



ITLS

RESEARCH REPORT

ITLS-RR-10-02

The acceptability of road pricing: An application of a theoretical and analytical framework to the realities of decision making in Sydney

By

Joel Palmer [Supervised by Dr. Sean Puckett]

November 2010

INSTITUTE of TRANSPORT and LOGISTICS STUDIES

The Australian Key Centre of Teaching and Research in Transport Management

The University of Sydney

Established under the Australian Research Council's Key Centre Program.

NUMBER: Working Paper ITLS-RR-10-02

TITLE: **The acceptability of road pricing: An application of a theoretical and analytical framework to the realities of decision making in Sydney**

Road pricing is an area of transport policy where the gap between theory and practice is greater than most. Road pricing offers many benefits to governments and society: (more) optimal resource allocation, environmental gains, increased productivity associated with reductions in congestion and travel time savings, and supplementary governmental revenue streams, among others. Despite the pragmatic benefits, and despite technical solutions making road pricing increasingly practicable, decision makers at either the administrative or political levels have often distanced themselves from road pricing within broader transport policies. This research examines the theory of road pricing, the related notions of public and political acceptability, case studies from international experience, and relates them to Sydney, Australia.

ABSTRACT:

The literature-based research is complemented by interviews with a modestly sized but diverse and informed sample of respondents. The interviews ‘test’ the conventional wisdom in the literature against the realities of transport planning and political decision making, with an emphasis on applicability to Sydney. The results are that theorists and practitioners largely agree on the key issues to be addressed, however with some variations in priorities or perceived importance, and that the issue of “timing” is largely overlooked in the literature. The level or layer of government where transport decision-making occurs is one notable issue on which agreement is found neither between the respondents and the literature, nor within the sample of respondents themselves. The implications of these findings are discussed.

KEY WORDS:

Road Pricing, Political Acceptability, Sydney, Acceptability

AUTHORS:

Joel Palmer [Supervised by Dr. Sean Puckett]

Institute of Transport and Logistics Studies (C37)

The Australian Key Centre in Transport Management

The University of Sydney NSW 2006 Australia

CONTACT:

Telephone: +61 9351 0071

Facsimile: +61 9351 0088

E-mail: business.itlsinfo@sydney.edu.au

Internet: <http://sydney.edu.au/business/itls>

DATE:

November 2010

Table of Contents

1	Introduction	1
1.1	<i>Purpose</i>	2
1.2	<i>Scope</i>	3
1.3	<i>The Grounds for Road Pricing in Sydney</i>	4
1.4	<i>Methodology</i>	5
1.4.1	The Qualitative Approach	7
1.4.2	Case Study Learning	8
2	Road Pricing	9
2.1	<i>Efficient Markets</i>	9
2.2	<i>Road Pricing for Different Externalities</i>	10
2.2.1	Congestion	10
2.2.2	Environmental Factors	11
2.3	<i>Asset Management</i>	12
2.4	<i>Road Pricing Case Studies</i>	13
2.4.1	New York	16
2.4.2	Edinburgh	18
2.4.3	Manchester	20
3	The Acceptability Problem	24
3.1	<i>Public Acceptability</i>	26
3.1.1	Perceived Effectiveness of Solutions	26
3.1.2	Problem Perception	27
3.1.3	Clear and Valid Policy Goals	28
3.1.4	Mobility Related Social Norms	29
3.1.5	Equity Issues and Socio-Economic Impacts	30
3.1.6	Attribution of Responsibility	31
3.1.7	Use of Revenues and Provision of Alternatives	31
3.2	<i>Technical Feasibility</i>	33
3.3	<i>Costs</i>	33
3.4	<i>Other Political Impacts</i>	34
3.5	<i>Levels/Layer of Government</i>	35
4	Interview Results	36
4.1	<i>Perceived Effectiveness of Solutions</i>	37
4.2	<i>Problem Perception</i>	38
4.3	<i>Clear and Valid Policy Goals</i>	39

4.4	<i>Mobility Related Social Norms</i>	39
4.5	<i>Equity Issues and Socio-Economic Impacts</i>	40
4.6	<i>Attribution of Responsibility</i>	40
4.7	<i>Use of Revenues and Provision of Alternatives</i>	41
4.8	<i>Levels/Layer of Government</i>	42
4.9	<i>Other Issues to Arise</i>	43
4.9.1	Timing	43
4.9.2	Communication	44
5	Discussion	45
5.1	<i>The Issue of Timing</i>	45
5.2	<i>The Levels and Layer of Government</i>	49
5.3	<i>The Knowledge Mismatch and Communication</i>	51
5.4	<i>An Evaluation of Road Pricing Acceptability in Sydney</i>	51
5.4.1	Reasons for Optimism	52
5.4.2	Ongoing Frustrations	53
6	CONCLUSIONS	55
6.1	<i>Limitations of Research</i>	55
6.1.1	Sample Size	55
6.1.2	Span of Issues Captured	55
6.2	<i>Areas for Further Research</i>	56
6.2.1	The Relationship Between Road Pricing Scheme Lead Times, Electoral Cycles and Political Feasibility.	56
6.2.2	The Feasibility of Hypothecation in Fiscally-Centralist Government	56
6.2.3	Perceptions of Congestion Experience and Expectations in Sydney and Surrounds.	57
6.3	<i>Concluding Remarks</i>	59
	REFERENCES	61

APPENDIX 1: INTERVIEWEE BIOGRAPHIES Error! Bookmark not defined.

List of Figures

Figure 1: Phased research methodology	7
Figure 2: Fee Structure of proposed New York congestion pricing schemes.	17
Figure 3: Summary of views on congestion pricing in New York city.....	18
Figure 4: Fee structure of the proposed Edinburgh congestion charge.....	19
Figure 5: Fee structure of the proposed Manchester congestion charge.	21
Figure 6: Summary of road pricing features and experiences.....	23
Figure 7: Elements of political and public acceptability.....	27

1 Introduction

The pricing of urban roads is perhaps the greatest instance in the sphere of transport policy of practice not keeping pace with theory (Calthrop and Proost, 1998). Road pricing has been developed as an economic concept for many decades, with Arthur Pigou (1920), Adam Smith (1937) and William Vickrey (1963) each presenting compelling landmark arguments for the practice some fifty or more years ago (Lindsey, 2006). More recently - since the 1970's - the academic interest in road pricing has steadily accelerated (Lindsey, 2006), with support and criticisms coming from a wider set of fields as it is recognised as a means of managing demand for limited capacity, the road asset, environmental externalities, safety issues, freight and many other road or traffic problems.

Road pricing has increasingly been included in government commissioned independent reports for transport, ranging from the landmark Smeed Report (1964) which specifically focussed on pricing approaches for road transport, to the Parry report into sustainable transport in NSW (2003), to the Henry (2009) review into Australian taxation, to name but a few. These reports have gone some way to bridging the gap between economic abstraction and real-world feasibility, and have generally recommended road pricing of some type; in doing so demonstrating a belief that, political considerations aside, road pricing is a realistic possibility.

Despite the wealth of academic and theoretical knowledge of road pricing, a significant majority of which argues *for* it (Lindsey, 2006), only a relative few metropolitan areas around the world have implemented road pricing schemes. Fewer still have implemented it with some degree of sophistication, such as the ability to differentiate price according to time of day, vehicle-specific emissions, safety features or some other criteria, and fewer again have implemented it successfully or in a politically sustainable manner. While technological impediments would have been a legitimate excuse for an implementation lag in Pigou's, or even Vickrey's, time, "as the cost of tolling equipment falls, the set of realistic policy options to internalise these externalities will continue to grow" (Calthrop and Proost, 1998, pg 335).

Road pricing, thought of as a policy rather than an economic abstraction, "allows great flexibility in pursuing a variety of public policy objectives" (Forkenbrock, 2005, pg. 98), and is unlikely to be any more expensive to implement than (comparably effective) alternative policy options, especially in regards to congestion and capacity building. Road pricing

schemes have been shown to be able to repay their own implementation costs in very reasonable timeframes (de Palma, Lindsey and Niskanen, 2006). Despite these positives, road pricing schemes have not, in general, been readily adopted. Clearly there is something about road pricing that is not to the tastes of many decision-makers or policy-makers (Schade and Schlag, 2003).

This paper is presented in six broad sections. This introduction will justify the research, provide a scope, and give rationale for the approach taken. The second section gives a theoretical overview of the logic of road pricing from a variety of perspectives, and explores the experience of international jurisdictions in implementing road pricing schemes. The third section addresses acceptability, both public and political, as it relates to road pricing, as well as any specific elements that may be particularly pertinent to a Sydney context. Section four details the ‘results’ of the interview process undertaken for this research, including recurrent themes from the interviews, as well as any specific points that were of particular insight. Section five compares these results to the conventional wisdom: the ways in which the Sydney experience has or may be expected to concur or diverge from that posited in the literature. Section six concludes the paper by summarising the findings and implications of the research, providing limitations of the present study and outlining areas for further research.

1.1 Purpose

Christainsen, in assessing the institutional environment that facilitated Singapore’s road pricing scheme, noted that “Singapore essentially broke the mold [sic] ... and the precise political conditions under which such breakthroughs occur, and endure, deserve more research on the part of political scientists as well as economists” and then pondered “whether those conditions are now close to being met in additional cities around the world” (Christainsen, 2006, pg. 87). This paper seeks to explore those aspects of road pricing that have inhibited its implementation, or even adoption within a broader transport policy, by more jurisdictions, and whether the conditions that Christainsen noted are present or even feasible in Sydney.

A reasonable assumption or hypothesis is that “political will” (or a synonymous phrase) would feature prominently in this exploration. Therefore the task at hand is to disaggregate “political will” into its component parts, to fully understand why it is that more decision-makers have not adopted, and continue to avoid, road pricing as part of a suite of transport

policies. This paper will examine these factors with particular reference to Sydney, Australia, including a consideration of institutional environments, decision making, and existing transport policy.

The purpose of this research is to provide some insights, by which any future proposed road pricing scheme for Sydney (or, more broadly, New South Wales) could be assessed not only for its theoretical merits or benefit-cost ratio, but also for the very feasibility of its implementation in the first place. This research, being exploratory in nature, will “investigate an issue or topic in order to develop *insight and ideas* about its underlying nature” and acknowledging that the “issue may require further research study for problem resolution” (McNabb, 2009, pg. 96). By examining the ‘sticking points’ of implementing road pricing policy in global examples and in NSW, it is intended that a set of issues can be identified whose consideration will enhance the political feasibility of this economically sound but politically dangerous policy concept.

1.2 Scope

The scope of this paper can be expressed as one key assumption and two qualifications of the approach taken.

It is assumed that in any urban area where road pricing could be applied, there is some “optimal” model of road pricing for that context. Variables in the model may include pricing structures, technology, pricing levels (both absolute and relative) and geographic reach (Balwani and Singh, 2009). Variables in the context may include levels or layers of government, physical topography, population and population density, and even elements of culture (Albalade and Bel, 2008; Schade and Schlag, 2003). This research will assume that for every feasible context above some threshold of population, density, and/or urbanisation, including Sydney, there is some ‘ideal’ or optimal model of road pricing. It also acknowledges that ‘ideal’ models could vary greatly between contexts and that in many (if not most) contexts, an implemented scheme will likely be sub-optimal for a variety of reasons. This generalised view of “road pricing” follows in a similar vein to Lindsey (2006, pp. 295-296), who notes that “road pricing is defined broadly to include any form of direct user charges (e.g. tolls and area licenses), charges on urban and intercity roads, charges on any form of motorized transport, and charges for any purpose”, and that “various terms are used in the literature besides ‘road pricing’, including ‘tolls’, ‘road-use pricing’, ‘road-user charging’,

‘congestion charging’, ‘congestion pricing’ and ‘congestion metering’. I use ‘road pricing’ to encompass all these terms”.

The first qualification of the present research is that the paper will not explore technological features, pricing models, and pricing levels of any given scheme *beyond how they affect the acceptability of a given model*. There is a great depth of existing literature on optimal pricing scenarios for various contexts, and this paper will not contribute to that discussion. As such, throughout the paper, unless specified otherwise, “road pricing” could be considered to mean “road pricing of some description” or even “road pricing of some optimal description”, rather than “road pricing of a particular description”. While perhaps not ideal itself, this is a necessary limitation in order to remain focussed on the primary question of acceptability. This limitation follows the precedents of Viegas (2001); Oberholzer-Gee and Weck-Hannemann (2002); Jaensirisak, Wardman and May (2005); Harrington, Krupnick and Alberini (2001); Schade and Schlag (2003); and Albalade and Bel (2009) who each assess the political acceptability of road pricing, *as a principle or concept* (but not specific models) in a general sense (i.e. not specific to any city or location).

Secondly, “freight transport plays an ever increasing role in the urban economy” (Hensher and Puckett, 2005, pg 573). Given the significance of transport costs to the freight sector, and the potential impact on those costs posed by road pricing, freight could well warrant being treated separately to private vehicle use in the analysis set out in this paper (Newbery, 1990; Hensher and Puckett, 2005). Presently, freight will not be treated separately in this analysis. This is a limitation of the analysis, however could tenuously be overcome by considering freight concessions (or some other freight-specific mechanism) within the understanding of “road pricing of some optimal description”, as noted above.

