One important way to judge the extent to which the preferences of users and community groups have been incorporated into the provision of roads is through the public availability of investment appraisal studies. It appears that no Australian State currently makes all of its project analysis work completely open to public scrutiny. However, it is common to publish long-term network plans of anticipated future maintenance and construction projects. For example, VicRoads publishes regional and route plans, including a table of benefit–cost ratios for each project listed. This allows the public to see the larger strategic picture and can improve the transparency of the road planning process.

Larger road projects also tend to be subject to environmental impact assessments. For example, major road projects in New South Wales are subject to Environmental Impact Statements or Reviews of Environmental Factors, which include the results of any benefit–cost analyses. Some of these have been subject to scrutiny by the New South Wales Auditor-General. In 1996, the special Queensland Commission of Audit examined the economic analysis method used by Main Roads as part of the review into Queensland’s public finances.

Box 2.5 Project analysis tools

Road agencies have at their disposal a range of tools to undertake investment appraisal. The following provides a brief description of the most common tools used to undertake investment appraisal.

Financial analysis

An assessment of the direct financial cost by the responsible road agency. This method ignores the impact on the broader community and is therefore useful mainly in examining the impact of a project on the road agency's resources.

Benefit–cost analysis

Assesses all the private and social benefits and costs over the life of a project. These are all measured in dollar terms where possible. Results can be presented as a benefit–cost ratio (gross benefits relative to costs), net benefit (benefits net of costs) and the internal rate of return of the project (calculated by setting the present value of benefits divided by the present value of costs equal to one).

Uncertainty in dollar estimates is common, but benefit–cost analysis should include:

- full disclosure of estimation techniques;
- full qualitative details of each benefit and cost; and
- sensitivity analysis.

Multi-criteria analysis

Assesses all the private and social benefits and costs over the life of a project. These are given point scores (in order to avoid the problems of placing dollar values on variables where it is inherently difficult to attach monetary values). However, this simply shifts the problem of how to apply points rather than dollars and still implicitly values all effects.

Network modelling

Assesses aggregate effects of projects across a road network. This method is used to identify overall traffic flows (and hence road requirements) across the entire road network but does not necessarily assess specific details of individual projects. Network models generally require a greater level of information and development to produce reliable estimates of traffic flows and road requirements.

Performance monitoring

Performance monitoring involves assessing the extent to which specified objectives have been achieved. Under a departmental approach, performance monitoring occurs through mechanisms such as the publication of annual reports and audits of financial statements by the Auditor-General. In Victoria, the *Transport Act 1983* further requires that the Minister make a written determination of quantitative targets which VicRoads must attain each financial year.

As outlined in chapter 1, given the lack of direct charging for road use, governments cannot readily use traditional measures of financial performance to monitor directly the performance of road agencies. Because of this, the types of performance indicators (contained in road agency annual reports and associated documents) focus on the extent to which approved projects have been completed on time and within budget and the quality of service the road network provides to users. An example of such indicators is contained in the Roads Implementation Program produced by the Department of Main Roads Queensland. Examples include congestion and smooth travel measures, serious casualty crashes as a proportion of total travel and the extent of intrastate network approved for use by B-doubles (MR Qld 1996).

Within the OBM approach, performance measures are more formally linked to the road-related outcomes the government has specified it wishes to achieve. For example, in Tasmania, one of the Department of Transport's specified outcomes is 'a safe transport system'. Combined with this road-related outcome are specific performance measures. An example includes the number of road fatalities per 100 000 population during the past year and a desired target for the current year (DoT Tas 1996).

Austrroads also publishes a set of national performance indicators on the Australian and New Zealand road systems. Areas covered by the performance indicators include road condition, congestion, safety and the environment (Austrroads 1996a). These performance indicators are published annually and can allow for outcome based comparisons across jurisdictions.

Delivery of road infrastructure

After the government has decided what road infrastructure projects will be undertaken (based on the advice from the road agency) and the necessary funding is provided, it is then the responsibility of the road agency to deliver the approved projects. The Neville Committee (1997) has recognised the expertise of State road agencies in the management and delivery of road construction and maintenance projects.

State governments have adopted three types of approaches to the delivery of road projects (see table 2.2). All of the approaches adopted by the States have been influenced by the signing of competition policy agreements. The approaches are:

- the application of CTC principles to in-house providers;
- separation and corporatisation of publicly owned construction facilities. CTC principles applied to outsourced works; and

- no in-house capacity and all works outsourced with CTC principles applied.

As shown in table 2.2, most State road agencies possess an in-house capacity to construct and maintain roads. An example of the CTC policies of the Department of Main Roads Queensland is provided in box 2.6. The signing of the competition policy agreement means that State governments have had to address the issue of applying the principles of CTC and competitive neutrality to each road agency's in-house provider.

In Tasmania, the in-house capacity of the Department of Transport to construct and maintain roads has been separated and corporatised into the Civil Construction Corporation. All construction works are delivered by CTC and from 1997–98 onwards all maintenance works will also be delivered by CTC.

The Northern Territory is an example where the government does not own construction and maintenance facilities. Instead, the government contracts the private sector to construct all approved road projects. The Northern Territory Department of Transport and Works has further stated that in contracting out road projects it actively supports the development of local consulting and construction industries (NTDTW 1995).

Table 2.2 Approach to road project delivery by State road agencies

<i>Jurisdiction</i>	<i>Approach</i>		
	<i>No government owned construction capacity</i>	<i>Separate corporatised construction agency</i>	<i>Provider has in-house construction capability</i>
NSW			✓
Vic			✓
Qld			✓
WA			✓
SA			✓
Tas		✓	
NT	✓		

Sources: Annual reports and other documents published by road agencies.

Box 2.6 **CTC policies of the Department of Main Roads Queensland**

The Department of Main Roads Queensland has an in-house capacity to construct and maintain road infrastructure. The Department does not subject all maintenance and construction work to open tender and some works are negotiated outputs between the Department and its own in-house operations or local councils. The policy position on what road works will be subject to CTC is as follows:

- the Department of Main Roads does not generally subject routine maintenance contracts to open competition;
- as specified by the Federal Government, all Federally funded works on the national highway system, other than routine maintenance, are subject to open tender except for exemptions by the Federal Minister;
- works not part of the national highway system or traditionally undertaken by local councils are subject to open competition, except where tender exemptions may apply on the grounds of efficiency, urgency or specific social issues; and
- for works traditionally undertaken by local councils, a three zonal system is adopted:
 - in coastal and provincial cities zone, local government is generally required to compete;
 - in the intermediate zone, sole invitee status may be negotiated but open competition is the preferred position; and
 - in the western zone, sole invitee status arrangements apply.

Sources: MR Qld (1996) and Queensland Transport (1993).

2.4 Funding and pricing of roads

How governments choose to fund their road agencies can influence the provision of road infrastructure. For example, the Neville Committee stated that:

The committee considers that the uncertainty of Commonwealth road funding levels from year to year is impeding the ability of the Commonwealth and the States/Territories to undertake long term planning ... (Neville Committee 1997,p.57).

As shown in table 2.3, all three levels of government provide funding for road infrastructure. However, as discussed later in this section, each level of government has differing abilities to raise road-related revenues to finance road infrastructure projects.

There are a number of ways in which governments can provide the necessary funding so that road agencies can undertake approved road projects. These are summarised in box 2.7. Most States fund their road agencies, at least in part, directly out of their annual budget. Under budget funding, each road project and

program is assessed against all other claims for funding, such as health, education and law and order projects and programs. The government then chooses its preferred expenditures in each area.

New South Wales, South Australia, Western Australia and Victoria use hypothecation of certain sources of revenue, which has the potential to offer a greater degree of funding certainty than normal budget funding. However, hypothecated funds still require budget authorisation on an annual basis as they come from governments' consolidated revenue accounts. As a result, the government may adjust the overall level of funding to suit changes in expenditure preferences.

Table 2.3 Australian road-related expenditure, 1996–97

<i>Level of government</i>	<i>Expenditure</i>
	\$b
Federal	1.6
State	2.8
Local	1.8
Total	6.2

Data source: BTCE (1998).

Australian jurisdictions that have established their road agencies as a statutory authority or body corporate have tended to provide funding by hypothecation. For example, the RTA in New South Wales (established as a statutory authority) is funded primarily through hypothecated road user charges. Main Roads Western Australia (whose Commissioner is a body corporate) has a proportion of its funds hypothecated. On the other hand, Tasmania's departmental approach is budget funded.

New South Wales and Victoria have also used private funding for some major road projects via build-own-operate-transfer (BOOT) schemes.³ Examples include the Sydney Harbour Tunnel and City Link in Melbourne. Governments have used this approach to avoid incurring directly the large, initial capital expenditures needed to fund these major projects.

³ Further discussion of BOOT schemes can be found in Hepburn, Pucar, Sayers and Shields (1997).

Box 2.7 Road funding mechanisms

There are a number of ways in which governments can provide the necessary funding to road agencies. The following list describes some of these approaches.

Budget

Budget funding involves government appropriations from consolidated revenue (including raising general government debt) in the annual budget process for government expenditure.

Hypothecation

Funds are supplied from consolidated revenue but on a formula basis (for example a percentage of fuel taxes or other road taxes). This may provide more long-term certainty than annual budgets as government commits to supply funds according to a formula over the long term.

Charging

Road agencies may have the power to levy road users directly to fund road provision, in the same way as utilities charge for electricity, gas, rail, post, telecommunications, water and ports. In this case, road user charges would no longer have to be imposed through government taxation mechanisms and hence the collection of road user charges could be removed from the government's budget.

Road agency debt

Road agencies could be permitted to borrow in their own names against their future revenue streams. However, this would depend on the surety of one or more of the above sources of revenue.

Private funds

Roads can be built, owned and operated by private firms. They then recover their costs through user charges or government payments over time.

Road user charges

Appropriate charging for the use of roads encourages optimal use of, and investment in, the road network. However, as outlined in chapter 1, currently there are difficulties in pricing directly for the use of road infrastructure. Instead, governments use their charging (taxation) powers to price indirectly for the use of roads through mechanisms such as vehicle registration fees and fuel excise (see box 2.8).

Although Australian road-related revenues are currently more than double road expenditures (see tables 2.3 and 2.4), there is not necessarily meant to be any particular relationship between these figures. This is because many road-related charges are tools of general taxation. As argued by the Bureau of Transport and Communications Economics:

Presentation in this Information Sheet of government road-related expenditures together with motor vehicle revenues does not imply that there is, or should be, any direct linkage

between the two. On the contrary, revenue collected by governments from most taxes and charges on motor vehicles is paid into consolidated revenue accounts, along with income from other sources (BTCE 1998, p.1).

Box 2.8 Road user charges

Governments currently have available a range of mechanisms to charge for the use of roads. Some of the mechanisms used both in Australia and overseas are described briefly below.