1.3 The Grounds for Road Pricing in Sydney

Sydney would, on face value, be an ideal candidate for urban road pricing; it is a sprawling metropolis with a large population, frequent congestion problems, notable air pollution and a large freight task¹ (Council of Australian Governments, 2006). It also has an established

¹ What is considered urban sprawl, a large population, and problematic levels of air pollution and congestion is subjective and relative. Compared to Los Angeles or Beijing, for example, Sydney is

motorway network with electronic tolling, and therefore a driving population for whom the notion of tolling is not foreign, nor is the technology for toll collection. Road pricing has been mooted as a component of Sydney's (NSW's) broader transport policy for some years, largely within a discourse of congestion, yet little progress has been made in the implementation of a comprehensive road pricing scheme (Lay, 2010).

Recurrent congestion (here opposed to incidental congestion associated with a particular planned or unplanned 'event') occurs where populations and densities are greatest. Intuitively, "the most densely developed cities tend to be the most congested" (Taylor, 2002, pg. 11), and congestion abatement techniques, including road pricing, are most likely to be effective, and therefore justify their expense, in those same areas.

Sydney conforms to these characteristics. The greater metropolitan area of Sydney has 4.72 million drivers license holders and 5.33 million private and commercial vehicles registered in 2009 (Roads and Traffic Authority, 2009). Sydney has both the greatest population of all Australian cities, and the second highest projected growth rate of metropolitan private vehicle travel in the fifteen years to 2020 (Council of Australian Governments, 2006).

In a study assessing the *technical* feasibility of implementing road pricing schemes in Australian capital cities, the former Australian Federal Department of Transport and Regional Services (DOTARS) noted that, against criteria of geography, population, density, and underlying congestion levels, "the largest Australian cities (Sydney and Melbourne) ... have sufficiently severe congestion problems to warrant these being addressed by charging policies", and that "congestion in the larger Australian cities is at a level where road pricing merits detailed consideration", and that "cities such as Stockholm, San Francisco, Manchester and Auckland, with populations similar to or smaller than most Australian capital cities, have taken this step" (Department of Transport and Regional Services, 2006, pg20 and pg. 52).

1.4 Methodology

This research has two distinct but connected components. One component is theoretical and literature based, and the other is empirical and qualitative. Throughout the course of the

or has none of these characteristics. The point being made is that, in absolute terms, Sydney is assumed to be a suitable candidate for a road pricing scheme.

research, the two had a cyclical relationship: each prompted greater or more specific enquiry in the other. The theoretical and literature based component focussed broadly on the concepts reflected in the first two substantial sections of this paper; road pricing theory, and notions of political acceptability.

The “combined approach” to research where quantitative and qualitative methodologies are used in parallel is appropriate for a research topic such as the one addressed here as it reflects a mainstream approach to problems of policy, where “public sector researchers use qualitative and quantitative research methods in generally equal proportions”, whereas “academic researchers still [generally] favour adopting quantitative approaches” (McNabb, 2008, pg. 12). Indeed this apparent disjoint in approaches to knowledge creation, if true, may already go some way to explaining the same disjoint in what the academic world supports and what the public sector exercises, a prime example being road pricing policy.

The research identified a number of existing quantitative studies into public and political acceptability of road pricing strategies in other contexts. Although a robust meta-analysis of such studies would be ideal, various limitations of the project had to concede to one major disadvantage of the meta-analytical process: “simply the amount of effort and [most pertinently for this project] expertise it takes” (Lipsey and Wilson, 2001, pg. 7). Such studies do offer value to a discussion of the acceptability problem or road pricing in Sydney, and so rather than disregard them, a ‘content analysis’ approach was taken, “by objectively and systematically identifying specified characteristics” of sample studies (McNabb, 2009, pg.12). McNabb (2009, pg. 12) notes that it is “nearly impossible to avoid interjecting some researcher bias into this method of analysis”: an unfortunate but necessary limitation of the present research.

The empirical component of the research took the form of nine semi-structured interviews with individuals from a variety of backgrounds or perspectives. Although the sample of interviewees was not large, they were approached such that views were collected from:

- Government (state and federal levels of government)
- Peak bodies
- Private enterprise
- Academia
- Political spheres

Within the broad grouping of “Government”, individuals were consulted that could be further distinguished as road-pricing subject matter experts, policy development specialists, and policy strategists. The diversity of interviewees is important, as Laurel (2003, pg. 148) notes: “we often use expert interviews when studying a category, and we find that our most productive and enlightening experts are outside the category. Their perspectives and frame of reference are unique – exactly what we need to challenge more entrenched thinking”. For a more detailed account of the interviewees, please refer to Appendix 1.

Schematically, the research followed the following process:

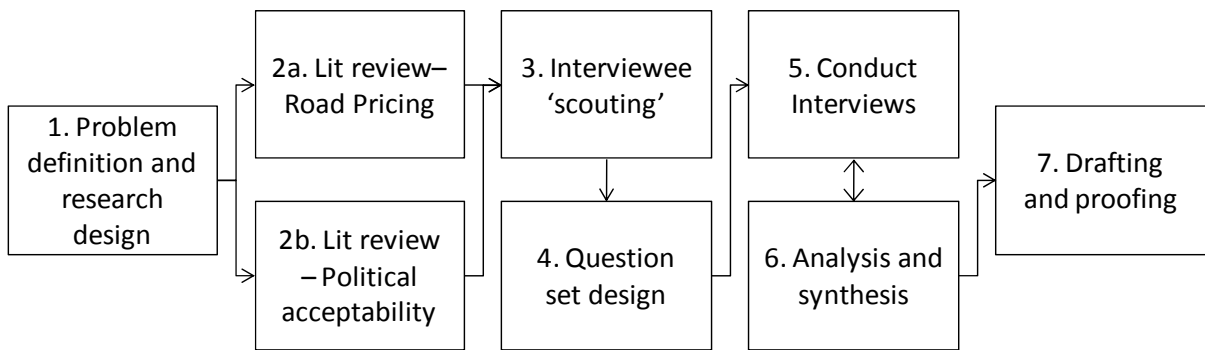


Figure 1: Phased research methodology
Adapted from McNabb (2009, pg. 11, 19-23)

1.4.1 *The Qualitative Approach*

A qualitative approach may be unconventional in the field of transport studies. Traditional research practices in the field include travel surveys, stated and revealed choice experiments and applied choice analysis (Hensher, Rose and Greene, 2005; Stopher and Stecher, 2006; Bliemer, Rose and Hensher, 2009), all of which have a far stronger quantitative approach and intuitively reflect the largely technical nature of the field of transport studies (or fields within transport studies).

However transport research within the context of a transport policy process is far less black-and-white. As Meyer and Miller (2001, pg. 41) state, “understanding the nature of alternative decision-making processes and the needs and capabilities of those who participate in them are thus prerequisites for the development of an effective transportation planning process”. This point is emphasised by Button and Hensher (2005, pg. 1), who posit that “transport policy

formulation is far from institution-neutral”, “is something that varies with time and place” and “depends upon the underlying political and philosophical underpinnings of the society concerned” where “what scientists consider to be rational choices give way to beliefs, norms and prejudices that are inherent in the institutions of the country”.

If these beliefs, norms and prejudices of institutions are so influential in transport policy, and if “the main obstacle to road pricing is political much more than operational” (Albalade and Bel, 2009, pg. 964) then research approaches that seek to capture these beliefs seems more compatible with the field of transport research and policy than initially apparent. A very similar approach has been taken for the case of Edinburgh road pricing policy failure by Rye, Gaunt and Ison (2008).

1.4.2 Case Study Learning

This research draws on case studies of road pricing strategies throughout the world, and in turn explores the conditions for that policy in a ‘new’ context, in doing so presenting a case study itself. Case study research is most appropriate when research topics are “defined broadly”, “cover contextual or complex multivariate conditions and not just isolated variables”, and “rely on multiple and not singular sources of evidence” (Yin, 2003, pg. 1). The acceptability problem of road pricing strategies, and particularly in a Sydney context, is precisely that. As noted above, the research is exploratory in nature, and as such the experiences of other cities or governments in implementing a road pricing scheme is highly relevant. A similar comparative case study method has been adopted, in road pricing acceptability research by Albalade and Bel (2009) and de Palma, Lindsey and Niskanen (2006), as well as numerous single-case case studies.

While much case study literature focuses on the ‘success case method’, which focuses on documenting, presumably for the purposes of replicating, actions or decisions that have resulted in or contributed to a desirable outcome, this research will also examine cases of failure: where road pricing has been debated but decided against; trialled but not continued; or implemented and later dissolved. Mustafa (2008) gives a comprehensive account of the benefits and pitfalls of case study method, and the similarities and complementary nature it can have with more quantitative methods. The present research may also act as a case study in the same body of literature.

2 Road Pricing

In very general terms, the objectives of pricing of vehicles including passenger vehicles for their road use fall into two non-mutually exclusive categories: changing the travel behaviour of motorists, and a raising revenue or funding exercise (sometimes specifically for road or transport projects) (Albalate and Bel, 2009, Schweitzer and Taylor, 2008). While potentially an important consideration for governments, the latter is not at the fore of the economic purists mind. The fundamental premise is that “if road pricing is to be effective ... some trips will be changed in mode, others in time, some others in space, and possibly some others cancelled altogether” (Viegas, 2001, pg. 290).

This section will give an outline of the general principles of road pricing, some considerations of its place within a broader context of transport planning and public policy, and review case studies of attempted road pricing implementation from international examples.

2.1 *Efficient Markets*

Market efficiency is frequently cited as a prominent virtue of road pricing, or the pricing of transport more generally to reflect overt and covert costs. Goodwin (1995, pg. 149) quite bluntly surmises the collective expert opinion on road pricing: “charging people something for the external costs of congestion and environmental damage will be more efficient than not charging them”. Albalate and Bel (2009, pg 963) present an academic but simple premise: “traffic is efficiently allocated when the price paid by each road user equals the marginal cost faced by the rest of users”.

The efficiency of pricing mechanisms is often exalted by the economic literature without addressing the “why” beyond it being a matter of economic principle (Schade and Schlag, 2003). Parry (2002) provides great insight into the observable outcomes (in terms of congestion reduction) of efficiencies in transport pricing by comparing a variety of policy options within road pricing. From a political acceptability perspective, this is crucial, and often overlooked, as Parry (2002, pg. 354) determines that “a congestion tax imposed uniformly across freeway lanes can generally achieve more than 90% of the maximum efficiency gains under ‘ideal’ congestion pricing”. This has significant implications when implementation costs of various schemes are factored into an acceptability model (Forckenbrock, 2005; Oberholzer-Gee and Weck-Hannemann, 2002).

In investigating the road pricing experience of Lyon, France, Raux and Souche (2004, pg. 194) also question the “universal validity of marginal cost pricing”, suggesting that, in order to be both acceptable and practicable, “pricing may have to deviate from the marginal cost principle” but, like Parry and the majority of the related literature, emphasises that this compromise “does not cast doubt on the pricing principle per se”.

2.2 Road Pricing for Different Externalities

Pricing measures are frequently endorsed as an efficient technique to “internalise the external costs” of transport, including (perhaps *especially*) road transport (Kinnock, 1995). Most prominently in the literature, road pricing is advocated as “an appropriate technique for alleviating traffic congestion and reducing environmental impacts” (Jaensirisak, Wardman and May, 2005, pg. 128). The latter is often divided into various sub-externalities: air pollution, greenhouse gas emissions, and noise, among others (Button, 1990). Road safety is increasingly included in the spectrum of externalities that could potentially be addressed by road pricing policy (Calthrop and Proost, 1998). Roson (2000) also puts forward a model for including the availability and value of public transport alternatives in a private vehicle charge. This section will review the theory behind road pricing as it relates the two most prominent externalities in the road pricing literature: congestion and environmental factors.

2.2.1 Congestion

Congestion reduction is the most commonly cited objective of road pricing schemes. As will be discussed in greater depth in Section 3, problem perception is one of the greatest prerequisites for policy acceptability (Schade and Schlag, 2003; Gaunt, Rye and Allen, 2007), and congestion is arguably the easiest problem to observe from the perspective of the average motorist. Road traffic congestion costs have been estimated at USD\$9.3 billion in Los Angeles in 2005, USD\$7.3 billion in New York in 2005 (Albalade and Bel, 2009), and AUD\$3.5 billion in Sydney in 2005, and AUD\$3.0 billion for Melbourne in 2005 (Council of Australian Governments, 2006). Road traffic congestion is an observable problem in most of the largest cities in the world (Taylor, 2002).