Tolls

Tolls are fees collected directly as roads are used. Tolling has been used in several countries and to a lesser extent in Australia. Advances in electronic tolling, such as that to be used in City Link, have reduced the cost of toll collection. Tolling allows fees to be varied not only for vehicle type but also for time of day and location.

Fuel excise

Fuel excise can be used as a proxy for road use because fuel varies with distance travelled and vehicle weight. The NRTC (1993) provides a discussion of fuel excise as a mechanism to indirectly price for the use of roads. Traditionally, fuel excise has also been used as a source of general tax revenue and could also form part of a carbon tax regime.

Registration

Registration charges are a form of access fee for vehicles and can be varied to account for vehicle size and other characteristics and potential loads.

Weight–distance charges

Weight–distance charges seek to charge road users more directly for the wear they cause to roads. Fuel excise and tyre taxes are two charges that vary with the weight of a vehicle and the distance it has travelled.

Tyre taxes

Taxes may be imposed on tyres as a proxy for distance travelled and vehicle type (and hence weight). Tyre taxes can be used also to fund the costs of tyre disposal.

Registration is a State matter, although the States recently have implemented a system of uniform national heavy vehicle registration charges, under the auspices of the National Road Transport Commission. The National Road Transport Commission recommends user charges for heavy vehicles (vehicles more than 4.5 tonnes gross vehicle weight). These charges are currently set independently by the States (NRTC 1993).

The Federal Government levies an excise on the producers of crude oil and LPG. In addition, the Federal Government also levies an excise on fuel wholesalers. The fuel excise is levied on a cents per litre basis and is currently indexed to inflation. As shown in figure 2.2, there has been a switch in the statutory (or legal) incidence of taxation away from the producers of crude oil and LPG towards the final users of fuel. This is

shown by the decrease in revenue collected from crude oil and LPG producers and the increase in revenue collected from fuel wholesalers.

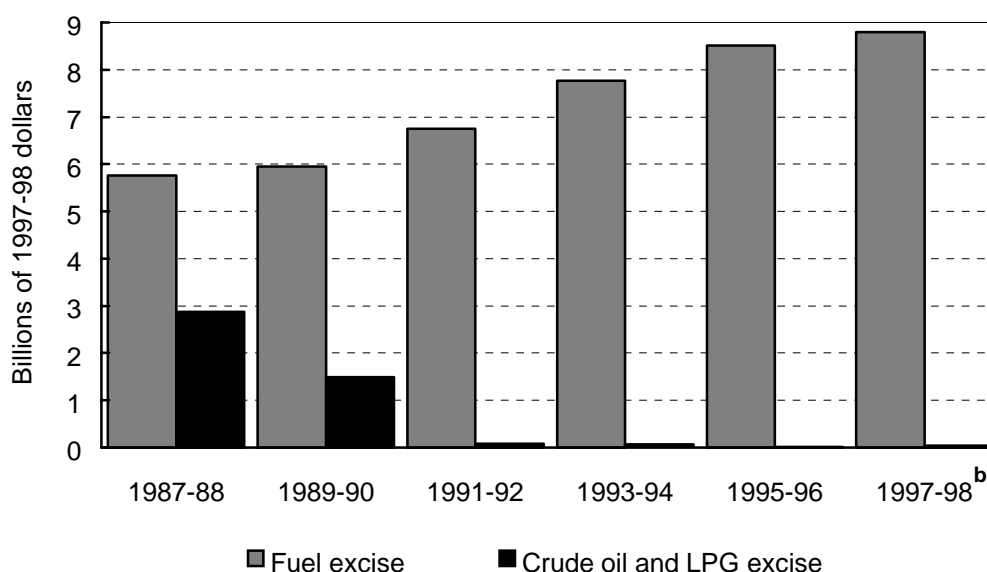
Table 2.4 Road-related revenue sources in Australia, 1996-97

Source	Commonwealth	State
	\$b	\$b
Fuel excise	8.6	1.6
Registration	0	2.1
Stamp duty	0	1.1
Other	—	0.5
Total	8.6	5.3

— Negligible.

Data source: BTCE (1998).

Figure 2.2 Fuel^a, crude oil and LPG excise collected by the Commonwealth Government



^a Estimated excise component attributed to motor vehicles ^b 1997-98 is an estimate of expected revenues.
Data sources: BTCE (1998) and Commonwealth Budget Paper No.1 (1998-99).

The growth in real revenues from fuel excise is explained mostly by increased fuel use by the Australian economy and not increases in the fuel excise rate above inflation. This is because in the ten year period to 1997-98, there has only been one increase in the fuel excise above the inflation indexations (in 1993-94).

Previously, both the Federal and most State governments levied fuel excise. However, a recent High Court decision has abolished the States' power to levy fuel excise. As a consequence of the High Court decision, fuel excise formerly levied by the States is now collected by the Federal government on their behalf.

Few Australian roads have tolls. Tolls are used on some larger road projects, including Sydney's recent motorway projects and the Gateway Bridge in Brisbane. The City Link project in Melbourne plans to make use of electronic tolling mechanisms.

3 Alternative institutional arrangements

The previous chapter outlined how existing institutional arrangements in Australia follow variants of the traditional departmental approach — often modified by the recent introduction of output-based management. This chapter describes two major alternatives to the traditional departmental approach that are currently being adopted or considered by other countries. They are the use of effective road funds and the public utility model.

The institutional arrangements embodied in these two alternatives contrast with the traditional departmental approach in the way they deal with the major issues that confront road provision by:

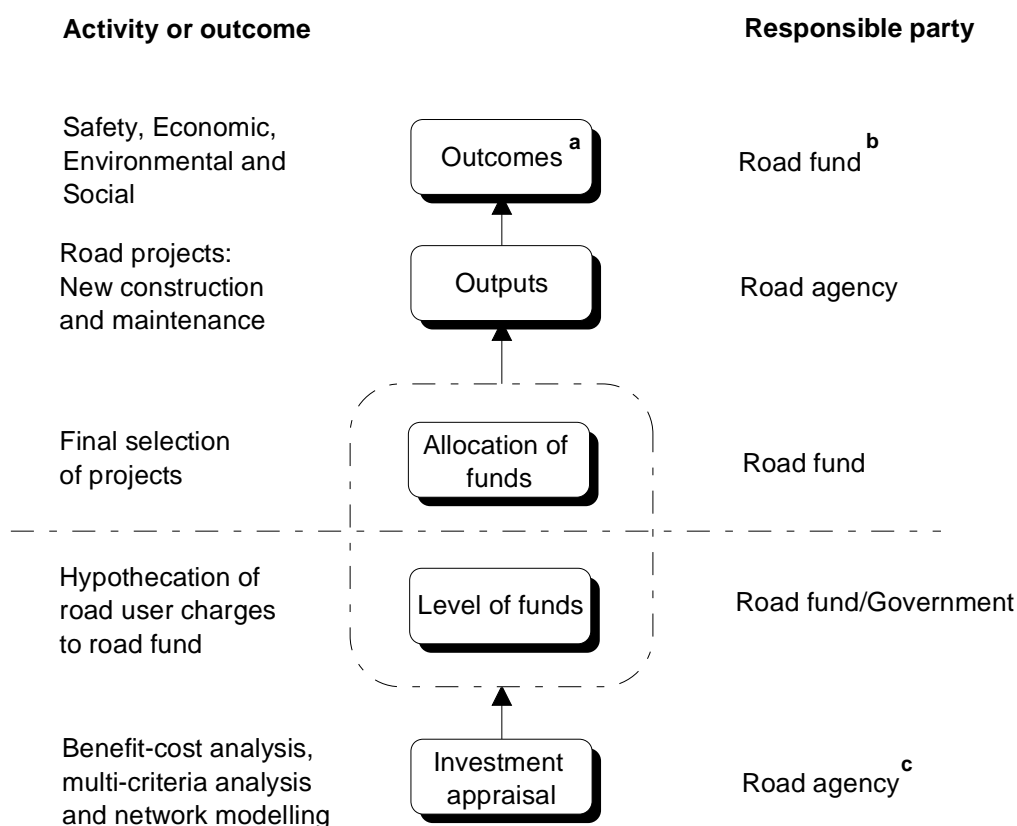
- attempting to incorporate the preferences of interested parties¹ effectively into road provision strategies at all levels (right down to the selection of road projects); and
- ensuring that an appropriate level of funding is raised and allocated efficiently (for maintenance, rehabilitation and construction of road networks).

The cornerstone of traditional departmental arrangements is an annual budgetary appropriation. This approach places a heavy reliance on ministerial and bureaucratic processes as the principal means through which the preferences of interested parties are expressed, and level of road funding and allocation is determined.

The key features of effective road funds and the public utility model are their relative independence from the budget cycle and the reduction in ministerial involvement through a greater emphasis on financial performance and on having road agencies obtain the preferences of interested parties directly.

¹ Interested parties include road users, business and property owners, and members of the community (who may have social and environmental concerns associated with road networks and their usage).

Figure 3.1 The effective road fund approach



^a Desired outcomes are derived from government's overarching social, environmental and economic objectives. ^b The road fund is responsible for achieving outcomes specified by government through a terms of reference and explicit direction. ^c The road fund oversees the investment appraisal process of the road agency.

Sources: Based on Heggie (1995, 1996).

3.1 Effective road fund approach

Broadly, the major features of the effective road fund approach (as proposed by Heggie 1995) involve devolution of responsibility and decision-making to a representative board of management (see figures 3.1 and 3.2). The key elements of the approach involve:

- the earmarking of (usually road-related) taxes and charges for road expenditure (usually into a separate account rather than into government's consolidated revenue);
- the provision for borrowing against expected revenue streams;
- the setting of road-related taxes and charges by the representative board (or at least recommendation on their level to government);
- the allocation of funds by the representative board to road projects (with the road works usually undertaken by separate road controlling agencies and local governments); and

-
- supervision of the delivery of the road projects by the representative board.

The elements of the approach are intended to provide for a more performance-focused system of management and allow the creation of more direct links between road users and road providers (Heggie 1996).

When compared with the traditional departmental approach, the effective road fund approach involves the devolution of responsibility for many road-related tasks to the road fund and its representative board of management. Importantly, the road fund has the predominant role in determining funding levels and expenditure allocation, and has the balance of responsibility for specific road-related outcomes (see figure 3.1).

The rest of this section describes in greater detail the key elements of the effective road fund approach. These elements include: objectives; legislative arrangements; investment appraisal; and, funding and expenditure allocation.

Objectives

The institutions that operate under the road fund approach can pursue the same broad objectives as under the traditional departmental approach — that is, economic, environmental and social objectives (see chapter 2).

Under the effective road fund approach, the government provides the road institutions with more detailed operational goals. These can be specified in legislation, as a terms of reference for the board, or through a statement of intent negotiated with the Minister. For an example of a road fund's statement of intent see box 3.1.