These estimations of the economic cost of road congestion provide an indication, an order of magnitude, of the total additional price imposed upon road users. In order for road pricing to be effective in ameliorating (to some extent) road congestion in Sydney, revenues from road pricing would have to exceed \$3.5 billion (in 2005 dollars, at 2005 congestion levels). As

approximately 71.5492 billion vehicle kilometres were travelled on NSW roads in 2005 (RTA, 2005a; RTA, 2005b), this would equate to a mean price per kilometre of \$0.049².

2.2.2 *Environmental Factors*

The negative environmental effects from transport are primarily air pollution, greenhouse gas emissions, and noise pollution (Calthrop and Proost, 1998; Kinnock, 1995), and are most often thought of in terms of detriment to human health (Parkhurst, 2004), however can also be measured in terms of localised vegetation changes (Rayfield et al., 1998) and even visual amenity (Wachs, 1993). While the measurement of the economic costs of externalities is consistently difficult, measuring the cost of environmental externalities has seemed particularly so, as standardising measurement of vegetation loss or noise impacts – for example – is far more complex than measuring or extrapolating hours spent in traffic, as is attributing a value to any measure. The exact impact of the burning of a litre of petrol may be relatively easier to quantify, but the inclusion of this measure into a pricing scheme – beyond the existent fuel levy (if indeed it is required beyond the fuel levy) – is still an obstacle.

In terms of the acceptability problem, this difficulty in quantifying the economic costs of environmental impacts from road use is significant in two ways. As discussed in Section 3.1.1 in greater depth, the perceived effectiveness and efficiency of the measures is important to public acceptability of road pricing measures, as is articulation of objectives or policy outcomes (Schade and Schlag, 2003). In the case of environmental impacts, if the value of these externalities cannot be readily determined, the ‘perceived effectiveness and efficiency’ is strongly undermined, which in turn compromises the ability of policy makers to articulate environmental benefits as a policy outcome.

² Note that this figure is meant only to provide an order of magnitude. The vehicle kilometres travelled (vkt) is taken from the entire state, whereas the economic cost is only for greater metropolitan Sydney, and as such the figure could be expected to be considerably higher. Also, this figure would represent the mean price, however in reality some users may pay more (those who travel in particular areas, at particular times, or in particular vehicles etc.) than others through price differentiation. This price represents the price for congestion only – internalising environmental and safety (or any other externality) costs would be additional to this.

2.3 Asset Management

Road use has an effect on the physical integrity of the road asset. In order for the road asset to reach its full economic life, maintenance must be undertaken – the amount of maintenance required is directly proportionate to the amount of use of the road. As Adam Smith (1937, pg. 683) so clearly articulated, “When the carriages which pass over a highway or a bridge ... pay toll in proportion to their weight ... they pay for the maintenance of those public works exactly in proportion to the wear and tear which they occasion of them. It seems scarce possible to invent a more equitable way of maintaining such works”. Although Smith wrote over seventy years ago, the principle still applies.

The need for marginal pricing in relation to asset wear – and therefore maintenance – lies in the current source of funding for that maintenance. In NSW, road maintenance is funded through a Treasury allocation to the Roads and Traffic Authority (NSW Treasury, 2009). This means that the money that is spent on road maintenance is sourced from general state taxes or commonwealth grants: either way it implies that “the cost burden is transferred from users to non-users” (Schweitzer and Taylor, 2008, pg. 809).

While the provision of public infrastructure (the capital component) can justifiably be a general public expense – as it provides everyone with the *opportunity* to use a road – the costs incurred as a result of actual use (the recurrent component) should rightly be carried by those who cause them. The externality in this sense is not time, as it is with congestion, or respiratory irritations, as it may be with environmental impacts, but on the forgone benefit of taxation dollars that could otherwise be used to provide broader public value.

Asset management arguments may present a way of framing the problem and potential solutions of road pricing such that many of the elements of acceptability (see Section 3) are satisfied, as “policy goals and objectives are established through consideration of a number of factors, including the economic and social impacts of transport infrastructure-related decisions” (Stalebrink and Gifford, 2005). In essence, thorough Transportation Asset Management³ practices translate policy decisions into observable services and results, which

³ This concept is referred to as Transportation Asset Management in Stalebrink and Gifford (2005) in Button and Hensher (2005), and abbreviated to TAM. In the parlance of NSW Government, TAM stands for *Total* Asset Management, yet represents exactly the same set of principles, tools and systems. This variation may stem from the fact that the TAM approach is

may be a method of demonstrating benefits of road pricing schemes to both the public and decision makers that has not been explored in great depth in New South Wales.

2.4 Road Pricing Case Studies

The sample of urban areas from which to draw empirical analysis on road pricing is not large. Indeed, “while economists see road pricing as an attractive policy tool, most attempts to introduce economic incentives of this type in the transportation sector have failed” (Oberholzer-Gee and Weck-Hannemann, 2002, pg. 358). Nonetheless, there is value in exploring the features of pricing models, the institutional environment and the broader context of cities that have successfully and unsuccessfully attempted road pricing implementation, identifying patterns between them. Those elements that are found to be contributing to the success or failure of a case study will be synthesised into a discussion of road pricing in Sydney in Section 5.

Case studies on those cities that have successfully (a subjective and relative term) implemented a road pricing scheme are abundant in the literature. Given the relatively small number of cities to have implemented road pricing, the cities that are studied tend to fairly consistent: London, Singapore, Stockholm and the three Norwegian cities dominate the case study literature. In particular, Albalade and Bel (2009) assess these cities according to the framework described above, and de Palma, Lindsey and Niskanen (2006) assess the same cities (as well as Brussels and Helsinki) in a similar (although not exactly the same) manner. The cases do not need repeating here, and as such this section will focus on three cases of failure (again, relative and subjective, and time-specific): New York, Edinburgh and Manchester. A brief summary of the elements of the success cases that contributed to their success will be given.

Lindsey (2006, pp. 221-231) presents what are considered to be the key reasons for the political success of the London experience. Among fairly intuitive requisites such as “a robust scheme”, “sound research and analysis”, “cooperation” and “adequate funding”, the importance of a single transport authority, and the beginning of a new electoral cycle with a new leader and a relatively large margin are collectively described as “a set of circumstances that made it easier for him [Mayor Livingstone] to pursue such a radical policy than those that

used across government in non-transport sectors (such as health and housing), and as such the Transportation Asset Management moniker would be inappropriate.

would apply to the leaders of many other cities. The Executive nature of the London Mayorship is also noted as being of significance, as it means the incumbent “does not have to secure the (continued) support of other politicians through the approval and implementation of [their] plans”.

Singapore must, for obvious reasons relating to its political environment, be considered a unique case in the road pricing literature, however even though “one political party has dominated the government ... there are still some political barriers to effective pricing” (Christainsen, 2006, pg. 72). Nonetheless, the example of Singapore conjures some important points. Christainsen (2006, pg. 86-87) describes the ‘ideal’ model of road pricing, with highly differentiated prices applied broadly across the network with minimal transaction costs, as “market socialism”, where “prices being used to balance supply and demand” represents market aspects, and roadways, in general, remaining a nationalised industry being the socialist aspect. It is this balance – not a true dictatorship nor a truly socialist government – that may provide insight into some beneficial institutional arrangements for road pricing.

Stockholm is here considered a success case only because it eventually did implement a road pricing scheme, albeit a heavily compromised one from that which was originally proposed. The Stockholm scheme was greatly frustrated by the diversity of the political environment in Sweden, and therefore the need for complex coalitions to form majority government.

Ahlstrand (2001) notes that it was the articulation of the environmental benefits of the scheme that eventually garnered sufficient public acceptance for the scheme, despite the scheme being developed within government as a means of financing motorway expansion. The significance of environmental benefits to the Stockholm population may closely relate to the social norms described in Section 3.1.4. The Stockholm experience emphasises the power of the environmental lobby on a scheme that may nominally be focussed on congestion.

For consistency and simplicity, the case studies presented here will use an expanded adaptation of a simple analysis framework presented by Albalade and Bel (2009). The simple analysis framework, which examines road pricing schemes or strategies for their public or political acceptability rather than their technical or operational viability, “helps identify where the bases of support and opposition are likely to lie, and how strong the sentiment is likely to be either for or against [road] pricing” (Albalade and Bel, 2009, pg. 964). The three areas of

focus in the framework are Fee Structure, Revenue Uses and Investments and Other Policy Impacts, and Political Impacts.

Fee Structures relates to the amount charged, the method of collecting charges, and the degree of variability in a pricing scheme. Albalade and Bel (2009, pg 264) note that fee structures are relevant in the acceptability discourse as “each city has its own characteristics and mobility patterns”, and that “projects based on other cities plans and technologies can be seen as non-credible by the public and by lobby groups, thus affecting acceptability”. Equity issues are also frequently cited as critical in the acceptability argument (Schade and Schlag, 2003). Fee structures can therefore also considerably affect acceptability, as broad-based, user-pays charging techniques have been shown to lessen the inequity (but not entirely remove it) in transportation costs compared to blunt, single facility tolls or non-user-pays methods of financing road infrastructure (such as from general taxation funds) (Schweitzer and Taylor, 2008).

The use of revenues derived from road pricing schemes is almost unanimously cited in the literature as a key aspect of public acceptability. In populations where taxation (transport related or otherwise) is already considered to be too high, or value is not seen to come from taxation levels, pricing may struggle to gain support if it is considered to be “just a tax increase by another name” (Harrington, Krupnick and Alberini, 2001, pg. 103). The ‘earmarking’ of road pricing revenues for particular uses has been shown improve acceptability, in a multitude of studies, with many agreeing that the provision of extra public transport services and enhanced road infrastructure provides a greater positive impact than does using revenues to offset other tax reductions (Harrington, Krupnick and Alberini, 2001).

‘Political impacts’ is used by Albalade and Bel (2009) as a catch-all term to describe three discrete concerns: activism within a community and the fact that smaller groups of ‘losers’ from any given policy are more easily organised and readily vocal than a large group of ‘winners’; degrees of democratic government and the potential for divisive policies to be victims of partisan politics; and the layers of government involved in decision making. The latter of these three concerns will be addressed in greater depth later, as it emerged as a potentially important but under-represented issue in the literature, and where there were strongest differences of opinion in respondents and the literature.

2.4.1 New York

Schaller (2010) presents an in-depth case study of the New York experience of road pricing reform. The scheme was first proposed as part of Mayor Michael Bloomberg’s sustainability plan for New York in 2007. The plan was granted provisional funding by the United States Department of Transportation, conditional on the scheme being passed through the New York state legislature by April 2008. Despite broad support from a variety of interest groups, including the modification of the scheme to incorporate community input, the scheme stalled at the legislature and the window of opportunity for the scheme elapsed. New York is here referred to somewhat unflatteringly as a “failure” case study, however it should be noted that road pricing is still on the political agenda in New York, and this case study refers to a particular episode in this debate: there still very much exists the possibility of road pricing of some nature in New York.

2.4.1.1 Fee Structure

The respective fee structures of the two proposed New York schemes are outlined in the Figure 2 below. The Traffic Congestion Mitigation Commission proposal was the result of extensive community consultation on the original (PlaNYC) scheme. Notable changes following the community consultation include a smaller geographic area (northern boundary of the charging zone amended from 86 Street to 60 Street), and fewer opportunities to charge (in-bound charging only). This is not surprising, as both amendments can only serve to make the scheme less expensive for some users, but not more expensive for any. Such tempering of a proposed scheme is to be expected as more, and more diverse, stakeholders are involved in the planning or consultation process.

	PlaNYC (April 2007)	Traffic Congestion Mitigation Commission (Jan. 2008)
Congestion Charge	\$8 daily fee for cars \$21 daily fee for trucks - \$7 for low-emission trucks \$4 for cars travelling solely within the zone and \$5.50 for trucks	Same as PlaNYC, as well as \$1 surcharge for cash payers
Northern Boundary	86 Street	60 Street
Hours	6:00am to 6:00pm	Same as PlaNYC
Direction Charged	In-bound, out-bound, and intra-zonal	In-bound only
Free Bypass	Through trips using FDR drive and Route 9A not charged provided they do not enter surface streets	No free bypass for through trips
Toll offsets	For E-ZPass users, the value of all tolls paid on bridges and tunnels in New York City (including Hudson River crossings) would be deducted from the fee up to \$8 (cars) or \$21 (trucks). No offset for cash payers	Same as PlaNYC
Exemptions	The charge would apply to all vehicles, except emergency vehicles, transit vehicles, vehicles with handicapped license plates, medallion taxis, and neighbourhood car services (radio cars)	No recommendation

Fee payment	E-ZPass; drivers without E-ZPass would have their license plates recorded by cameras and payments could be made through the internet, via telephone call centre or at participating retail outlets	Same as PlaNYC
-------------	--	----------------

Figure 2: Fee Structure of proposed New York congestion pricing schemes.

Source: City of New York, 2007, pp. 88-91, and Commission on Metropolitan Transport Authority Financing, 2008, pp. 63-64, both cited in Schaller, 2010, pg 269.