Box 3.1 Statement of intent of a road fund: an example from New Zealand

New Zealand's road fund (known as Transfund) describes its principal objective in its statement of corporate intent as being:

... to allocate resources to achieve a safe and efficient road system (Transfund 1997a, p.4).

(continued on next page)

Box 3.1 (continued)

From this principal objective and the *Transit New Zealand Act 1989*, Transfund's Statement of Intent provides a number of operational goals, such as:

- maximise the benefits from resource allocation through prioritising and allocating funds consistently on the basis of expected national benefits for a given cost;
- achieve through a collaborative approach an improvement in the alignment between regional land transport strategies and the outcomes of Transfund's resource allocation processes;
- develop and apply policies which optimise the value of the road asset;
- pursue efficiency in delivering roads and alternatives to roads through contestability and development of enhanced administrative, evaluation, and technical processes;
- provide assurance as to the efficient and effective utilisation of the resources allocated for land transportation through rigorous audit process;
- maximise the resources available for allocation through pro-active financial management; and
- provide relevant, accurate and timely advice to the Minister of Transport, road controlling authorities, regional councils and other key parties in the transport industry.

Sources: Transfund (1997a and 1997b).

Legislative arrangements

A key element of an effective road fund is a firm legislative basis (Heggie 1995, 1996). This is achieved by having the road fund established under its own Act with the legislation designed to:

- detail how the representative board is to be constituted in a way that protects its representativeness;
- guide the operation of the fund (its road provision tasks and operational objectives);
- promote the autonomy of the fund and its management to undertake these road provision tasks; and
- protect its ability to raise revenue from road users (and protect this revenue from being diverted for other uses).

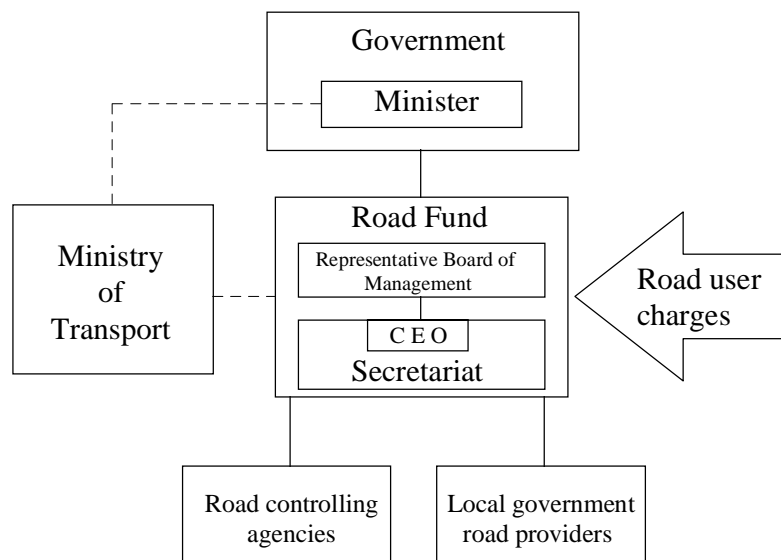
Furthermore, the enabling legislation should outline the fund's governance structures and operation in sufficient detail to provide for some minimum protection from arbitrary ministerial intervention. These arrangements should include, for example, that Ministerial directives have to be tabled in the legislature (Heggie 1996 and Gwilliam and Shalizi 1996).

Executive structure

The executive structure that Heggie (1996) and Gwilliam and Shalizi (1996) suggest for the road fund comprises a representative board of management presided over by a Chair and supported by a secretariat which is managed by a Chief Executive Officer (CEO) (see figure 3.2).

The executive (including board of management, CEO and the secretariat) should be given the primary role of formulating road construction and maintenance policy, marshalling and allocating funds, and securing effective implementation. This ensures that the board can be held ‘accountable’ by government and interested parties for performance within a clear and transparent framework.

Figure 3.2 **A schematic diagram of the key players in the effective road fund approach**



Sources: Based on Heggie (1996) and NZMoT (1997).

Heggie (1996) and Gwilliam and Shalizi (1996) suggest that legislation should ensure the independence of the executive. This could be achieved in two ways. First, they suggest that the representative board should be presided over by an independent chair to eliminate conflicts of interest and ‘capture’ by pressure groups (independence, for example, also means that the chair should not be the Minister responsible for roads; neither should the chair be the CEO of the road fund’s secretariat or a road controlling agency). Second, the CEO of the road fund secretariat should be chosen by the board — again, to promote independence of the road fund from arbitrary ministerial intervention.

Heggie (1996) and Gwilliam and Shalizi (1996) also stress the importance of the board of management being representative. There are different ways to achieve this. Heggie (1995, 1996), for example, suggests that the different constituencies of interested parties should nominate board members. He suggests that the

type of constituencies that should be represented on the board include: chambers of commerce; farmers' associations; the road transport industry; automobile associations; institutions of engineers; and local governments.

Alternatively, the Minister could choose the representatives from constituencies outlined in the enabling legislation. As described later in this section, this is the approach used by New Zealand's road fund (Transfund).

Which ever approach is used, Heggie (1995, 1996) suggests that each board member should make decisions on the basis of what is best for the community as a whole, not simply what is best for their particular constituency. Nevertheless, he argues that the representative element can contribute to decision-making in two ways. First, board membership encourages all interested parties' views to be considered in decision-making. Second, representativeness means that decisions may be more soundly based because, in addition to being accountable to government, the board is also directly accountable to the wider community.

Responsibility and decision-making

Under a firm legislative framework, a road fund could be established with the power and authority to undertake effective long-term planning in relation to road provision. With the power to borrow against its earmarked source of funds, it could also be provided with the resources to carry out its plans. These powers could provide a road fund with a high degree of responsibility for, and autonomy in, the road decisions it makes.

The basic framework provides a high degree of independence from the government's annual budget appropriations cycle. This approach does not preclude the Minister from issuing directions to the road fund. However, directions should be in writing and tabled before the legislature.

Community consultation

The effective road fund approach encompasses all the community consultation mechanisms used by the traditional departmental approach. As discussed earlier, the traditional approach includes: the provision of various material to the public outlining the strategies and projects being pursued; advertisements informing the public of routine maintenance and rehabilitation, and the start of new projects; surveys, advisory and consultation groups; and direct consultation with interested parties and representative bodies.

An effective road fund also makes use of an additional consultative mechanism. As mentioned earlier, it has access to community preferences through a representative board of management.

Accountability and performance monitoring

The road fund is held accountable to both the Minister (in pursuing its terms of reference) and also to interested parties through its representative board.

The mechanisms through which performance can be evaluated are similar to those used in the traditional departmental approach. These include annual reporting requirements to the legislature, audits including performance audits, and performance agreements between the fund and the Minister or government. Informal performance monitoring is also provided through community consultation, as outlined above.

Scope for redress could involve the replacement of board members for non-performance. Under Heggie's (1995, 1996) suggestion this would involve some action by a representative's constituency. If the board members are appointed directly by the Minister (as in the case of Transfund New Zealand), it is the Minister who replaces them.

Funding and expenditure allocation

Compared with the traditional departmental approach, an effective road fund has as a key element firmer funding arrangements. With a road fund's greater control over dedicated sources of revenue, there is greater scope for forward planning. For example, the road fund can borrow (against expected revenue streams) to finance economically justified construction. This is a key aspect of the approach because road users tend to bear any increase in transport costs where economically justified road construction is delayed.

In the effective road fund approach, the board of management has a stronger role in determining appropriate road user charges. Preferably it should set the levels of road user charges (or at least recommend them to government). As mentioned earlier, effective road fund arrangements also include the creation of legislative barriers to secure a stable supply of revenue to the road fund.

The funding arrangements also aim to establish a clear link between identified charges on road users and road expenditures. In particular, the approach used is to identify more clearly the components of road-related charges that are to be treated as payments for road use. Heggie (1996) argues that by recognising and promoting them as road user charges that are paid to the road fund (not consolidated revenue) for services delivered, a strong link between road users and road providers is created.

Investment appraisal and project selection

The range of techniques for investment appraisal used under the road fund arrangements are the same as those used in the departmental approach (including financial analysis, benefit-cost analysis, multi-criteria analysis and network modelling combined with community consultation and public scrutiny — see box 2.5).

Under effective road fund arrangements, the representative board has the autonomy to determine what projects will be undertaken from available resources. Ministerial or legislative involvement in the project selection process is confined to the issuing and enforcement of transparent road project selection guidelines.

Delivery of road infrastructure

Under effective road fund arrangements, the fund should purchase road services (the provision and operation of the road network) rather than undertake these tasks itself. Undertaking investment appraisal and the delivery of road projects is the responsibility of the road controlling agencies and local governments.

An example of an effective road fund

Amongst developed countries, a useful example of a road fund employing many characteristics of the effective road fund approach is New Zealand's Transfund (see box 3.2). In the case of Transfund, important departures from the effective road fund approach outlined above are the absence of borrowing and limited emphasis on ensuring wide representation on the board of management. For example, Transfund's board comprises two members of the road controlling agency, one member from local government, one from road user associations and one representing other interested parties. Also, because Transfund cannot borrow against expected revenue streams, current expenditure is constrained by current revenue. The principal criterion for setting priorities for all road expenditures in New Zealand is the cost-benefit ratio. At present, expenditure is approved only where the cost-benefit ratio exceeds four — so funds are still being rationed.

Box 3.2 The road fund approach operating in New Zealand: Transfund

Transfund's main role is to purchase from various providers the components (road outputs) that make up the National Roothing Program. The principal road provider is Transit New Zealand which is the road controlling agency for the national highway system. The other controlling agencies for the rest of New Zealand's roads are local authorities.

Transfund's objective and functions

Transfund's principal objective is "to allocate resources to achieve a safe and efficient road system". Its key functions are to:

- approve and purchase a national road program from the various road agencies, including capital projects;
- approve the competitive pricing procedures applicable to the road program;
- audit the performance of Transit New Zealand and local authorities (which provide roads) against their respective road programs; and
- provide advice and assistance to local authorities.

Executive structure of Transfund

Transfund has a five member board of management. (The governance structure is specified in the *Transit New Zealand Amendment Act 1995*.) The Board consists of:

- two members who are employees or members of Transit New Zealand;
- a representative of local government;
- a representative of road users; and
- a member to represent aspects of public interest not represented by the other members of the board.

Responsibilities and decision-making

Transfund has a high level of autonomy in deciding what road works will be undertaken to achieve assigned objectives. While the Minister has the power to appoint or dismiss Transfund's board members, the Minister does not participate in

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Box 3.2 (continued)

management decisions. However, Transfund must comply with any lawful direction in writing from the Minister which must be published in the *Gazette* and provided to the House of Representatives.