2.4.1.2 Revenue Uses

Detailed modelling and analysis of the proposed Traffic Congestion Mitigation Commission scheme projected net revenues of the pricing scheme (after implementation and operational costs) of USD\$491million per annum. These funds were to be allocated to a “lock box” account which was to be dedicated to public transport enhancements, but not road projects. The services to benefit most from the additional revenues were expanded local and express buses in the boroughs immediately neighbouring Manhattan, and increased frequency of subways services within Manhattan (Schaller, 2010, 266-268).

2.4.1.3 Political Impacts

At first glance, the New York scheme enjoyed almost unprecedented support from diverse stakeholders: the amended 2008 Traffic Congestion Mitigation Commission’s scheme “was supported by Mayor Bloomberg, Governor David Paterson, a coalition of 135 civic, business, labor, environmental and advocacy groups and the editorial boards of all four major newspapers” and “received surprisingly little opposition from other suburban officials or groups” (Schaller, 2010, pg. 268).

The condition placed on the funding (\$354 million) of the scheme by the United States Department of Transportation was that it pass through the state legislature by April 2008. The state legislature consisted of representatives from across New York State, including elected officials from the metropolitan boroughs immediately neighbouring Manhattan who the most vehemently opposed to the plan: Queens and Brooklyn. Schaller (2010, pg. 269) importantly notes that these two boroughs “are more auto-dependent than neighborhoods closer to Manhattan and have the least rapid or convenient transit access to Manhattan jobs”. It would seem that the transit enhancements to be funded by road pricing revenues were not sufficient to overcome the equity and viable alternative concerns of these stakeholders. As a result, despite the Mayor’s office and the Metropolitan Transport Authority satisfying the needs of a majority of interest groups with the specifications of the scheme and the process of implementation, a minority of interest groups were able to stall the formal endorsement of the

proposal until the funding opportunity had elapsed; in essence turning a public acceptability issue into a cost viability one.

Assessment area	Views of congestion pricing supporters	Views of congestion pricing opponents
Societal impacts	Reduces traffic congestion Funds better mass transit Reduces air pollution Furthers the goals of sustainability, urban quality of life Reasonably discourages often-unnecessary driving	Congestion pricing targets “working person” driving to work, medical appointments, etc. Pricing represents social engineering by Manhattan-based elites Little impact on Manhattan traffic (trucks and taxis seen as main cause of congestion in central business district) Revenue will be diverted from the MTA MTA cannot be trusted to use new revenue for better service
Impact on transit riders	Funds better transit Transit improvements will absorb increased ridership from drivers switching to transit	Trains and buses will be more crowded
Impact on auto users	Drivers will have reasonable transit alternative Will benefit drivers by reducing traffic congestion	Transit is not and will not be viable alternative to driving Value of travel time savings (if any) not worth the \$8 fee

Figure 3: Summary of views on congestion pricing in New York City.

Source: Schaller, 2010, pg. 269.

2.4.2 Edinburgh

The city of Edinburgh, Scotland, had spent over a decade debating the need for a congestion charge, and what a charging scheme may look like, by the time the proposal was overwhelmingly defeated by public referendum in 2005 (Rye, Gaunt and Ison, 2008). Gaunt, Rye and Ison (2008) present an in-depth account of the political experience of the Edinburgh congestion charge.

2.4.2.1 Fee Structure

The fee structure of the proposed Edinburgh scheme is outlined in the table below. Many parallels can be drawn to the London scheme, especially in the technical details (ANPR technology) with a notable exception being that travel within a single cordoned area was free, unlike the London Licence Area Scheme. Also of note is the relatively small fee charged for travel across either or both cordons. This may reflect the smaller population, geographic area, and therefore potentially congestion levels, of Edinburgh, as well as socio-economic profiles, where £2 represents a relatively larger fee in Edinburgh than it may in the global finance centre of London.

	Inner cordon	Outer cordon
Congestion Charge	£2 per day charge for crossing one or both of the cordons.	
Hours	7:00am to 6:30pm, Monday to Friday	7:00am to 10:00pm, Monday to Friday
Direction Charged	In-bound only	In-bound only
Free Bypass	No free bypass, however travel solely within one cordon area was free (i.e. charge only incurred for <i>crossing</i> cordon, not being within area)	
Toll offsets	None	None
Exemptions	The charge would apply to all vehicles, except emergency vehicles, transit vehicles, vehicles with handicapped license plates, motorcycles, and city car club vehicles.	Same
Fee payment	Automatic Number Plate Recognition technology used to track vehicles crossing of cordons. Pre-payment with transport authority by phone, internet, SMS or at retail outlets.	

Figure 4: Fee structure of the proposed Edinburgh congestion charge.
Source: Rye, Gaunt and Ison, 2008.

2.4.2.2 Revenue Uses

Economic modelling of the proposed Edinburgh scheme forecast net revenues “in the region of £760m ... over a 20-year period”, all of which, as part of the proposal, were to be hypothecated “for investment in public transport improvements”. Two interesting stipulations (among others) accompanied, as directed by the Scottish Executive (the equivalent of a national legislature, with authority of oversight for local council issues): public transport investment would have to precede the congestion charge (in effect requiring the funds to spent before they had been collected); and the revenues from the scheme to be directed to public

transport enhancements had to *in addition to* current and planned transport expenditure, not a substitute for it (Rye, Gaunt and Ison, 2008, pp. 646-647).

2.4.2.3 Political Impacts

Unlike New York, where public acceptance was achieved but political partisanship stifled the proposal, Edinburgh had a polity that was eventually reasonably supportive (or perhaps *sufficiently* supportive) of the proposed scheme, but was unable to convince the electorate to support it. Unlike the legislative defeat – a political vote – in New York, the Edinburgh was overcome by a referendum – a public vote.

The complexity of the administrative burden in Edinburgh, and Scotland more generally, is surprisingly different to its United Kingdom counterpart London. The relationship between local authorities and the national executive, even on apparently local matters – where local authorities carry the burden of developing and promoting policy but the national executive has the power of veto at the “in-principle”, “in detail”, and “final” stages – “added time, expense and complexity to the process”, which may have in turn resulted in the disenchantment associated with “consultation fatigue” (Rye, Gaunt and Ison, 2008, pg. 646; Malyshev, 2006, pp. 287-288).

The reasons cited for the failure to gain public acceptance of road pricing reform in Edinburgh resonate strongly with the acceptability literature: the two factors that were most influential in the unsuccessful outcome were a “disagreement on the objectives for the scheme and whether it would achieve them” and “public (mis-)understanding of how it was supposed to function” (Rye, Gaunt and Ison, 2008, pg. 659).

2.4.3 Manchester

The city of Manchester, in North-West England, is one of the more recent examples of failure to implement road pricing strategies. The proposal enjoyed initial support but as confusion around the details of the scheme increased, support for the plan decreased. The scheme had technical similarities to the Edinburgh model (two concentric cordons) however the political experience seems to more closely align to the New York experience, as implementation was contingent on capital from a higher level of government (Guardian News, 2007) As Manchester is a relatively recent case, no comprehensive analyses of the process or

experience can be found at this stage: information comes primarily from a variety of news sources and interest groups.

2.4.3.1 Fee Structure

The fee structure of the proposed Manchester congestion charge is outlined in the table below. The proposed Manchester scheme would have differentiated price more than many other ‘failure’ cases (as well as many ‘success’ cases); differentiating by time, location (presumably as a proxy for congestion levels), but interestingly not by vehicle type. The Manchester scheme also proposed what is arguably the most sophisticated charge collection mechanism.

	Outer cordon	Inner cordon
Congestion Charge	£2 per crossing	£1 per crossing
Hours	7:00am to 9:30am, and 4:00pm to 6:30pm Monday to Friday	Same as outer cordon
Direction Charged	In-bound only in morning peak, out-bound only in evening peak	Same as outer cordon
Free Bypass	No free bypass, however travel solely within one cordon area was free (i.e. charge only incurred for <i>crossing</i> cordon, not being within area)	
Toll offsets	None	None
Exemptions	The charge would apply to all vehicles, except motorcycles, taxis and hire cars.	
Fee payment	“Tag and Beacon” system – fee automatically charged to an account or credit card at the time of crossing. Pre-pay provisions for occasional drivers or for visiting vehicles from outside Manchester.	

Figure 5: Fee structure of the proposed Manchester congestion charge.

Source: Greater Manchester Future Transport, 2008.

2.4.3.2 Revenue Uses

The Manchester proposal was part of a broader bid for funds from the national Department for Transport’s (DfT) Transport Innovation Fund. At the time of the bid, the DfT was offering a total of £3billion in grants for metropolitan areas to implement transport improvements. The DfT was also offering government loans, secured against future earnings of road pricing schemes. This presented a great financial opportunity for the Association of Greater Manchester Authorities (AGMA), as revenues would have exceeded the income directly from the motorists (Guardian News, 2007)

The proposal was to dedicate all revenues from the scheme to public transport enhancements, with notably no mention of any road enhancements (Greater Manchester Future Transport, 2008). The specific expenditure of this revenue was supposed to be broad across public and active transport: “More buses, double-length trams and extra rail carriages ... park & ride spaces, more cycle routes, a cycle hire scheme ... 120 more Yellow School Buses ... More bus lanes and segregated busways, a second Metrolink city centre crossing” (Clean Air Now, 2008)

2.4.3.3 Political Impacts

The existence of multiple, individually represented boroughs within a single metropolitan area, similar to New York, appears to have been the ultimate downfall of the Manchester proposal. The bid to the national DfT was made by the highly factional AGMA, rather than the all-encompassing Greater Manchester County Council (for instance). The disunity that existed within the AGMA as result of perceived or actual equity issues around the scheme based on respective geographic circumstances undermined the strength of the plan that was sought to be developed.

The social activism and organisation of interest groups strongly in favour or against the proposed scheme is also more widely documented than for other cases of implementation failure. News reports demonstrate a parallel debate occurring in Manchester between partisan political parties, borough representatives, but notably more so than other cases, between organisations of residents, business and labour groups. The interesting point here is not that there were groups opposed to the scheme, as these often to be expected, but that there were groups such as Clean Air Now and United City that were vocally in favour of the reform (Clean Air Now, 2008; Binns; 2008). This somewhat defies King, Manville and Shoup's (2007, 114) assertion that "no one will be so much better off that they will take the lead to implement the program". The complex and multiple political arenas that the road pricing debate was carried out in resulted in a public referendum at the end of 2008 where a significant majority voted against the proposal.

The acceptability of road pricing: An application of a theoretical and analytical framework to the realities of decision making in Sydney
Palmer

City		"Success" Cases				"Failure" Cases		
		London	Singapore	Stockholm	Burgen/Oslo	Manchester	New York	Edinburgh
Feature	Implementation	2003/ extension 2007/ removed 2010	1975, 1998 electronic upgrade	2006	1986/1990	Referendum 2008	Legislative debate 2008	Referendum 2005
	Charging type	Cordon (Camera controlled)	Area Licensing Scheme	Two cordon lines	Toll cordons	Two concentric cordon zones	Area licence scheme single facility tolls	Two concentric cordon zones
	Covered size	22km ²	7km ²	35km ²	-	Approx 80miles ²	Approx 40km ²	-
	Hours charged	7:00am-6:00pm weekdays	7:30am-7:30pm Mon-Sat	24hrs weekdays	6:00am- 10:00pm/24h	7:00-9:30am, 4:00- 6:30pm Mon-Fri	6:00am-6:00pm 7 days	7:00am-10:00pm
	Toll differentiation	Non-varying fee	Time and vehicle varying	Time varying	Non-varying fee	Time, location (congestion)	By vehicle type	Varying by geographic area
	Discounts and exemptions	City residents, motorcycles, emergency vehicles, public transport	Vehicles entering 10:00-12:00am, vehicles with >3 passengers	Traffic from Lidingo and Esseingeleden, emergency and 'green' vehicles, motorcycles,	-	Motorcycles, taxis and hire cars only.	Emergency vehicles, public transport vehicles, Disabled persons	None detailed
Revenue Uses	Revenue/cost ratio (2008)	2.04	508	3.45	Unknown	-	-	-
	Revenue use (hypothecation)	Road works, public transport enhancements, road safety, active transport	Not disclosed	Public transport projects (social democratic government) arterial roads (conservative government)	Road projects only	Public transport enhancements only.	Dedicated to transportation investments	All revenue to be hypothecated to public transport and road projects, and to be treated as "additional".
Political Impacts	Impact on congestion	30% reduction long run, recent increase in congestion	40% reduction, 15% reduction electronic tolling	19% reduction in congestion	Negligible effects	15% reduction in inner-city congestion	30% reduction forecast (Manhattan)	21% reduction on inner- city, 9% overall (forecast)
	Impact on pollution	16% decline in CO2 emissions	Unknown	8-14% reduction in emissions	Unknown	-	-	Not forecast
	Political levels involved	Municipal/metropolita n (Greater London Authority	Only one level in country	National and municipal governments	National and municipal governments	Local/municipal and national	Metropolitan, Boroughs, State Legislature	Municipal/metropolitan and national
	Political support	Government support (Labour) Opposition against (Conservatives)	Government support (pseudo- dictatorship)	Government support (democratic) Opposition against (conservatives)	Government and opposition support	Inner-city boroughs,	Metropolitan support, Boroughs against	Government support (Labour) Opposition against (conservative)
	Public opinion	Support	Acceptability gained	Support in city of Stockholm, opposed in surrounding cities	Against	Very divided, highly vocal and political.	Majority support, with reservations as to revenue uses	In-principle support, neighbouring areas against.