The principal avenue for direct Ministerial involvement is provided for by the *Land Transport Act 1993*. Under this Act, the Minister of Transport has responsibility for the development of a land transport strategy which is implemented and monitored by the Ministry of Transport.

Coordination with other agencies

Transfund shares and coordinates some of its responsibilities with other agencies. They include:

- the NZ Ministry of Transport (NZMoT) — the lead agency for policy advice and development of the National Land Transport Strategy; and
- the Land Transport Safety Authority (LTSA) and the Police — responsible for safety and enforcement.

Transfund's funding

Transfund's purchase of road outputs is financed through the National Road Fund (NRF). The NRF is funded by proceeds from an identified portion of the fuel excise, and from road user charges and motor vehicle registration fees. Transfund recommends to government the level of these charges. Some of these funds go directly to the Police and the LTSA and the balance is transferred to a National Road Account under the control of Transfund.

Performance monitoring

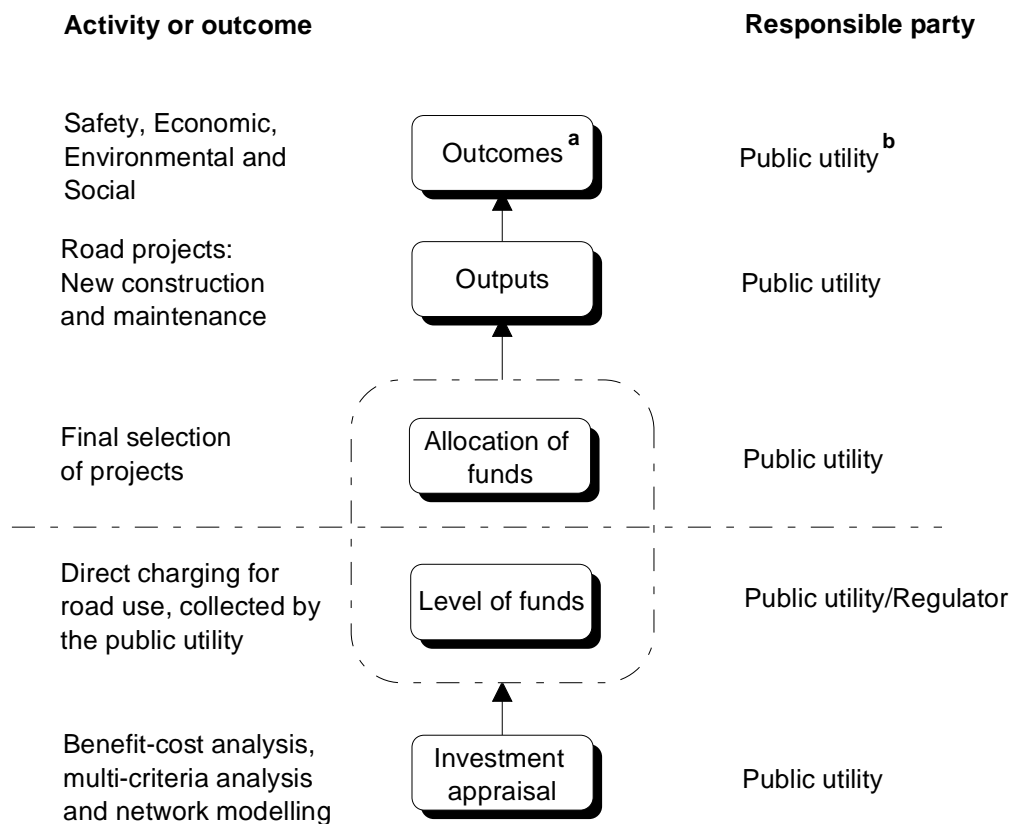
The performance of Transfund is evaluated principally against a performance agreement made with the Minister for Transport. Transfund is also subject to the normal monitoring requirements of government such as the auditing of financial statements and publication of annual report.

Sources: NZMoT (1997) and Transfund (1997a).

3.2 The public utility model

The public utility model involves a fully commercial treatment of road provision. The public utility model in relation to road provision is yet to be implemented on a broad scale in any developed country. Under this model roads are expected to be treated similarly to other forms of economic infrastructure (see figure 3.3). That is, they are treated in the same way as rail transport, water, postal and telecommunications services — provision through government-owned (or private companies) on a fee-for-service basis.

Figure 3.3 The public utility model



^a Desired outcomes are derived from government's overarching social, environmental and economic objectives ^b Public utility is responsible for achieving specific targets set by government.

Sources: Based on AAA (1997) and RAG (1997).

The key elements of the public utility model as it relates to road provision involve:

- creating one or more financially viable road companies charged with operating the entire road network. The companies would have a traditional commercial structure — with government or private sector shareholders, a board of management, a managing director and a statement of corporate intent. They would be treated also in a competitively neutral way — that is, they would have the same tax treatment as other companies and would be subject to ordinary commercial law;
- subjecting the operations of the company to the same broad land use and environmental laws and regulations which apply to other commercial building and construction activities; and
- providing the company with suitable authority so it can charge road users directly for road access and use. This could involve giving the company the right to levy fuel charges and registration fees, and to charge property owners for the access they gain when their property abuts a road.

Furthermore, under the public utility model there might be a need for:

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- some means of ensuring that social and environmental objectives are met along with commercial objectives; and
 - regulatory oversight.

A number of commentators have highlighted the potential significance of the public utility model in relation to road provision (see, for example, Roth 1996) and recently it has attracted considerable interest in several quarters. For example, the Australian Automobile Association (AAA) outlined its merits to the recent Neville Inquiry into road funding (AAA 1997, see box 3.3). Furthermore, a Roading Advisory Group (RAG) has proposed adoption of the model for New Zealand (RAG 1997, see box 3.4).

Box 3.3 The Australian Automobile Association's proposal

In a submission to the recent Neville Inquiry into Federal funding of roads, the Australian Automobile Association (AAA) proposed that Australia adopt a public utility model for road provision. It proposed that a commercialised entity should be formed — to be referred to as the Federal Roads Corporation (FRC) — using principles which have been established for government trading enterprises.

AAA suggested that the (proposed) Federal Roads Corporation should:

- be managed by a board which is accountable to Parliament for the FRC's commercial performance;
- be established as a corporation subject to corporations law;
- have targets for returns on assets and dividends to government, based upon the needs of the industry, and its historical legacy of performing and non-performing assets;
- adopt uniform and commercial accounting practices;
- not be subject to the constraints of government employment policies or the benefits available from government borrowing;
- be separated from all regulatory functions (pricing, safety and operational regulations) which should be placed outside of the FRC;
- be liable for all government taxes and charges;
- have any community service obligations identified, costed and directly funded by governments in order to make these subsidies transparent; and

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Box 3.3 (continued)

- be able to enter into contracts and to raise loans.

AAA suggested that adoption of the public utility model would have the following advantages:

- direct provider-customer link between the FRC and road users;
- separation of the policy-regulation function of government from its provider function;
- investment decisions would be less influenced by overt political considerations, so that investments would be directed at projects which contribute to specified economic and other objectives;
- road funding would not appear in the Federal budget, hence reducing the level of Federal taxation;
- revenue for the FRC would be raised through a petroleum based road user charge clearly identified as such, and not through hypothecation of tax revenue;
- the FRC would have access to private sector finance;
- the involvement of the private sector in the provision of infrastructure would be facilitated;
- major projects could be funded so as to be executed in the most efficient manner over several years, not in smaller, less efficient projects constrained by annual funding; and
- the FRC would be responsible for a larger network than the current National Highway System, and there would be greater transparency in decision-making and accountability for performance.

Source: AAA (1997).

Box 3.4 The New Zealand's Roothing Advisory Group's proposals

In November 1997, the New Zealand Roothing Advisory Group (RAG) released a report — *Road reform: the way forward* — which recommended the 'public utility' model for New Zealand roads.

The recommendations generated considerable public interest — there have been some 13 000 submissions responding to the report. Currently the New Zealand government is in the processes of deciding whether to adopt the model.

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Box 3.4 (continued)

The key recommendations outlining the model were:

Management structures and behaviour

- All road assets (comprising State Highways and local roads currently managed by Transit New Zealand and territorial local authorities) should be transferred to road companies;
- road companies should be owned by the New Zealand Government and local governments who would be prohibited by statute from disposing of their shares in the companies to third parties. However, shareholders in the companies should be allowed to trade with each other;
- road companies would have both 'governance' and 'equity' shares. Governance shares would provide the control of the company, while equity shares would provide claims over company assets;
- road companies should be financially viable; and
- road companies should be required to be successful businesses, which includes making profits and paying tax.

Responsibilities and decision-making

- Road companies should be established and directors appointed along the lines of local authority trading enterprises in the transport sector. The general structure of the companies should embody the principles of the New Zealand *Companies Act 1993*;
- all regulation of road companies should be explicit, and not be handled through ownership structures. That is, ownership should be concerned singularly with financial performance;
- the rights of all classes of road users should be defined in legislation;
- the rights of current utility operators using the road corridor should remain, subject to reasonable allocation of costs to both utility operators and road companies, and the right of road companies to coordinate access; and
- to establish better management, road companies, utility operators and local authorities should establish a process for information exchange.

Community consultation

- A comprehensive information disclosure regime should apply to all road companies;
- road companies should be required to consult appropriate road users before setting or changing prices;

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Box 3.4 (continued)

- all road companies should be required not to close any part of the network without appropriate user and landowner consultation;
- road companies should have a Corridor Management Plan that is developed in consultation with the appropriate local authorities, and subject to a legal test of reasonableness;
- territorial local authorities may issue a requiring order for work they pay for on a local corridor; and
- all road transport planning and operation should be consistent with the National Land Transport Strategy.

Source: RAG (1997).

In New Zealand, the RAG proposed the public utility model in order to address the following problems:

- Lack of a direct relationship between road pricing and road use.

Charges do not reflect actual road use. This results in an inefficient and unfair allocation of costs and it means that consumers' transport choices are based on distorted price signals.

- Lack of a direct relationship between road service providers and road users.

Road service providers are not responsive to user needs and there is no direct accountability of the way in which road revenue is spent.

- Lack of commercial incentives to invest in road infrastructure.

Investment decisions are made on a short-term basis, governed by the amount of road funding available in any one year. This means that pressing issues such as congestion are not being addressed. (RAG 1997, p.6)

The rest of this section describes in greater detail the key elements of the public utility model, including: objectives; legislative arrangements; investment appraisal; and, funding and expenditure allocation. When compared with the traditional departmental and the effective road fund approaches, the key elements of the public utility model involve a fundamental reduction in direct government involvement in road provision.

Instead, road provision is determined by the public utility based on the following constraints:

- the costs, revenue and profitability of providing each road; and
- the legislative and regulatory framework (set up by government) within which it undertakes commercial activities.

Objectives

With the public utility model, the objectives pursued by the road utility would be the same as those pursued by any other commercial entity — maximisation of the returns to its owners.