Figure 6: Summary of road pricing features and experiences

Sources: Framework and "success" data from Albalade and Bel 2009, "failure" cases data from Rye, Gaunt and Ison (2008), Schaller 2010, Greater Manchester Future Transport, 2008.

3 The Acceptability Problem

The barriers to road pricing policy and implementation are far political than technical. Road pricing strategies, in many various forms and in many different countries, are “frequently discussed and debated, but seldom implemented” (Gaunt, Rye and Allen, 2007, pg. 86). As charge collection technology has become increasingly sophisticated, accessible and relatively affordable, so too have the technical feasibility related reasons for non-implementation become fewer. Acceptability, as discussed in the literature, is comprised of various elements, and can be thought of in terms of political acceptability and public acceptability: two concepts that are clearly related but should not be conflated.

This section will distinguish between political acceptability and public acceptability, and will summarise elements of each that have been identified in the literature. It will seek to outline those “more controversial aspects potentially ignored of or left for future discussion” that result in “the outcome of [the political bargaining] process not being ‘optimal’ in a technical sense” (Miller and Meyer, 2001, pg. 64). These elements may be generic to the public policy environment, specific to transport policy, or specific to road pricing, as literature relating to each has been consulted. Also, the dominant phraseology for concepts in the literature has been adopted: where different articles clearly address the same issue but by different names, the most prevalent name has been used here.

These concepts are drawn from a literature on theoretical assessments of road pricing acceptability (Viegas, 2001; Oberholzer-Gee and Weck-Hannemann, 2002; Albalade and Bel, 2009; Parry, 2002; Roson, 2000); empirical research on acceptability but not limited to a specific context or case (Jaensirisak, Wardman and May, 2005; Harrington, Krupnick and Alberini, 2001; Schade and Schlag, 2003; de Palma, Lindsey and Niskanen, 2006; Schweitzer and Taylor, 2008); and a literature of acceptability in specific road pricing case studies (Roux and Souche, 2004; Ahlstrand, 2001; Gaunt, Rye and Allen, 2010; O’Mahony, Geraghty and Humphreys, 2000; Schaller, 2010; Richards, 2006).

The cumulative findings from Section 3 below will be used as the basis for structuring Section 4, and the relevance and implications of each to Sydney will be addressed in Sections 4 and 5. At this point, a theoretical understanding of each element is being sought, and a comparative attribution of importance as derived from the literature.

Previous studies into the acceptability of road pricing have largely focussed on public acceptability, with an implicit assumption that public acceptability is synonymous with political acceptability – “The political acceptability of congestion fees remains a serious barrier to their wider use, and there is intense interest amongst policy makers in ways to make congestion pricing less objectionable to motorists” (Harrington, Krupnick and Alberini, 2001, pg. 88. Emphasis added by author). This research does not hold that assumption to be true in all circumstances: political acceptability is a complex set of issues of which public acceptability may only be one (Meyer and Miller, 2001).

Figure 7 represents various elements of both political and public acceptability collected from the literature. It does not represent a hierarchy - no single element of the acceptability is subordinated to another in importance or relevance; it merely demonstrates that public acceptability is a subset of political acceptability. Also, elements that are represented as being a component of public acceptability may also have a *direct* impact on political acceptability: problem perception, for instance, may strongly influence political acceptability of a proposal in and of itself, not only as it affects public acceptability. Indeed in such an example the perceptions of the nature or severity of a problem may be radically different between stakeholders.

The various elements of acceptability, both public and political, are also very much interconnected. Viegas (2001, pp. 293-294) demonstrates this in one short passage, linking notions of problem perception, policy objectives, communication, perceived effectiveness and equity issues, writing of economists and politicians: “the former have adopted a far more restricted set of the objectives, giving too much emphasis to the issue of efficiency, which are hard to understand and convey to the population, and paying less attention to the more visible aspects of effectiveness of congestion relief and equity”.

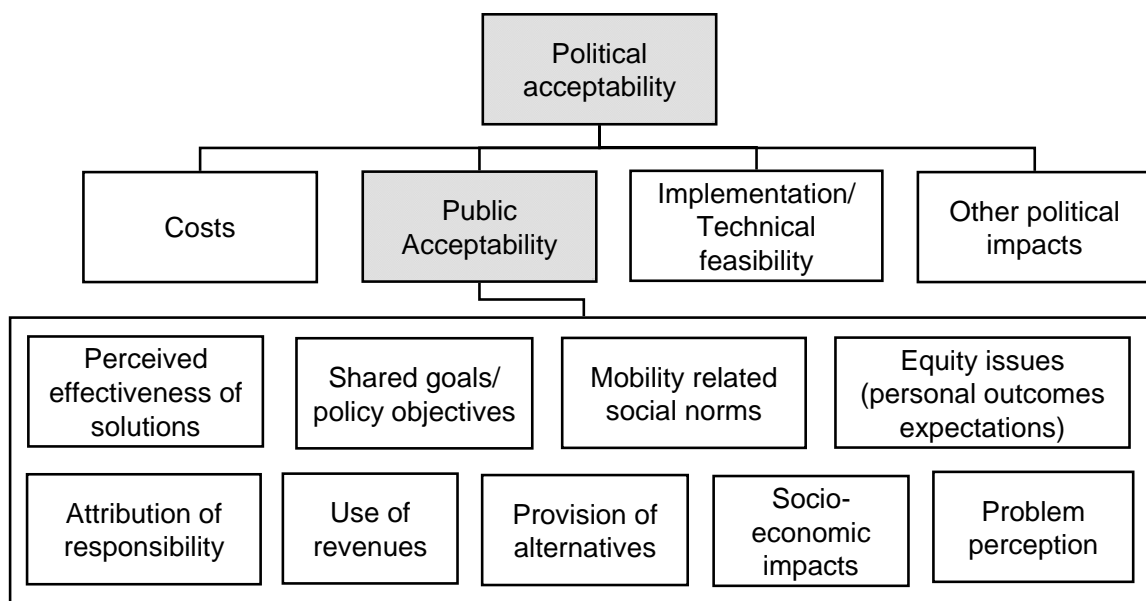


Figure 7: Elements of political and public acceptability

3.1 Public Acceptability

The diverse elements of public acceptability make up the majority of the broader acceptability literature. A description, analysis or attribution of importance has variously been sought to be given for these elements on the basis of political economy, population composition in terms of socio-economic, gender and racial characteristics and the nature of government.

Nonetheless, despite the diversity of approaches to the issue, “public aversion to congestion pricing is well-accepted among transportation planners and policymakers” (Harrington, Krupnick and Alberini, 2001, pg. 103).

3.1.1 Perceived Effectiveness of Solutions

Road pricing schemes must be considered to be effective and, to some extent also efficient, if they are to gain public acceptability: “lower perceived effectiveness usually correlate with lower acceptability of the particular measure, and vice versa” (Schade and Schlag, 2003, pg. 49). Viegas (2001, pg. 291) expands this notion to be the “quality of the mobility system”, where the effectiveness is not considered for the pricing scheme in isolation, but its contribution to the effectiveness of the transport network as a whole.

When travel time savings are used as a proxy measure for the perceived effectiveness of a solution, studies have shown that while “the coefficient of driving minutes saved is positive”, it is “not significant in the conventional levels” (Harrington, Krupnick and Alberini, 2001, pg. 102). Jaensirisak, Wardman and May (2005), similarly using travel time savings as a proxy

for scheme effectiveness, found a similar correlation, noting that the positive correlation was far less than that of the size of that charge itself. This finding is further reinforced by Schade and Schlag (2003).

Taking the findings of the literature considered simultaneously, the perceived effectiveness of a road pricing scheme can be seen to have positive effect on acceptability, with varying degrees of significance. The range of significance can nonetheless be interpreted as being between low and moderate: studies agree that while perceived effectiveness does influence acceptability, other elements can do far more so.

3.1.2 *Problem Perception*

The 'problems' that road pricing may seek to address are potentially many and varied, however the two main issues for which empirical work exists are congestion and environmental issues such as air pollution, greenhouse gas emission and noise. Interestingly, the focus on one of these issues or the other has been observed to influence the acceptability of road pricing schemes between cohorts: "exactly the groups perceiving traffic congestion as one of the biggest problems reject road pricing more strongly than groups perceiving mainly environmental problems" (Schade and Schlag, 2003, pg. 48) and "survey evidence indicates that this [motorists concerns with private vehicle use] is not congestion per se, but environmental issues: thus we would make the improvement of the natural environment the cornerstone of our program" (Oberholzer-Gee and Weck-Hannemann, 2002, pg. 367). Nonetheless, the general hypothesis is that "a high problem awareness will lead to increased willingness to accept solutions for the perceived problems" (Schade and Schlag, 2003, pg. 48).

This hypothesis is confirmed to some extent by Harrington, Krupnick and Alberini, (2001, pg. 102), who observe that "in all specifications ... the coefficient of rating of the congestion problem is positive and strongly significant", and by Jaensirisak, Wardman and May (2005, pp. 145-146), who note that "Acceptance levels ... are relatively high amongst those who perceive their current travel situation to be unacceptable, [and] those who perceive congestion and pollution problems to be very serious... The figure is a little lower for those with no strong dislike of charging. For those who do not have these attitudes, the acceptance levels are low."

Taken collectively, the literature suggests that problem perception – the awareness of the existence and severity of some negative product of vehicle use – does have a relatively strong and positive correlation with acceptability of pricing schemes, keeping in mind that specific ‘problems’ (congestion and environmental concerns) may provide variance within this element, as noted above.

3.1.3 *Clear and Valid Policy Goals*

Policy goals logically follow from perceived problems (above) however may also include revenue generation, and asset preservation. These policy goals may be seen to provide net benefits (and/or losses) to society, which may or may not be in conflict with mobility related goals of individuals. As an example, the net environmental benefits to society of reduced private vehicle use is in conflict with the mobility losses to some individuals who may be priced out of some journeys. The hypothesis here is that “a higher valuation of common social aims will be positively related to acceptability of road pricing, while pursuing personal gain maximising aims may lead to a refusal of road pricing” (Schade and Schlag, 2003, pg. 48).

The identification of survey respondents as being – bluntly – ‘selfish’ or ‘altruistic’, either directly or by use of some proxy is not prominent in the literature. Tenuously, it can be said that Jaensirisak, Wardman and May (2005, pg. 145) provide some support for this hypothesis in noting that “there is a very large difference [in pricing acceptability] between car users and non-car users”, however car use, or not, can be attributed to many more factors than simply altruistic or selfish tendencies. Similarly, the only parallel to be drawn from Harrington, Krupnick and Alberini (2001, pp.100-102) is that those who voted Democrat (traditionally, but also stereotypically, more socialist leaning) demonstrated far stronger support for pricing strategies than those who identified as Republican (traditionally, and also stereotypically, more individualist leaning). These should be considered indicative evidence only. The strongest evidence relating to this element of acceptability can be found in Schade and Schlag (2003, pg. 57), who demonstrate that the importance of societal aims has a far smaller predictive ability for pricing acceptability than most other elements: greater than only internal attribution of responsibility.

The articulation of intended outcomes, as described in Section 3.1.2, is highly predictive of pricing acceptability. Taken collectively, the literature does not provide great support for the notion that personal bias towards societal or individual benefits has a significant impact on

acceptability, with the most salient point being “the importance to politicians of taking into account the views of non-car users” (Jaensirisak, Wardman and May, 2005, pg. 145).

3.1.4 *Mobility Related Social Norms*

Mobility related social norms, such as the “American love affair with their vehicles” (Taylor, 2001, pg. 12) refer to the internal inertia of behaviours and habits, and to the pressures associated with the opinions and preferences of important or referent individuals (Jakobsson, Fujii and Garling, 2000). In practice this means the willingness of an individual to change their transport behaviours, and the effect of the opinion of a spouse, parent, or friend on transport choices. The hypothesis here is that “the more favourable the perceived social norm is with a presented pricing strategy, the stronger should be an individual’s acceptability of the strategy” (Schade and Schlag, 2003, pg. 48).

Little statistical evidence exists to measure the predictive ability of this element on overall acceptability. The only statistical study consulted to directly address the issue found mobility related social norms to be a very strong indicator of acceptability: “one surprising result is that social norm has the most predictive power of all variables ... a kind of striving for concordance between own preferences and the ones of important others has emerged” (Schade and Schlag, 2003, pg. 59). Mobility related social norms have also emerged in the cases. Most notably, Jaensirisak, Wardman and May (2005, pg. 148) observed consistently lesser acceptability levels of like-for-like pricing schemes for respondents in the city of Leeds compared to those in London, after accounting for other variables such as the provision of alternatives in those cities, and surmise that in London, there is simply “a more favourable climate towards road pricing”. Similarly, the rejection of road pricing at public referendum in 2005 has been largely attributed to the lack of appreciation of policy makers to understand the cultural significance of car use to the Edinburgh population, who saw the proposed pricing scheme as “insufficient, irrelevant, or ill-defined” (Gaunt, Rye and Allen, 2010, pg. 100).

While measuring social norms relating to transport and mobility is difficult, and translating results between studies equally so, the general consensus within the literature is that social norms are a critical factor, perhaps surprisingly so, in overall acceptability.

3.1.5 *Equity Issues and Socio-Economic Impacts*

While equity issues and socio-economic outcomes are frequently noted separately in the literature, they are often treated concurrently. This research will follow this lead. A vast literature exists on equity and acceptability in road pricing strategies. Viegas (2001, pg. 291) distinguishes equity issues into “longitudinal equity – having to pay for what was previously freely available and taken by many to be a basic right” and “vertical equity – the risk of exclusion from a wide range of urban functions for those with little revenue available for the extra cost of driving into the city”. Raux and Souche (2004, pp.195-196) also identify sub-groupings of equity: “spatial equity” which refers to equal “right of access to jobs, goods and services from any location”; “vertical equity” as above; and “horizontal equity” which refers to consistent application of the user pays principle.

Raux and Souche (2004) and Viegas (2001) here represent a sub-category of the literature who equates equity with acceptability throughout their analyses, and in doing so imply that acceptability is limited to equity issues, or at least that equity has clear primacy over other elements of acceptability. This research clearly does not agree with this limitation, however the insights provided from their work on equity issues is still considered valuable.

Equity issues and socio-economic impacts represent the point of greatest disagreement within the literature. A fair base hypothesis would be that “the more people perceive advantages following the introduction of road pricing, the more likely they will be to accept it” (Schade and Schlag, 2003, pg. 50). However evidence and academic opinion vary widely. Schade and Schlag found that while personal outcome expectations (an individual being better or worse off after scheme implementation) had a very strong influence on overall acceptability, relative equity (spatial/geographic or socio-economic) had very little. Interestingly, however, “it could be shown that these groups [higher income groups] are more likely to expect advantages from the strategies, whereas lower income groups tend to expect disadvantages” (Schade and Schlag, 2003, pg. 58) regardless of scheme design. Similarly, Harrington, Krupnick and Alberini (2001, pg. 102) noted that “against our expectations ... the [income] coefficient is very small, and both its magnitude and significance level drop as we add other respondent characteristics”, and “surprisingly, the sensitivity to the charge does not vary with the income group” (Jaensirisak, Wardman and May, 2005, pg. 143).

Despite hypothesising relative significance of equity issues and socio-economic impacts, the major statistical studies consulted for this research failed to provide strong evidence for these claims. However in focussing almost solely on equity and socio-economic concerns, the branch of the literature represented by Raux and Souche (2004) and Viegas (2001) clearly has a strong belief that equity is of strong significance in overall acceptability, with (unsubstantiated) assertions such as “acceptability is strongly connected with the perception of fairness” (Viegas, 2001, pg. 290).

This research does not seek to identify which school of thought on this particular topic may be ‘right’ or ‘wrong’, ‘better’ or ‘worse’, but to identify this divergence within the literature as an area of further exploration, and to relate this finding to the broader comparison of the wider literature with real-world perceptions.

3.1.6 *Attribution of Responsibility*

Attribution of responsibility can be distinguished into two concepts: responsibility for problem causation – an awareness and acceptance (or not) of one’s own contribution to some negative societal product; and responsibility for problem solving – “to whom the responsibility to solve the problem is attributed” (Schade and Schlag, 2003, pg. 50). The hypothesis here is that “if the individual is considered at least partly responsible to solve the problems [and for generating them in the first instance], this should lead to increased agreement with measures raising the price of or restricting the use of the car” (Schade and Schlag, 2003, pg. 50).

Attribution of responsibility was found, in the only statistical study consulted for this research to address it, to “contribute to the explanation of acceptability to a negligible extent” (Schade and Schlag, 2003, pg. 59). Other studies have not assessed other criteria that may at least be used as a proxy for this element of acceptability; however its overall omission from the literature, combined with one unflattering result, may indicate that is a relatively unimportant element to be considered here.

3.1.7 *Use of Revenues and Provision of Alternatives*

“The use of revenue from road pricing is of central importance for public support” (Ahlstrand, 2001, pg. 486). This sentiment is echoed throughout the road pricing acceptability literature. While it is generally acknowledged that the use of revenues from road pricing strategies is a

key concern for public acceptability, what the precise beneficiary of the revenues should be does not enjoy the same concurrence: “accountability on the application of revenues becomes an integral part of the approach” (Viegas, 2001, pg. 294)

Jaensirisak, Wardman and May (2005, pp. 143-144) found a “lack of any strong preference between the use of the revenue raised for tax reductions or public transport”. This study emphasised the split between car-users and non-car users in their sample, and how these groups may be inclined to prefer tax reductions and public transport enhancements respectively. Alternatively, (Schweitzer and Taylor (2008) present a compelling economic argument for revenues to be directed specifically to transport initiatives on equity grounds, however their analysis does not refer explicitly to acceptability. Oberholzer-Gee and Weck-Hannemann (2002, pg. 363) espouse “compensating in the same dimension”; using road pricing revenues specifically for road network enhancements as opposed to public transport improvements or tax reductions. Their argument is that by directing revenues sourced from road users to improvements that will most benefit road users, the likelihood of public acceptability will be increased.

Goodwin (1989) suggests hypothecating road pricing revenues based on maximising support among various stakeholder groups and compensating those who may lose the most from a scheme (although these two groups may not be mutually exclusive). The “rule of three” suggests allocating a third of road pricing revenues to road improvements, a third to public transport improvements, and a third to “the general fund of the city” (Goodwin, 2009, cited in King, Manville and Shoup, 2005, pg. 8), which in NSW is referred to as the ‘consolidated fund’. The “rule of three” makes a simple but important assertion, regardless of the exact proportions (exact thirds may not be necessary), or even the exact uses of the funds (other uses may be deemed equally deserving in various contexts): that road pricing revenues need not be allocated to only one beneficiary, and that by expanding the breadth of beneficiaries, public and political support will likely be expanded also.

The case studies demonstrate that hypothecation of revenues to either road improvements or public transport enhancements (or a combination of both) were a feature of all of the success cases, and a stipulation of political opposition in the cases that weren’t successful (use of revenues in Singapore was not evident in the case study consulted, however as Singapore has a markedly different government style to the other cases, hypothecation may not be as critical

in that context) (Lindsey, 2006; Schaller, 2010; Gaunt, Rye and Allen, 2007; Raux and Souche, 2004; O'Mahony, Geraghty and Humphreys, 2000). None of the cases observed used road pricing revenues for broader tax reductions. Without labouring the point, it is apparent from the literature that the hypothecation of revenues from road pricing strategies towards some transport related improvement (road or public transport) is a fundamental component of gaining public acceptability for those strategies.

3.2 Technical Feasibility

The technical feasibility of implementing a road pricing strategy is an obvious constraint within the considerations of political acceptability (Forkenbrock, 2005). The feasibility of implementing a particular scheme is not as great a concern within public acceptability, beyond how effective that scheme is perceived to be (see Section 3.1.1). Technical feasibility, like costs, is a parameter within which decision makers must choose the most suitable “alternative within limited resources and the ability of the decision maker to acquire and process information” (Miller and Meyer, 2001, pg. 61). Within the evolution of road pricing practice, “the costs of implementing a reliable tolling system have fallen” (Calthrop and Proost, 1998, pg. 335), and as such is becoming less and less of a constraint.

3.3 Costs

The costs of implementation are a constraint on public policy in a general sense. If funds are not available, either due to dire fiscal circumstances or simply an unjustifiable minimum expense of a policy proposal, to procure the necessary technology, infrastructure, labour, and to service ongoing maintenance, operating and perhaps finance costs, then no amount of public acceptability will ensure implementation. In the instance of road pricing, the costs associated with implementation vary widely according to scheme design, however broadly they may be thought of as some technology and infrastructure to capture vehicle movements, such as overhead gantries with electronic beacons; some in-vehicle technology to identify vehicles, such as an electronic “tag” (the cost of which may be carried by the government or the motorist); potentially some concessions to affected groups in the form of rebates or similar; the administrative cost of policy development; and ongoing administration costs. The latter should not be underestimated, as the London experience has shown that operational or administration costs can become the single greatest burden on a pricing scheme (Lindsey, 2006).

However unlike many policy initiatives, road pricing by definition has the ability to recoup some of its own fixed and variable, or establishment and ongoing, costs. Nonetheless, cost-effectiveness, similar to the concept of 'efficiency', may sway decisions makers preferences between schemes: "cost-effectiveness is likely to be particularly high when problems vary across space and time: charges can reflect these differences, whereas rules...tend to coincide with jurisdictional boundaries" (Kinnock, 1995, pg. 8). Costs, both establishment and ongoing, *should* not (or at least *need* not) be a prohibitive constraint on road pricing policy: "in a well-run country no conflict need arise between the goals of designing an equitable and efficient system of road-use charges and taxes and the desire to cover the highway system's costs" (Newbery, 1990, pg 23).

3.4 Other Political Impacts

The broader political impacts – either intrinsic to the policy making and setting environment or external to it – are the "dimensions of the problem that economists are not seeing" (Viegas, 2001, pg. 289). Indeed, "once rational ignorance and the influence of groups are taken into account, the set of policy instruments that is employed in political equilibrium can deviate significantly from the instruments a social planner would use" (Oberholzer-Gee and Weck-Hannemann, 2002, pg. 365).

Internal political influencers can generally be thought of as the nature of partisan politics – "congestion charging can become caught up in traditional divisions between political parties" (Albalade and Bel, 2009, pg. 965). In each of cases explored, with the sole exception of Oslo/Burgen, a road pricing proposal put forward by the government of the day experienced resistance from the opposition of the day: this occurred despite no notable consistency of political ideologies of the governments and oppositions respectively. The experiences of Edinburgh, Manchester and New York support the notion that "the planning of transportation systems is as much a political process as it is a technical one" (Miller and Meyer, 2001, pg. 58).

Albalade and Bel (2009, pg. 963) note that "benefits and costs of a prospective policy promote the birth of interest groups that will also play an important role in the implementation process". These interests may not represent the opinion or interests of a majority of all people: "in political equilibrium, policies match the preferences of well organised interests (automobile associations) better than the preferences of more dispersed groups (citizens who

consume polluted air). In general, smaller groups are easier to organise than larger groups” (Oberholzer-Gee and Weck-Hannemann, 2002, pg. 364). This was certainly the case in New York, where a minority of groups representing a minority of the population sufficiently frustrated the road pricing proposal to ultimately derail it (Schaller, 2010).

3.5 Levels/Layer of Government

The plethora of influencers that could conceivably be considered “other political factors” is exhaustive. This research will focus on the ‘layers’ of government that exist in a given decision making context, and the particular ‘level’ of government that holds primary responsibility for transport related decisions. This focus was inspired by an observation that, in general, the successful cases had been implemented by a metropolitan authority – the ‘level’ of government with the most narrow focus – rather than a state (or equivalent) or national authority. Kinnock (1995, pg. iii) distinguishes these layers in the instance of European Union membership: “Since some transport policies are formulated at the Community level (e.g. vehicle standards, minimum fuel excises etc.), whilst others are introduced by Member States, there is need for a broad agreement on the policy approach in order to ensure consistency. This is also necessary to safeguard the efficient functioning of the internal market and to take account of cross-border effects.”

In assessing the net impacts on transport policy in Brussels, one study found that “lack of coordination between the governments resulted in a welfare loss relative to the cooperative outcome” and that it “depends on the degree to which the jurisdictions of governments overlap, the sharing rules for revenue, and the strategic interdependence between the policy instruments” (de Palma, Lindsey and Niskanen, 2006, pg. 158). This assessment was of a jurisdiction that has only two layers of government: a fair assumption is that such ‘welfare losses’ are at least proportionate (perhaps even exponentially related) with additional layers of government. Albalade and Bel (2009, pg. 965) suggest how this may take effect: “the existence of different political levels where incumbent parties are different and rivals may become an important obstacle for congestion pricing implementation. Then, political controversy can arise more easily when different parties control different stages of the decision process”.

4 Interview Results

As outlined in Section 1, an objective of the research is to identify discrepancies in what is considered pertinent to the acceptability problem of road pricing in the literature compared to what may be considered pertinent to the same debate in a real-world context. This ‘real world’ context is a sample of expert individuals within government, academia and industry in NSW, each of whom have some interest in road pricing in Sydney, and each of whom bring a distinct perspective to the conversation based on diverse professional backgrounds and interests. The purpose of the interviews was to test the wisdom presented in the literature, against the informed thoughts and opinions of the sample group, who collectively may be thought of as ‘practitioners’. The interviews also sought to provide the practitioners with the opportunity to add to the debate; to go beyond what had been prescribed in the literature if there were any elements of the acceptability problem that were deemed missing.