However, the public utility approach does not preclude the government pursuing social and environmental objectives that the utility would not pursue for commercial reasons. These can be incorporated by the government through:

- modifying the legislative environment within which the public utility operates; and
- purchasing outputs for specific purposes.

The government could pursue road-related social objectives by using either the universal social obligation and community social obligation frameworks currently applied to government trading enterprises (See IC 1992, 1997a and 1997b). For example, the government may contract with the road utility to provide roads in rural areas where the utility would not do so on a commercial basis.

Legislative arrangements and regulatory oversight

A public utility providing road infrastructure would be established as a company (either government or privately owned) subject to a country's corporation law.

Corporatisation of government bodies usually involves the following reform elements:

- clarity and consistency of objectives;
- management authority;
- performance monitoring;
- effective rewards and sanctions; and
- competitive neutrality with the private sector (DoF 1996, p.18).

As discussed in chapter 1, some aspects of road provision have strong monopolistic characteristic. Consequently, in addition to broad legislation governing the conduct of all commercial enterprises — for example, land use and environmental law — the public utility should be subject to some form of regulatory oversight.

RAG (1997) suggested that this oversight should include specific legislation covering:

- the rights of road users and landowners, and the rights of other utilities using the road corridors — for example, electricity and telecommunications companies;
- access requirements, so that each road company coordinates its activities with those using the road corridor and with other road companies;
- consultation on pricing requirements — a requirement to consult with road users before setting or changing user charges;
- general consultation requirements — for example, a requirement to consult with appropriate users and landowners before closing a road or undertaking major construction;
- comprehensive disclosure requirements — to enhance consultative processes and ensure that performance can be assessed;
- a safety audit regime to ensure the safe design and management of the road network; and
- specific environmental requirements in addition to any general environmental legislation.

Responsibility and decision-making

The public utility would have considerable autonomy in planning and implementing its own corporate plans. Other than the requirements imposed by the legislative environment and possible regulatory oversight, a binding constraint would be the financial viability of expenditure decisions by the road company.

Under this model, the utility's accountability would be principally to its shareholders (whether private or government) for its financial performance. Government should not interfere with the broader policies through its ownership of road companies (RAG 1997).

The government's broader role would be principally through:

- the general legislative framework governing land use, the environment and commerce, possibly augmented by specific legislation in relation to road provision; and
- its capacity to purchase outputs from any government-owned or private company in the pursuit of its own objectives. For example, as indicated earlier, the government may have a contract with the company to provide roads in rural areas where the company would not do so on a commercial basis.

Community consultation and public scrutiny

Some proponents of the public utility model anticipate that commercial incentives will ensure that the road company will engage the community when developing its plans and activities. To do so would make

business sense, and to avoid doing so would risk conflicts which, in turn, could threaten profitability and precipitate legal actions through civil courts or, government or regulatory intervention (see Roth 1996).

Others, (see RAG 1997, for example) support the augmenting of the commercial incentives with regulatory oversight covering the rights of various affected parties, consultation on price setting, land use, environmental and safety issues. RAG also proposed that a road utility be subject to comprehensive disclosure requirements.

As well as being subject to legislative requirements on consultation, a road utility would also be subject to the public scrutiny applying to any commercial enterprise. That is, it is likely that a variety of road user associations (for example, automobile and transport associations) would continue to subject the road company to the scrutiny that they currently use in relation to road authorities. As already discussed, public scrutiny would be carried out principally through the market mechanism and continuing incidence of poor performance is likely to precipitate greater activism by road user associations, civil and regulatory actions and ultimately government intervention.

Performance monitoring

The owners of the road company would be the principal monitors of its financial performance. There could be provision also for additional reporting requirements in specific regulation. These could include, for example, disclosure requirements (including use of performance indicators) and safety and performance audits (see RAG 1997).

As also mentioned above, road users would monitor performance in an informal manner — similar to the way the performance of any commercial enterprise or industry is subject to public scrutiny.

Road pricing

Although the treatment of road pricing is important in both the traditional departmental and the effective road fund approaches, it is of crucial importance to the operation of the public utility model. This is because of the model's heavy reliance on commercial incentives which means that the pattern of revenues generated by the road network has a strong bearing on the road company's investment and maintenance policies.

Proponents of the public utility model for road provision consider that the emphasis on commercial pricing for roads is one of the model's strengths (Roth 1996). The emphasis on road pricing is argued to contribute significant static and dynamic efficiency benefits.

Roth (1996) argues that the efficiency of road provision will be improved because the commercial imperative means that road companies have an incentive to:

- provide roads only where ever they cover their costs (and hence, increase the net benefits that roads contribute to society); and

-
- find the least-cost ways to provide them (which also increase net benefits).

Road pricing can be categorised as either:

- direct — where charges are paid directly for the use of particular roads; and
- indirect — where charges are imposed on factors associated with road use (for example, vehicle registration fees and fuel taxes).

Traditionally most road pricing has been indirect because direct charging (through, for example, manual tolling) has faced significant technical difficulties (see box 3.5).

The revenue from most indirect charges (for example, fuel charges) is not easily linked to the use of particular roads. Because of this, indirect charging may provide a poor guide for a public utility's investment decisions.

Two ways to overcome these problems are currently being tried (see box 3.5). They allow an expanded use of tolling on wider road network. They involve the use of:

- *direct tolling* — where the vehicle owner is charged manually or electronically for road usage; and
- *shadow tolling* — where the government pays the road owner from consolidated revenue based on an estimate of road usage.

The source of revenue should also be linked to the use of particular roads. Direct tolling achieves this but shadow tolling does not.

Box 3.5 Road tolling

Some of the economic benefits from financing roads through tolls include that it creates a market, encourages efficiency and good management, makes additional funds available and allows risk to be assigned to the road operator (Glaister and Travers 1994).

Manual tolling

With manual tolling systems there are significant costs which must be weighed against the benefits mentioned above. The direct costs include the tolling infrastructure — the booths and extra approach lanes (to keep the traffic flowing) — and the costs of collection.

These factors mean that a minimum traffic level of 1500 vehicles per day (vpd) is required to keep costs below 30 per cent of the tolls collected (Zietlow 1996) and collection only becomes economic for a toll operator with at least 15 000 to 25 000 vpd (FDoR 1997).

Electronic tolling

Electronic tolling avoids some of the costs associated with manual tolling but incurs others. The costs avoided are the elimination of:

- the disruption to traffic flow — because charging occurs automatically as vehicles drive by without them needing to slow down; and
- much of the manual tolling infrastructure — toll booths, operators or automated machines, and additional feeder lanes.

Currently, the number of entrances and exits to a tolled road need to be limited to reduce the number of sensors required (and hence the overall cost). However, this constraint is dependent on the costs of electronic sensing technology which are expected to fall over time.

Shadow tolling

With shadow tolls, the government pays the road operator according to the volume of traffic (usually based on a traffic count). Glaister and Travers (1994) argue that shadow tolls have significant advantages over manual and electronic tolling:

- they avoid most of the costs of collection and enforcement;
- they avoid diversion of traffic onto congested or less suitable streets;
- they have more flexibility, because the technical requirements of real tolls restrict their use to relatively few sites;
- they are invisible to the user and may attract less opposition from the public;
- they do not involve the widespread use of technically complex equipment and so do not carry such a technical risk; and
- they have a smaller set-up cost, so that adopting shadow tolls is less costly to reverse if it does not turn out well (Glaister and Travers 1994, p.ii).

Source: FDoR (1997), Glaister and Travers (1994) and Zietlow (1996).

The pricing system should charge road users the full costs of road usage. The most important costs that a road pricing system should recover are:

- *road costs* — the costs arising from road use and the costs of provision;
- *congestion costs* — costs imposed by slowing down other road users;
- *accident costs* — those not covered by insurance; and
- *pollution costs* — costs imposed on others by vehicle emissions and other environmental effects (Roth 1996).

Of these four groups of costs, road and congestion costs may be technically difficult to assess because they involve complex interactions amongst a number of factors (see box 3.6).

Box 3.6 Factors affecting road and congestion costs

Road costs

Road costs are related to the costs of provision, operation and the rate of deterioration of the road.

The costs of road provision vary significantly according to the terrain, cost of land, pavement thickness, numbers and spans of bridges, and the costs of financing (Roth 1996). The costs of operating roads varies with the cost of lighting, traffic management, policing and traffic incident management (Paterson and Archondo-Callao 1991). The costs associated with road deterioration also vary widely and are influenced by the type and frequency of road rehabilitation and maintenance, the passage of time, the type, axle weights and volume of traffic, local geographic conditions and the weather (Roth 1996).

Congestion costs

Congestion costs arise because space on a road is limited, so that as traffic volumes increase each extra vehicle tends to slow others down. The costs of the congestion generated are related to the type of vehicle, the volume of traffic and the value that each road user places on the time delay (Roth 1996 and Thomson 1998). The congestion costs across a network result from the complex interaction of all these factors and are usually estimated using network modelling.

Source: Paterson and Archondo-Callao (1991), Roth (1996) and Thomson (1998).

Funding and expenditure allocation

Road-related funding would be from road user charges. Some of these would be collected directly from road users (for example, tolls, vehicle registration and access fees) and some others might require granting the public utility sufficient legislative powers to impose charges on road-related expenditures like fuel (possibly subject to the consultation requirements, for example, suggested by RAG 1997, see above).

Projects would be evaluated using financial analysis and expenditures would be allocated on a commercial basis. That is, they would be determined by the extent to which they maximise the returns to shareholders.

Investment appraisal and project selection

In the appraisal process, road users' needs would be identified by their willingness-to-pay for the different road services supplied. That is, the road company would use a number of techniques (including community consultation) to estimate the demand for a particular road, and then, to the extent that demand would support profitable provision, they would provide it.

Investment appraisal and project selection would be driven principally by an assessment of risk-adjusted profitability. Some expenditure — for example, on landscaping — could be motivated by the need to be a good corporate citizen.

Delivery of road infrastructure

The road company would have complete autonomy (subject to regulation and law) in how it goes about delivering the road infrastructure. Proponents of the public utility model expect that commercial incentives would result in it choosing the most cost effective means of delivering roads — whether it be by contracting out or through the use of an in-house capacity (Roth 1996).

4 Comparison of institutional arrangements and issues for consideration

Providing road networks that achieve government's road-related objectives involves a number of interrelated tasks. As noted in chapters 2 and 3, this paper categorises the provision of road infrastructure into seven key tasks. They are:

- setting overall road-related outcomes the institutional arrangement is to pursue;
- development of the institutional framework or operating environment in which road tasks are allocated and undertaken;
- deciding on the aggregate level of expenditure on road provision;
- deciding how that expenditure is allocated between different projects — new construction, rehabilitation and maintenance of existing roads;
- undertaking project appraisals to support the decisions above;
- supervising project delivery to ensure these decisions have been implemented efficiently; and
- charging for the use of roads.