Nine semi-structured interviews were undertaken with various transport officials, economists, academics, political officers and operators in the road freight industry. Interviews lasted between 1 hour and 2 hours, and a mix of questions was formulated to be sufficiently broad to capture a wide variety of issues, as well as sufficiently targeted to gain insight from each respondent’s area of expertise or unique perspective. Respondents were asked a mix of open ended questions (i.e. “What issues do you think...”), as well as prompted/leading questions (i.e. “Do you think the decision making environment in NSW is conducive to...”). This approach is consistent with that espoused by McNabb (2008, 2009).

The nine respondents come from a variety of professional backgrounds, outlined below (A more detailed account is provided in Appendix 1):

- Respondent 1 – Senior Transport official in NSW State Government. Background in NSW state politics (Office of Minister for Roads).
- Respondent 2 – Senior manager for road use management in NSW State Government. Background in law.
- Respondent 3 – Head of peak body of Australian road authorities. Background as a social economist.
- Respondent 4 – Transport academic at leading Transport and Logistics school in Australia. Background in planning in NSW State Government.
- Respondent 5 – Senior Transport official in NSW State Government. Background in Treasury and social policy.

- Respondent 6 – Senior Transport official in NSW State Government. Background as a civil engineer.
- Respondent 7 – Senior manager in Australian Nation Heavy Vehicle Regulator. Background in freight policy.
- Respondent 8 – Transport economist at leading global professional services firm.
- Respondent 9 – Manager in a leading Australian logistics firm. Background in motoring organisation.

The results have here been group by the themes presented in the Section 3 to draw comparisons across responses.

4.1 Perceived Effectiveness of Solutions

There was unanimous consensus within the sample group that the perceived effectiveness of solutions, in principle, is a critical factor in the acceptability of road pricing schemes. Different respondents had different interpretations on who may be doing the ‘perceiving’, and what constituted ‘effectiveness’. Respondent 1 saw the public as the main consumer of information relating to the effectiveness of , stating that “good policy makes good politics”, implying that if the road pricing ‘product’ is sound, then it will be acceptable, firstly to the public and then to decision makers.

Respondent 5 saw the decision makers as those ultimately doing the ‘perceiving’, and also highlighted the importance of framing notions of ‘effectiveness’ in a manner that is suitable to the intended audience: “The cabinet minute that has been put up for the last fifteen years, it’s the same every time, it’s so esoteric and doesn’t tell them the real benefits”. In elaborating, the cabinet minute being referred to detailed the benefits of proposed road pricing strategies in very technical terms such as road smoothness, asset life and sweeping statements about congestion abatement.

Respondent 2 noted the difficulty in communicating benefits in a problematically circular policy environment: “the benefits of mass-distance charging as opposed to single facility or corridor charging are likely to be very different to different people. Until we get approval to pursue one or the other or anything else, we can’t go wandering down avenues hoping that that’s the one they go with.”

Interestingly, the perceived effectiveness could be seen to be closely linked to other elements of acceptability, especially equity issues within and between stakeholder groups, and was noted as not necessarily being a positive to all interest groups: respondent 7 noted that “the problem with the freight industry is they know what an effective scheme means for them too well. The more effective the scheme is the worse off they think they will be”. This implies the need for a more nuanced approach to communicating the benefits (and costs) of any proposed pricing scheme to groups differentiated by industry, geography and transport habits.

The effectiveness of road pricing was also suggested to be dependent on the existing or proposed transport policies that exist around it: “single policy issues become polarising, and pricing is not a silver bullet” (respondent 1) and “we need to implement it within a suite of road use, and transport use, management policies” (respondent 6).

4.2 Problem Perception

Problem perception was also cited by a majority of respondents as being an important factor in the public and political acceptability. While there was general acknowledgement that government (both the bureaucracy and elected officials) were aware of congestion issues in Sydney, only two respondents made any reference to “problems” outside the realm of congestion. This has a direct link to item 4.3, “clear and valid policy goals”.

Respondent 8 distinguished between problems for governments and problems for individuals: “most people have an idea of a problem, and I’m sure most people could name something that they’re unhappy with about the transport in Sydney. But problems mean different things to different people. The government is aware of the problem of economic costs of congestion and the increasing consumption of energy, whereas someone living in the suburbs sees that problem as ‘It takes me an hour and a half to get to work and I keep paying more for petrol’.”

An observation was made that drew problem perception directly into the context of Sydney: “people in Sydney think that the problem [referring to congestion] is bad, but it’s not bad enough [to justify road pricing]. They expect a certain level of it, and accept a certain level of it. It will have to get worse for a majority of people to support it [pricing]”.

4.3 Clear and Valid Policy Goals

The articulation of clear and valid policy goals was generally agreed as an important influencer of policy acceptability. Notably, this was most obvious within the academic, political and private industry respondents, and less so among government respondents.

The tension between breadth of benefits and focus of action was articulated by respondent 4 – “while it’s all nice to tell people that we’re able to reduce congestion by so much, or reduce pollution by so much, and tell them all the other benefits we may expect, governments need to clearly articulate what it is they are trying to achieve, it’s absolutely critical”.

An opinion was given that, despite road pricing schemes being adopted in other cities with congestion abatement being the primary publicly stated policy goal of the scheme, it was in fact lobbying from different interest groups that drove implementation: “in all the other cities, London, Amsterdam, the Norwegian ones, they got up on environmental grounds. They might have been called congestion charges, but it was the environmentalists that got them up” (respondent 6).

The perspective of the ‘consumer’ of road use is interesting in this theme, and may imply that clear and valid policy goals, in reality, need to be augmented with notions of government integrity: “they’ve told us that it’s about the user paying for the damage and the congestion, and I guess you can see the economics behind it all, but at the end of the day it’s hard not to think of it as a bit of a cash-grab” (respondent 9).

4.4 Mobility Related Social Norms

Mobility related social norms was generally not considered by the respondents to be an important element of road pricing acceptability in general, or specifically in Sydney. When asked to comment on the notion that Sydneysiders may be ‘wedded to their cars’, the general sentiment was “there might be something like that there, but if they are given good alternatives and the benefits to them are made clear, then I don’t think it’s much of an issue” (respondent 4) and “it maybe to some extent, but I think there are more important issues to overcome before we worry too much about that” (respondent 2).

Although not recognising mobility related social norms as a critical issue, respondent 1 made a relevant observation about the potential of a narrow view to be taken on such policy issues,

and the network wide considerations that should be made: “probably, but it’s really the people who travel long distances every day that would be most. And we can’t forget that, on the whole, Sydney’s transport is pretty decent: we should also be thinking about the people in Wollongong or Newcastle, for instance, who drive long distances all the time.”

4.5 Equity Issues and Socio-Economic Impacts

Equity issues were identified consistently as being of specific relevance to Sydney, primarily on the grounds of existing socio-economic distribution and actual or perceived inequalities, and the current provision of public transport services.

Respondent 5 suggested that perceptions were as important as reality in making road pricing strategies acceptable: “people living in the west and north west especially are going to think that they are being ripped off by any road pricing strategy that is worth implementing, probably whether they are or not”. This problem was also touched upon by respondent 2 – “the real trick is in identifying the winners and losers, and making sure that winners know that they are winners – because some won’t and may even think they’re losers – and listening to the losers”.

Equity issues also need not only apply to individuals, nor to stakeholders who may currently be disadvantaged, as respondent 7 noted that the freight industry, which is easily organised, stands to be comparatively worse off as road freight potentially becomes less competitive with rail freight for long-haul movement: “it’s not necessarily one person compared to another, or another area compared to another, but between industries as well. There are real issues for the freight industry if it becomes significantly cheaper to put more containers on trains up and down the east coast.”

4.6 Attribution of Responsibility

The attribution of responsibility for all private vehicle related externalities, primarily congestion, environmental impacts and safety, was not considered to be a significant element of road pricing acceptability. The general sentiment among respondents was that responsibility was assumed to rest with the government for addressing these issues and that little could be expected of individuals to act in the collective interests.

One difference of opinion was apparent, as respondent 9 suggested that internal attribution of responsibility (that is, acknowledging one's own contribution to the problem) did not necessarily equate to altruistic behaviour. When referring to road pricing as a means of asset management and maintenance, respondent 9 pointed out that "sure heavy vehicles cause more damage per vehicle on the road, but they also move things around so people can have their groceries and petrol. Perhaps that's the price to pay for those benefits".

4.7 Use of Revenues and Provision of Alternatives

The use of revenues and provision of alternative transport options are very closely linked, and were often discussed in parallel in the interviews. The hypothecation of road pricing revenues to other transport initiatives *and* the provision of alternative transport choices (or lack of in certain cases) were largely identified as two of historic and current challenges to the implementation of road pricing in Sydney. This was one area where the complexities of the policy environment in New South Wales were acutely evident in government respondents' conversations (perhaps overly so); far less in non-government respondents' conversations. Nonetheless, all agreed that both issues were significant.

Respondent 4 noted that it is not only the provision of alternative (public) transport that is critical, but that that transport precedes any road pricing scheme: "it's absolutely critical to enhance the public transport services *before* people are made to pay more. It's not fair to try to change behaviour when there aren't any alternatives to change to. Especially in the areas where transport is pretty poor already".

Respondent 6 noted that the hypothecation of revenues, which was admitted as being of critical importance to acceptability, was a significant barrier to the policy process: "well that's the sticking point isn't it. We've been saying for years that we need to make sure every cent goes into transport, be it roads, rail or the other modes, but Treasury just don't want to do it. That's the problem with operating in such a fiscally oriented and fiscally centralist government. Maybe that can change now with Transport NSW and a single transport budget, but Treasury still don't like letting go of the purse strings"

Respondent 3 made an interesting point that brings into question the necessarily political toxicity of additional taxes, which road pricing can often be criticised as being: "at some point in the late eighties or early nineties, I don't know you'll have to look it up, there was this

thing called the ‘three by three’ tax – an addition to the fuel excise. It was an extra three cents a litre for a set three years, and it was surprisingly popular, as popular as a tax can be, because it was specifically for the purpose of road maintenance, which people thought of as being a priority issue”. If true, this precedent would also support the notions of ‘problem perception’ and ‘attribution of responsibility’ elements of acceptability.

4.8 Levels/Layer of Government

The levels of government (the complexity of the policy making environment) and the layer of government (the tier at which primary responsibility for transport policy decisions rest) was the issue that was most divisive among the sample group. While all agreed with the proposition that a more complex institutional environment would likely frustrate the policy making process, there was variance in opinions of whether current conditions in Sydney and New South Wales were tenable for road pricing acceptance and implementation. Similarly, there was disagreement within the sample as to the importance as to the layer of government primarily responsible for transport decision, and within those who thought it was either somewhat or very important, there was disagreement as to which tier of government would be most appropriate.

Respondent 6, speaking from a position of leadership within the state government, was blunt in his assessment of the impact of the institutional environment on the policy outcomes: “It is possible to get the right result under our current governance”. The manner in which this was delivered inferred that the true nature of the response was a lack of interest for obstacles that perhaps could not be overcome, so did not warrant effort.

Respondent 3 noted that the complex environment that existed within and between states increased the complexity of almost all roads policy: “It’s not just the Minister you’ve got to convince; it’s the Premier, the stakeholder groups like motoring associations and industry, but then when we’re talking about vehicles that can cross borders, we find the need for consistency of approaches. So then we have the ATC [Australian Transport Council – a forum of state Transport Ministers and the Federal Minister for Infrastructure], COAG [Council of Australian Governments – a forum of state Premiers and the Federal Prime Minister] and the NTC [the National Transport Commission – a research and policy advisory body that reports to the ATC].”

Respondent 2 favoured a more local/municipal/metropolitan authority for road pricing schemes (presumably *urban* road pricing schemes): “If you look at London and Amsterdam, then yes I think they might have a slightly easier time because they didn’t have as many people to please and as many hoops to jump through. I don’t think it’s the most critical issue, but yes, if we could start again I think a more Metropolitan system could work.”

Others favoured a more national or federal approach: “we have vehicles that drive from Victoria through NSW and up to Queensland. I don’t think we’d like a different system in each state – it would quadruple the back office work to get it all together. It’s the same with registering vehicles; all the states have slightly different requirements and it’s such an administrative burden just to get a mover on the road” (Respondent 9).

4.9 Other Issues to Arise

The interviews sought to both gauge the significance and relevance to Sydney of the elements of road pricing acceptability identified in the literature, and to identify any other issues that weren’t prevalent in the literature. While each of the respondents touched upon some issues outside of the literature findings, two featured recurrently throughout the interviews.

4.9.1 Timing

The concept of timing was addressed frequently in the interview process. While the term “timing” is quite vague, it could, as result of the interviews, be interpreted as three discrete elements: the lead time of road pricing scheme implementation; the time within an electoral cycle that it is introduced; and the conditions at the point in history when road pricing is pursued.