The way in which these tasks are carried out differs considerably in the four generic institutional arrangements for road provision described in the preceding chapters — the traditional departmental approach, output-based management (OBM), effective road fund and public utility model. These differences relate to:

- who is responsible for undertaking the tasks;
- accountably for outcomes achieved; and
- how performance is monitored.

This chapter compares and contrasts these differences by examining the merits of each institutional approach in terms of a number of governance characteristics. The governance characteristics include accountability, responsibility, autonomy and transparency.

Collectively, these governance characteristics have a crucial bearing on the ability and incentives of the agencies within an institutional framework to provide efficient road-related outcomes. This is because governance characteristics:

-
- set the boundaries for each level of decision-making;
 - affect the information available to decision-makers; and
 - shape the incentives facing decision-makers.

The next section describes a broad framework that can be used to compare and contrast the institutional arrangements described in the previous chapters. This will be followed by a discussion of the relative merits of each institutional arrangement. The final section identifies areas for further work required to help meet the challenges and impediments associated with improving road provision in Australia.

4.1 A framework for comparison

The framework for comparison used in this paper is based upon the ‘principal-agent’ model. The key elements of this model are how accountability, responsibility and autonomy are allocated between the ‘principal’ and ‘agent’ (see box 4.1). Underpinning these arrangements is the transparency through which interest groups can evaluate the performance of the government and road agency in relation to road provision.

Accountability

Accountability applies to both the government and road agency. In all the institutional approaches discussed in this paper, the government is ultimately accountable to the public for road-related outcomes achieved. A devolution of responsibility to other parties for undertaking road-related tasks does not reduce the government’s accountability for outcomes achieved.

For a road agency, accountability means that the managers of the road agency are held responsible for decisions with rewards for good performance and sanctions for poor performance. This can only occur if the road agency has sufficient autonomy to carry out its tasks. Without sufficient autonomy, the road agency cannot be held accountable for decisions that are imposed upon it. Accountability is best served by an effective performance monitoring system.

Box 4.1 **Components of the principal-agent model**

The broad framework used to compare institutional arrangements for road provision is based on the principal-agent model. The key elements of this model include accountability, responsibility, autonomy and transparency.

Accountability is a complex concept. Doern provides a good explanation of accountability as:

... a defined capacity by some person or institution to call an authority into account, in the sense of having to answer for its conduct; a responsible authority or person with a duty to answer and explain such conduct; an agreed language and criteria for judgment; and upward, downward, and outward reporting or answering processes (Doern 1993, p.4).

This indicates that accountability involves a reporting relationship between two parties. The party that can be held to account is often referred to as the agent; with the person or institution to whom they are accountable referred to as the principal.

Assessing an accountability relationship involves addressing numerous issues. These include:

- who is accountable to whom (who is the principal and who is the agent);
- what outcomes the principal and agent accountable for achieving;
- what incentives (sanctions and rewards) underpin the relationship; and
- how the agent's performance is assessed.

Examining the extent to which the responsibility for undertaking specified tasks has been assigned appropriately involves addressing the following issues:

- who is responsible for undertaking specified tasks;
- how responsibilities are shared between the principal and agent; and
- whether the agents have sufficient autonomy to undertake specified tasks.

Autonomy in the 'principal-agent' model concerns the freedom an agent has to decide how specified objectives will be achieved. The rationale behind providing agents with autonomy relates to information. Often, the agent has better information to determine how a specified objective can be achieved. Inappropriately restricting an agent's autonomy to make decisions can increase the cost of achieving the objective or the objective may not be met at all.

Transparency relates to the ease with which various principals and interest groups have access to information about agents' and principals' decisions and performance. Transparency is a key to effective accountability because a principal is unable to hold an agent accountable if the principal is unable to scrutinise performance. If scrutiny is poor, an agent faces weakened incentives and hence mediocre performance is more likely.

Sources: Doern (1993) and IC (1996).

Accountability for a road agency is established as part of the governance arrangements. If the road agency is set clear and consistent objectives (with performance targets) by the government, then the road agency can be held accountable for its performance.

Responsibility

In the case of road provision, responsibility involves determining which party (that is, the government or road agency) is responsible for undertaking the key tasks associated with the provision of road infrastructure. From this basis, it is possible to examine whether the road agency has sufficient autonomy to complete assigned tasks successfully and whether the regime of performance monitoring accurately reflects the assignment of responsibility.

As shown in table 4.1 and figure 4.1, the assignment of responsibilities varies considerably between the four institutional approaches described in this paper. For example, in the traditional departmental and OBM approaches the government retains the greatest control over road provision tasks. The effective road fund approach and public utility model involve a devolution in responsibility over decision-making away from the government towards the road fund and public utility.

In all institutional approaches, the government decides the road-related outcomes it desires to achieve and creates the environment within which each institutional approach operates. This has important implications when considering the merits of each institutional approach. In particular, it emphasises the fact that while the government may transfer responsibility for decision-making to another party, the government is still ultimately responsible for the road-related outcomes achieved.

Autonomy

Autonomy means that a road agency has full internal control to undertake assigned tasks without undue external interference. Autonomy is important because it facilitates accountability and performance monitoring. This is because if a road agency has sufficient autonomy to achieve specified objectives, external interference cannot be used as an excuse for poor performance.

In the absence of concurrent reforms, such as those establishing accountability and transparency, autonomy in a public sector institution could result in a loss of control. Therefore, in considering the devolution of responsibility for decision-making, the government needs to establish clear and consistent objectives for the agency supported by effective performance monitoring.

Transparency

In the case of road provision, transparency relates to the ease with which interest groups can observe how well the government and road agency are operating. Transparency is particularly important because it

means that the parliament and the public are able to make assessments about the effectiveness of the road agency's operations. This can assist and encourage public confidence in the way public funds are spent.

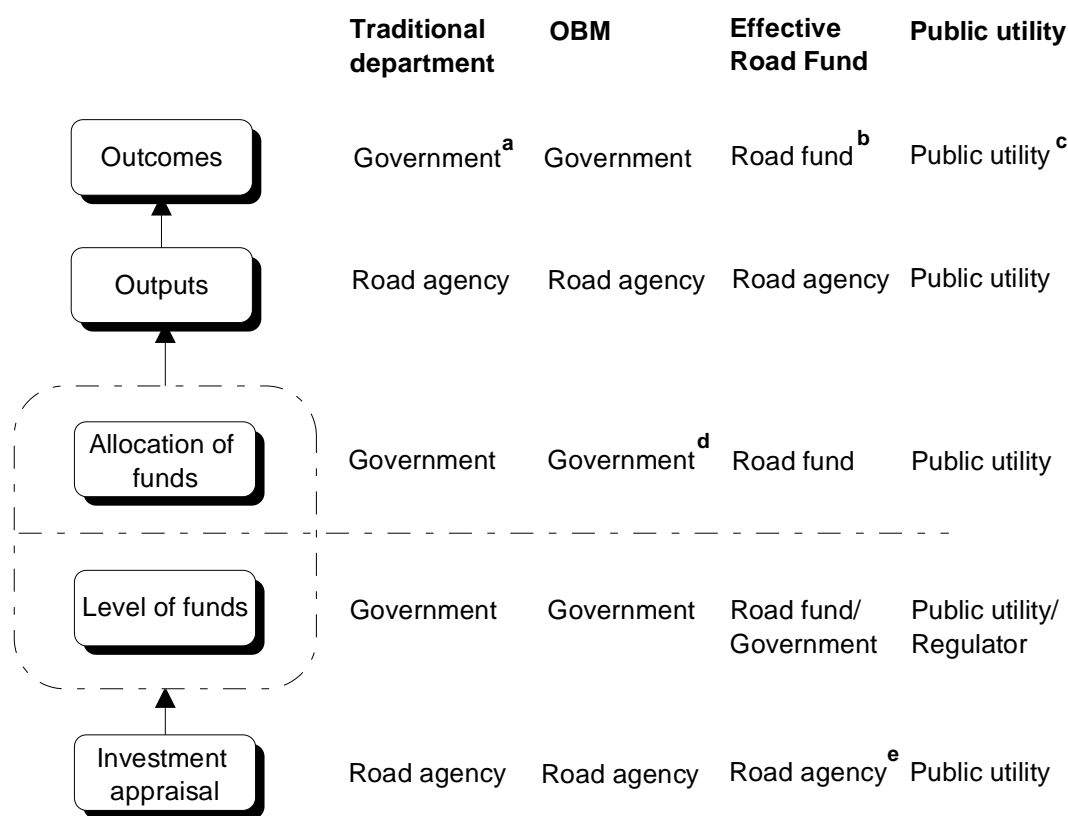
Table 4.1 Responsibility for undertaking key road provision tasks

Task	<i>Institutional arrangement</i>			
	<i>Traditional department</i>	<i>Output-based management</i>	<i>Effective road fund</i>	<i>Public utility</i>
Setting of objectives	Government	Government	Government	Government
Operating environment	Government	Government	Government	Government
Aggregate expenditure	Government	Government	Road fund/ Government ^a	Public utility/ Regulator ^b
Expenditure allocation	Government	Government/ Road agency ^c	Road fund	Public utility
Project appraisal	Road agency	Road agency	Road fund/ Road agency ^d	Public utility
Project delivery	Road agency	Road agency	Road agency	Public utility
Charging for road use	Government	Government	Road fund/ Government	Public utility/ Regulator

^a The government and road fund are jointly responsible for setting road user charges and the revenue collected will influence aggregate expenditure levels over the long run. ^b The prices charged for road use by the utility is subject to regulatory oversight which will influence aggregate expenditure over the long run. ^c The road agency is paid to produce a range of outputs (projects) but has autonomy in how the revenue is allocated subject to the constraint that it must produce the agreed outputs. ^d The road controlling agency is primarily responsible for project appraisal but is subject to audit of its appraisals by the road fund.

Appropriate transparency can begin with publication of the road agency's performance monitoring results as established under accountability. However, in the case of road provision, transparency should also extend to many of the decision-making processes used in the planning and delivery of road projects. This could include full publication of investment plans including benefit-cost analyses. Transparency may be served also by including expert assessment of the road agency's operation. This may involve auditing the road agency's activities by the auditor-general or a regulatory overseer.

Figure 4.1 Allocation of responsibility for the four generic institutional arrangements



^a There is an element of joint accountability between the government and road agency in achieving road-related outcomes. ^b The road fund is responsible for achieving outcomes specified by government. ^c Public utility is responsible for achieving specific targets set by government. ^d While the government is responsible for deciding which projects will be undertaken, the road agency has greater freedom in allocating expenditure to undertake specified projects. ^e The road fund oversees the investment appraisal process of the road agency.

Sources: Based on road agency annual reports, IC (1996), WA Treasury (1996), Parliament of Tasmania (1997), Heggie (1996), Gwiliam and Shalizi (1996), AAA (1997) and RAG (1997).

4.2 Comparison of institutional arrangements

The previous section outlined a framework for comparing the four generic institutional arrangements for road provision. This section employs the framework developed to compare each set of arrangements.

Traditional departmental approach

The traditional departmental approach for road provision follows the normal allocation of responsibility and accountability associated with most government entities. First, the electorate delegates responsibility to

Members of Parliament. The Parliament then delegates responsibility to Cabinet/Ministers, who in turn delegate responsibility to a Chief Executive Officer to manage the road agency.

Within the departmental approach, the government ultimately has the authority to determine the aggregate level of expenditure on road infrastructure and where these funds will be invested. However, experience has shown that road-related investment decisions are influenced and constrained by various political and institutional considerations as well as community expectations (see chapter 2).

Within this allocation of responsibility, the government is accountable directly to the electorate for road-related outcomes achieved. Therefore, under departmental arrangements, the main mechanism interested parties have to influence road-related issues is through the voting process during polling time.

The road agency is primarily accountable to the government. As will be discussed later in this section, there may be room for improving the performance monitoring of road agencies.

Legislative arrangements

In chapter 2, it was argued that regardless of their legislative arrangements, most State road agencies were characterised by the departmental and OBM approaches. This issue is important because current legislative arrangements may in some instances create confusion over the delineation of responsibility and accountability. For example, VicRoads states that:

The Roads Corporation is a Victorian statutory authority operating under the registered business name of 'VicRoads' (VicRoads 1996, p.5).

This statement may give the impression that VicRoads is governed in a similar manner to that of other government owned statutory authorities providing economic infrastructure, such as electricity and gas (known as government trading enterprises (GTEs)). However, the functions and governance of State road agencies are markedly different from that of GTEs. In the first instance, State road agencies are not GTEs because they receive virtually no income from their services. In addition, many GTEs have also been 'corporatised' which describes initiatives aimed at replicating many of the commercial incentives which apply to private firms, but which excludes changes in ownership (IC 1994).

Matching accountability to responsibility

A key issue of the departmental approach (and all other institutional arrangements) is the extent to which the government and road agency are held accountable for the decisions they make. An important feature arising out of the departmental approach is that the government and road agency are jointly accountable for road-related outcomes. However, while joint accountability may exist, it is still the government that is primarily responsible for road-related outcomes. This occurs for two main reasons. First, as noted earlier, regardless of the allocation of responsibility for undertaking road provision tasks, it is the government that is directly accountable to the electorate for the road-related outcomes achieved. Second, as discussed in

chapter 2, Ministers retain the ultimate authority to direct the activities of road agencies. In most instances directions do not have to be specified in writing, be made publicly available or tabled before parliament.

The primary activities of road agencies is to determine the benefits and costs of alternative road projects through investment appraisal. Road agencies also supervises the delivery of approved projects. On this basis, improved accountability and performance monitoring regimes may be best served by focusing on how well road agencies have undertaken these assigned tasks. The areas for performance monitoring may include:

- how the preferences of affected parties have been obtained and incorporated formally into investment appraisal;
- the extent to which the estimated benefits and costs of completed projects have been achieved; and
- the proportion of road construction and maintenance projects that has been completed on schedule and within budget.

Indicators used to assess performance in the areas listed above can be found in most State road agency annual reports and associated documents. Continual improvement of performance indicators combined with their appropriate use in applying rewards and sanctions to road agency management, can improve the accountability of road agencies to the government and wider community as a whole.

An important mechanism to allow a robust assessment of the performance of road agencies is the public availability of investment analysis. This would allow interest groups to comment directly to the government, road agency or other designated body on the extent to which they believe their preferences have been incorporated adequately into the investment appraisal process.

However, experience suggests that only some elements of investment appraisal documentation are available for public scrutiny. Currently, it is the results of investment appraisal and intended investment programs that are usually available for public scrutiny and not the actual appraisal documentation itself. For example, as outlined in chapter 2, VicRoads publishes regional and route plans. Major road projects in New South Wales are subject to Environmental Impact Statements or Reviews of Environmental Factors, which include only the results of any benefit–cost analyses.

Output-based management

OBM involves the same allocation of responsibility and accountability as the traditional departmental approach. The primary purpose of OBM is to clarify the respective roles of the government and road agency in providing road infrastructure. In doing this, accountability can be strengthened through improved performance monitoring regimes.

Under OBM, the government specifies the road-related outcomes it desires to achieve. By doing this, it clarifies the fact that it is the government — and not the road agency — which is accountable directly for road-related outcomes.

The government then specifies what outputs (road construction and maintenance projects) it will purchase to achieve desired outcomes.¹ As the government develops a list of specified outputs, providers (both government and non-government) receive clear directions on what is expected of them. In particular, it further clarifies the fact that the provider is responsible for providing specified outputs and the government for achieving overall road-related outcomes.

Matching accountability to responsibility

As described above, a key purpose of OBM is to clarify the respective roles of the government and road agency in providing road infrastructure. By publishing desired road-related outcomes — combined with associated performance indicators and targets — the public have greater information to assess the extent to which the government has achieved its stated objectives. In addition, by supplying providers with a schedule of specific road construction and maintenance projects, performance monitoring regimes can become better focused on the activities of providers.

However, the potential advantages of OBM can be limited by various implementation issues. They include:

- the role of the road agency in undertaking investment appraisal;
- the ability to develop and weight robust performance indicators; and
- the extent to which the arm's length agreement between the Minister and road agency can be maintained.

As with the traditional departmental approach, under OBM the government is still reliant upon the road agency to estimate the benefits and costs of alternative road projects. This information is then used by government as the basis for deciding what outputs the government will purchase to achieve desired outcomes. This situation inherently blurs the distinction OBM attempts to make in separating the role of the government and road agency as purchaser and provider, respectively.

A crucial requirement of OBM is the extent to which sufficient information can be obtained to make informed decisions on how well the government has achieved its desired outcomes. Quality information is reliant upon the ability to develop robust performance indicators for each specified road-related outcome. As shown in box 4.2, there are a number of issues surrounding the development of appropriate performance indicators for road-related outcomes. In particular, because governments specify multiple road-related outcomes, assessing overall performance requires that each outcome is assigned a weighting. This is to determine the relative importance of each outcome and to make transparent tradeoffs between (sometimes conflicting) outcomes. In addition, each road-related outcome can be influenced by various outputs, only some of which were provided by the road agency.

¹ In the case of road provision, by purchasing road construction and maintenance projects, the government is technically purchasing 'inputs' and not 'outputs'. This is because each road project is an input into producing road services and not an actual service or output itself.

Effective performance monitoring for road provision is hampered also by the production and demand characteristics of roads. Annual evaluations of road-related outcomes are limited by the fact that roads provide a stream of services to users over many years. For example, increased expenditure on roads to achieve specified economic and regional development goals may not produce tangible results for some time into the future.

Successful implementation of OBM requires that the role of the government and road agency as purchaser and provider, respectively, are maintained over time. A discussion paper by the Department of Finance and Administration highlights some of the problems that can develop in maintaining this separation:

Agencies [a term used to describe a variant of the OBM framework] are not an appropriate solution when they cannot be at arms length from the Minister and involve very politically sensitive issues (DFA 1998, p.6).

This issue is worth noting in light of the effect individual road projects can have on both the government's budget and road-related outcomes. For example, in New South Wales, the Roads and Traffic Authority's approved capital investment program for 1997–98 is around \$1.7 billion. This represents over 40 per cent of the total capital expenditure of New South Wales budget sector agencies (NSW Budget Paper No.4 1997). Some of the Roads and Traffic Authority's major projects have an estimated total cost of more than \$500 million.

Box 4.2 Performance measurement issues for output-based management

In the case of road provision, a central feature of output-based management (OBM) is the development of appropriate performance indicators to assess the government's overall performance in providing road infrastructure.

Governments generally specify multiple road-related outcomes. These include improved road safety, social and environmental goals and enhanced economic and regional development. As a consequence, in assessing the government's overall performance in relation to road provision, it appears necessary to weight each road-related outcome. This is to determine the relative importance of each outcome and to make transparent tradeoffs between (sometimes conflicting) outcomes.

Each road-related outcome are often influenced by a variety of outputs, not all of which are provided by the road agency. For example, WA Treasury (1996) describes the application of OBM with the outcome of 'a reduction in road accidents'. In achieving this outcome, the government purchases various outputs, such as road patrols, driver testing and road maintenance. As stated by WA Treasury:

... a number of outputs, possibly produced by different agencies, may contribute to a single outcome (WA Treasury 1996, p.13).

Because of this situation, when assessing the performance of road construction and maintenance projects, it appears necessary to assign a weighting to each road output. This is to determine the contribution each road output is expected to make in achieving a specified outcome.

Effective road funds

The effective road fund ('road fund') approach represents a significant departure from the traditional departmental and OBM approaches in the allocation of responsibility. As shown in table 4.1 and figure 4.1, with the road fund approach, the government's main role is to develop and monitor the institutional environment in which the road fund operates. The government also use its taxation powers to levy road user charges and to distribute these revenues to the road fund.

Under the approach proposed by Heggie (1996), the representative board of the road fund undertakes the key road provision tasks of deciding upon the level of expenditure on roads and how available funds are to be allocated between different road projects (see chapter 3). However, the road fund is still reliant upon the government to levy and distribute road user charges to the road fund. Because of this situation, in practice it would be expected that the level of road user charges payable to the road fund would be determined jointly between the government and the road fund (as is the case in New Zealand).

As described in chapter 3, the cited advantage of the road fund approach is that the representative board has a vested interest to provide an optimal supply of road services from an economic, social and environmental perspective.

Another element of the road fund approach is the introduction of a purchaser-provider split. A purchaser-provider split occurs because the road fund does not undertake investment appraisal or project delivery. Instead, the road fund purchases these outputs from road controlling agencies and local governments.

Information flows and issues surrounding the representative board

With the road fund approach, it is the road fund — and not the Minister — which determines the balance between the benefits of increased road expenditure against the cost of provision. However, the road fund is still a government entity and the approach does not preclude avenues for the Minister to influence the activities of the road fund. The government has mechanisms such as a terms of reference, statement of intent or through the road fund's establishing legislation to influence the board. For example, Heggie (1996) argues:

... [terms of reference] for the road fund has to clearly state which items the road fund can finance and should give some indication of priority (Heggie 1996, p.7).

In addition, the Minister may make written directions to the road fund. Such directions should be tabled in parliament and be made available for public scrutiny.

Gwilliam and Shalizi (1996) and Heggie (1996) outline three issues surrounding the use of a representative board as a mechanism to promote an optimal (from economic, environmental and social perspectives) supply of road services. They are:

- the ability of the representative board to represent the interest of all parties affected by the provision of road infrastructure;
- the ability of the board to make correct decisions regarding the tradeoff between maintenance and new investment; and
- the lack of evidence currently available to demonstrate that road funds result in improved road-related outcomes.

The effectiveness of the representative board in supplying an optimal level of road services is highly dependent on the extent to which the board members act in the interests of the community as a whole. For example, Gwilliam and Shalizi argue that a board representing only road users may not address valid social and environmental concerns adequately:

Beyond the narrow confines of road maintenance, Road Boards dominated by 'user representatives' may not allocate resources optimally (Gwilliam and Shalizi 1996, p.6).

However, as discussed in chapter 3, the board of the road fund should have representatives from all parties affected by the provision and use of road infrastructure. This may include, for example, members representing the social and environmental interests of the wider community.

Heggie notes that the road fund may have difficulties in obtaining an optimal balance between expenditure on maintenance and new investment:

The concern is that a fund which finances both maintenance and investment may give undue attention to new roads at the expense of maintenance. It is also the case that major new roads tend to have major land-use impacts and decisions on these matters should be taken at Cabinet level (Heggie 1996, p.7).

This issue can be addressed through two main mechanisms. First, the government can specify in its terms of reference that the board's first priority is to maintain the existing road network. Second, both the government and road users can bring redress against members of the board.

The benefits of the road fund approach (in terms of improved road-related outcomes) in supplying roads in a modern economy are yet to be established. This is because the use of road funds is a relatively new approach to providing road infrastructure. In particular, variants of the road fund described in this paper have been applied only in developing countries with the exception of New Zealand. Because of this situation, it may be argued that the road fund approach is a solution to the problems of supplying road infrastructure in developing countries with poor institutional and financial arrangements.

Accountability and scope for redress against the representative board

A crucial element of the road fund approach is the mechanisms available to hold the representative board accountable for outcomes achieved. Simply shifting the responsibility for making road-related investment decisions to a representative board will not necessarily result in improved road-related outcomes. The representative board must face appropriate rewards and sanctions to encourage improved performance.

Under the road fund approach proposed by Heggie (1996), there are two main mechanisms to hold the representative board accountable for outcomes achieved. First, each representative board member should be nominated by the constituency he or she represents. This allows the constituency that each member represents to bring redress against their nominated member. This would occur principally through the nomination process.

Second, the Minister may have the authority to replace board members. A crucial and still largely unresolved issue of the road fund approach concerns the circumstances and conditions under which the Minister can remove board members for poor performance. As the Minister is still ultimately accountable to the general public for road-related outcomes, the Minister must have access to suitable mechanisms to bring redress against the representative board.

The public utility model

The public utility model seeks to encourage an optimum supply of road services by treating the provision of roads in a manner similar to other forms of economic infrastructure. The public utility model for road provision is still only an 'in principle' proposal and is yet to be implemented on a broad scale in any developed country. As discussed later in this chapter, along with the road fund approach, there would be

numerous constitutional, legal and financial constraints to implementing a public utility model for road provision.

A road utility would have the autonomy to charge directly for the use of roads (subject to regulatory oversight) and would supply road services on a commercial basis. However, the adoption of a public utility model for road provision would not preclude the government from pursuing clearly specified social, safety and environmental objectives.

As described in chapters 1 and 3, there are important features of road provision that must be taken into account when considering the application of a public utility model. These features include:

- some aspects of road provision having natural monopoly characteristics;
- significant externalities associated with the provision and use of roads, such as environmental externalities; and
- avenues for the government to pursue both economic and non-economic objectives.

Regulatory oversight

A public utility providing road infrastructure may have the potential to exploit ‘monopoly’ power through overcharging for road use. To promote public confidence in the utility, it may be necessary to regulate the prices charged by the utility. In addition, the regulation of a road utility may need to extend beyond the traditional areas of asset valuation and price setting. As noted by the Roading Advisory Group (1997) a road utility should be subject to strong mandatory consultation and disclosure requirements (see chapter 3).

However, there has been criticism of past attempts to regulate the activities of public utilities (see box 4.3). These criticisms focus on the appropriateness of incentives created by the regulator and the effects that these incentives have upon resource allocation.

Externalities and non-economic objectives

A public utility providing road infrastructure and pursuing only commercial objectives may fail to provide an optimum level of road services. This is because the provision and use of roads can result in various externalities (such as noise and air pollution), which should be reflected in the pricing and provision of roads. In addition, the government may wish to pursue social objectives. For example, providing roads to a higher standard in rural areas than is justified purely on an economic and commercial basis.

As described in chapter 3, the government has two main mechanisms to pursue social, safety and environmental objectives. They are through legislation or the direct purchasing of outputs from the utility. Issues arising from these mechanisms include the extent to which legislation can be an effective tool to promote optimal environmental outcomes and the ability to clearly specify and cost road outputs to achieve social objectives.

Accountability and scope for redress

The public utility model represents the greatest devolution of responsibility away from the Minister towards the infrastructure provider. However, this does not mean that the Minister is no longer accountable for road-related outcomes achieved. Instead, the Minister must specify a combination of financial and non-financial outcomes that balances the profit motive of the road utility against the expectations of the community in regard to the level and quality of road services provided.

With a public utility model for road provision, the Minister can bring redress against the board of the utility in a similar manner to that of other government owned providers of economic infrastructure. In particular, the Minister can remove board members for poor performance when agreed performance targets have not been achieved.

Box 4.3 Regulation of a public utility providing road infrastructure

A public utility providing road infrastructure may require regulatory oversight. This is to promote public confidence in the operations of the public utility by ensuring that the utility does not misuse its potential monopoly power. In addition, regulatory oversight may also be required to ensure that the operations of the utility are transparent and open to public scrutiny.

In general, the purpose of a regulator is to ensure that the utility provides adequate services at minimum cost consistent with earning a reasonable return on investments.

In the case of road provision, the regulator must first determine the total revenue (revenue requirement) to which the public utility is entitled to receive for services supplied. Second, the revenue requirement must be translated into a set of prices to be paid by individual vehicles and road users.

Determining the revenue requirement and translating this into a set of prices is not an easy task. For example, Howe and Rasmussem outline some of the difficulties and criticisms of past regulation of public utilities:

The complex nature of regulation in these industries, particularly the relationship between the regulatory commission and the public utility, has been the subject of considerable criticism over the years. Although the level of service typically has been more than adequate, opponents of public utilities have mounted numerous attacks on, among other things, the nature and effectiveness of regulation, the appropriateness of incentives, and resource allocation in utility industries (Howe and Rasmussem 1982, p.158).

However, continuing reform of economic infrastructure providers have had to address the issue of regulating segments of industries displaying strong natural monopoly characteristics. Examples include the regulation of rail track and electricity transmission. An examination of the regulation of these industry segments may provide valuable information on the extent to which a public utility supplying road infrastructure can be subject to effective regulation.

As noted throughout this paper, the provision and use of roads can affect all members of the community. Because of this situation, an important issue of the public utility model (and all other institutional approaches) is the scope that members of the community have to bring redress directly against the utility. This paper has identified three main mechanisms that members of the community have to seek redress. They are:

- by using alternative transport modes, such as rail, water and air transport (also available under other institutional approaches);
- through commercial law governing aspects of the utility's operations; and
- through the regulator directly.

The effectiveness of these mechanisms will depend on various issues requiring more detailed examination. These include:

- the availability of alternative transport modes;
- the financial and legal resources of affected parties; and
- the authority and mechanisms to bring redress established as part of the regulatory regime.

4.3 Issues for consideration

As discussed earlier, evidence presented at two recent Parliamentary Committees of Inquiry into road provision (and work by other authors) highlighted some concerns about the way in which Australian governments provide road infrastructure (see chapter 1). In particular, submissions to the two Parliamentary Committees of Inquiry argued that:

- governments have not set clear road-related objectives;
- current investment patterns have not maximised the quality of service to road users; and
- political imperatives and funding uncertainty have hampered long-term planning in relation to road provision.

As noted in chapter 1, the concerns outlined above do not necessarily imply that Australia's road network is resulting in unacceptable road-related outcomes. However, there does appear to be room for further improvement in the way governments in Australia provide road infrastructure.

An important issue to be considered is the extent to which road-related outcomes can be enhanced by improving existing Australian institutional arrangements or whether the movement to a new set of arrangements is required.

Improving current Australian institutional arrangements

Each of the alternative institutional approaches described in this paper contains elements that would appear to provide scope to improve the government's accountability, transparency and efficiency in relation to the provision of road infrastructure. However, they also raise significant implementation issues.

Most State governments have or are implementing some version of the OBM approach to providing road infrastructure. The application of OBM provides one avenue for governments to improve accountability and transparency with minimal change to current operating environments. However, in the case of road provision, there are important implementation issues which can limit the potential gains of OBM. For example, OBM requires the development of robust performance indicators and maintenance of the arm's length relationship between the government and road agency.

The effective road fund represents a significant departure from current Australian institutional arrangements. The closest practical version of the effective road fund described in this paper can be found in the operations of Transfund in New Zealand. The effective road fund approach uses a representative board of management to promote a more optimal supply of road services. However, the merits of the road fund approach for a modern economy are yet to be demonstrated and there are still important accountability issues to be resolved.

The public utility model represents the greatest devolution of responsibility to the provider of road infrastructure. Versions of the public utility model have been proposed by a Roading Advisory Group in New Zealand and in the Australian Automobile Association's submission to the Neville Committee. As discussed earlier, road provision exhibits a number of important features that must be taken into account in considering the application of the public utility model.

Areas for further research

As described in this paper, there are still unresolved issues requiring further research surrounding the effective road fund approach and the public utility model. For example, the effective road fund approach has unresolved issues concerning the composition and accountability of the representative board. A road utility may misuse monopoly power and require effective regulation. These are issues which require further research.

Apart from the possibility of moving to a new set of institutional arrangements, there may also be value in further exploring options for improving current Australian institutional arrangements. For example, there may be elements of the effective road fund approach and public utility model which could be readily applied to current Australian arrangements. These would act to strengthen accountability and transparency. Examples include the requirement that directions from the Minister, to the road agency, must be made in writing and tabled in parliament. The road agency could be made subject to the same strong mandatory disclosure laws proposed for the public utility model.

Change must also be considered within the context of Australia's three tier system of government. As noted in chapter 1, all three levels of government in Australia provide road infrastructure. However, the levels of government often have overlapping responsibilities but with varying abilities to raise revenue to finance spending programs. Australia's three tier system of government raises the following issues in changing current institutional arrangements:

- the allocation (also termed classification) of roads between different levels of government;
- the ability of each level of government to collect road user charges;
- the pricing of road use and the allocation of road revenues;
- the coordination of road infrastructure with other forms of transport infrastructure, such as rail and sea ports; and
- the cost of implementing institutional change, especially for the smaller jurisdictions in Australia.

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