The lead time of road pricing schemes was noted as being of significance, and potentially underestimated or too narrowly considered: “it’s not just about the policy development and putting up gantries or whatever it may be, but you’ve also got to consider how long it will take to deliver bus services or some other alternative beforehand. It could probably be done in parallel, but it needs to be considered” (respondent 4). Further, the dimensions of the policy process that may be beyond the interests of economists or theorists need to be considered: “we need to have a dialogue with the community, to really make them aware of the benefits. That alone could take two years” (respondent 1).

Secondly, the lead time of a pricing scheme, once understood, needs to be considered in the context of an electoral cycle: “We have four-year fixed terms. It’s not unreasonable to think that it will be unpopular to begin with, but if you can get a trial or pilot phase happening for, say, a year, and people see that it’s not too bad and that there are benefits, it may be more palatable. If that’s the case, then you would want to be doing the announcing early in the electoral cycle to give yourself enough time to make people happier about it” (respondent 5).

Lastly, the specific time in a city’s history was identified as being relevant to the implementation of road pricing schemes, and potentially transport policy more broadly: “the timing just hasn’t been right ... we need to work within and look beyond the political cycle” (respondent 1), “let’s face it, we could be looking at a two-term government next year, and that might be when governments make the brave decisions” (respondent 5), “there is sufficient disenchantment with transport in Sydney” and “it really rides or falls on the majority of the next government” (respondent 6).

4.9.2 Communication

As highlighted in the interview results for “problem perception” and “perceived effectiveness of solutions, communication has been a fundamental role to play in the acceptability of any policy proposition. For road pricing, it was seen to be particularly important, and a particular weakness of the policy debate in NSW so far, as the objectives of the policy may not be clear or obvious, the concepts involved are necessarily complex, and the implications for various stakeholders are varied: “as someone who is pretty clued up on this stuff, but also a member of the public, I can see why people would have reservations about it: with most road safety initiatives, for instance, it’s pretty clear what they are trying to achieve, but people hear ‘pricing’ or ‘tolls’ or ‘charging’ and, without knowing what they’re paying for, are immediately sceptical, and understandably so” (respondent 8).

The generalised sentiment to come from the sample group was that the majority of the knowledge, technical or otherwise, already exists within various bodies in the policy environment, but that the language around the issues involved was inadequate, and that communication of ideas was not targeted to audiences information needs: “theorists haven’t adequately engaged with elected officials, and vice versa. We need to partner in research so that research has a higher degree of ownership” (respondent 1).

5 Discussion

The above research has outlined the key concepts relevant to road pricing, public and political acceptability, case studies of world experience in road pricing acceptability, and presented the findings from a series of interviews conducted with various subject matter experts in Sydney, New South Wales. It is found that road pricing, in a general sense, enjoys widespread support from the economic and academic community. The many and varied potential benefits of comprehensive road pricing schemes are well documented.

In comparing the apparent importance of various elements of public and political acceptability in the literature with the importance ascribed to those same elements by people who may collectively be called ‘practitioners’, some anomalies appear. A number of elements are generally agreed upon – “perceived effectiveness of solutions”, “use of revenues”, “provision of alternatives” and “problem perception” are identified by the literature and the practitioners as being of relative importance to the acceptability problem, whereas “attribution of responsibility” is similarly agreed to be of relative unimportance. Notably, the literature suggests that practitioners need to pay more attention to “mobility related social norms”; an element that was largely disregarded among the sample group. The response of the practitioners suggests that more research needs to be done on the various issues within the concept of “timing”, and that there is considerable divergence of opinion on suitable governance arrangement for road pricing and transport decision making.

Road pricing is largely considered in isolation in the literature, but critically needs to be viewed in context of broader transport policy: “Congestion charging alone will rarely, if ever, be a stand-alone transport policy. It must be part of a balanced package of measures, providing adequate alternatives to the use of the car, and ameliorating the adverse effects” (Lindsey, 2006, pg. 223). That the problem pricing measures aim to address is largely assumed to be only congestion is not surprising, but a fundamental reframing of the problem to include a wider range of issues – and therefore benefits - would likely increase the political traction of pricing strategies.

5.1 *The Issue of Timing*

The nature of timing in the policy setting context, and the specific timing issues relating to road pricing implementation, is an under-represented aspect of road pricing’s acceptability problem in the literature. Timing-related issues are made explicit in only a few studies, and

are inferred as being of relevance to some cases without those cases examining the role it plays in any depth. Interview respondents frequently referred to issues around timing, and while these issues were not identical, the recurrence signifies that this is key consideration in a genuine policy setting context. Broadly, the issues of timing that were raised in interviews can be grouped as: pricing scheme implementation lead time; alignment of road pricing policy phases with electoral cycles; and the political feasibility of road pricing a given point in history.

The development and implementation lead time of road pricing schemes emerged as an issue that does not have a consistent understanding within the literature or respondents, and whose impact or significance is not properly understood. De Palma, Lindsey and Niskanen (2006, pg. 160) focus their comparative case study analysis on “a framework for formulating implementation paths for pricing reform”. This provides a useful analysis of task-dependency and the welfare benefits or losses that may be expected from any given implementation path. The analysis does not, however, provide any reference to time: how long various implementation paths may take – or elements within those paths – or should take to not only maximise welfare gains, but to maximise public and political acceptability. Also, the analysis includes only those elements of the implementation path that a planner may consider: no mention is made of community dialogue or education in the early stages of development.

Understanding the impact of policy development and implementation lead times for road pricing strategies is not apparently recognised as an important issue in the literature, however two cases may provide insight into how implementation lead times are significant. In London, the elapsed time between the policy being used as a key platform for an election campaign, and the scheme being implemented was just over three years; a relatively short lead time (Lindsey, 2006). Conversely, the decade long public and political debate has been noted as one of the main factors that led to the erosion of public support in Edinburgh (Gaunt, Rye and Allen, 2007). While rushing implementation would not be advised as due diligence is required, both case studies have noted the role that implementation lead time played in their relative success, with the more expedient implementation being more successful. Lindsey (2006, pg. 223) articulates:

“Whilst it can be argued that a radical policy, such as congestion charging, should be developed slowly, allowing time to build support, there is strong evidence which suggests that an initial commitment to

controversial policies can be eroded over time, in the face of procedural and funding difficulties, technical issues, political change and well orchestrated opposition. Thus speedy action can ensure delivery that might fail with a more relaxed approach.”

What may be considered a reasonable timeframe for road pricing policy development and scheme implementation – reasonable in that it achieves economic, technical *and* political feasibility – is also a mystery. De Palma, Lindsey and Niskanen (2006) come closest to defining a beneficial implementation path, but again no time parameters are ascribed to this. Interview respondents had varying interpretations of what phases may be included in these development and implementation times, and the magnitude of these timeframes: respondent 6 suggested that Sydney could feasibly establish a scheme “in two and a half years”, yet respondent 1 noted that “we need to have a dialogue with the community, to really make them aware of the benefits. That alone could take two years”. The degree of overlap between the ‘dialogue’ and technical implementation is not clear, however respondent 4 noted that phases need not necessarily be consecutive, as alternative transport delivery and scheme implementation “could probably be done in parallel”.

The second element of timing is the alignment of road pricing policy phases with electoral cycles. This notion is not directly addressed in the literature. Interview respondent 5 noted that: “We have four-year fixed terms. It’s not unreasonable to think that it will be unpopular to begin with, but if you can get a trial or pilot phase happening for, say, a year, and people see that it’s not too bad and that there are benefits, it may be more palatable. If that’s the case, then you would want to be doing the announcing early in the electoral cycle to give yourself enough time to make people happier about it”. Interview respondent 1 also noted that, for complex reform such as road pricing within a wider transport agenda, the government (that is, the bureaucracy, not the elected party) must work “within and between political cycles”.

Although not addressed specifically in the literature, two case studies may support the sentiment of the respondents. In London, congestion charging was part of Mayoral candidate Ken Livingstone’s campaign platform. Rather than being something shied away from, road pricing was presented as “a key element of his 2000 manifesto, and to pursue it as soon as he took up office, building the team to help him secure a policy that was to become a major accomplishment of his first term of office” (Lindsey, 2006, pg. 221). Most importantly, the

policy development and scheme implementation could commence at the commencement of the electoral cycle.

In contrast, the New York pricing proposal was instigated as part of Mayor Bloomberg's Comprehensive Sustainability Plan, which was launched at the midway point of the New York City electoral cycle (2007-8 in an electoral cycle that ran 2006-10), partly as a result of the impetus of the availability of federal funding (Schaller, 2010). This potentially sub-optimal timing meant that when city elections were to be held next, the likelihood of a functioning scheme, or even trial, was low. Similarly, the funding opportunity presented by the US Department of Transportation was contingent on State Legislature approving the policy by April 2008. By providing such artificial time constraints, road pricing planning was necessarily rushed, and may have led to the ongoing disagreement between the City of New York, the Metropolitan Transport Authority, the State Legislature, and particularly the boroughs of Queens and Brooklyn, which was the scheme's ultimate demise.

The limited evidence is insufficient to state whether commencing a road pricing proposal at the beginning of an electoral cycle is necessarily beneficial for the overall acceptability. Interview respondents and two contrasting case studies provide some evidence (although in both cases many more factors must be considered in their respective successes and failures) that this may be the case. Most importantly, it should be noted that alignment with electoral cycles is an issue repeatedly raised by practitioners, but is lacking scrutiny in the literature, and needs to be explored with a greater understanding of implementation lead times.

In a very context specific sense, some of the logic presented above combined with the responses provided in interviews indicates that road pricing in Sydney, with regards to timing, may be most politically acceptable, and feasible, in the near future. New South Wales is due for a State election in March 2011. Immediately, and regardless of who may gain power, this represents an opportunity as the beginning of a new electoral cycle. Secondly, two interview responses stand out that surmise the opportunity of the next government: "there is sufficient disenchantment with transport in Sydney [to make road pricing reform possible]" (respondent 6) and "there is an appetite for real reform" (respondent 5).

New South Wales has been governed by the same political party since 1995. While acknowledging the leading edge technological advancements of Singapore in implementing

electronic road pricing in 1998, the 2011 election may introduce the first *new* government in New South Wales since broad-based and/or differentiated road pricing (of some description) has become technologically feasible and affordable. Moreover, there is wide speculation in public forums and mainstream media that a change of government is likely, with a potentially large margin: “let’s face it, we could be looking at a two-term government next year” (respondent 5). The implications of this possibility on transport reform, including road pricing, should not be ignored: the ability for brave policy decisions “rides or falls on the majority of the next government” (respondent 6) and “we have the bullets, they just need to fire them” (respondent 2). This is echoed by Lindsey (2006, pg. 222), who suggests that in road pricing reform “there is a need for political and policy stability”.

5.2 *The Levels and Layer of Government*

A passing observation of the ‘success’ cases such as London, Singapore and Oslo was that these cities enjoyed *relatively* simple institutional environments: each has a single authority at least responsible for all metropolitan transport planning and delivery, and those authorities were the layer of government at the most local level (i.e. not state/county/province or national layers of government). A simple two-part hypothesis to draw could be that (a) the fewer levels of government in a decision making setting (or the less complex the institutional environment), the more likely complex policy proposals are to be politically successful, and (b) the lower the tier of government responsible for transport planning decisions, the more likely road pricing schemes will be implemented.

This first hypothesis is so intuitive it almost does not warrant examination. Nonetheless, it is important to note that this notion does receive support from the road pricing acceptability literature, whose collective sentiment is that

“the existence of different political levels... may become an important obstacle for congestion pricing implementation” (Albalade and Bel, 2009, pg. 965). Within particular case studies, “the importance of a single implementing agency” (Rye, Gaunt and Ison, 2008, pg. 660) that “has responsibility for the major road network, traffic (signal) control, and buses, and is also the charging authority” (Lindsey, 2006, pg. 225) has also been identified frequently.

Importantly, this does not suggest that a single authority or simple institutional environment is either necessary or sufficient for successful road pricing implementation (unless, of course, Singapore’s government style is considered), but that with simplicity comes greater likelihood of acceptance.

The second hypothesis – that the lower the tier of government responsible for transport planning decisions the more likely road pricing schemes will be implemented – is neither significantly or directly supported nor opposed in the literature. While it this happens to be the case in the success cases studies, the limited size of this sample and the wide range of factors that influence political acceptability mean that this can only be considered a coincidence. Also, as the cases examined all happen to be relatively small and dense countries, such that administering road pricing schemes at a national level could be an entirely different experience to doing so in a geographically vast country. Lessons from the cases relating to this issue may not be transferable.

Interview respondents, however, demonstrate a considerable amount of divergence in opinion on what may be the most suitable layer or tier of government to drive the policy process and administer a road pricing scheme. Within the interview respondents, there was various support for each of the three broad tiers of Australian government: Federal, State and Local/Metropolitan. In support of State government, respondent 6 noted that “there are over 60 local councils in Sydney; it’s like trying herd cats ... it’s possible to get the right result under our current governance”, implying that if administered at the local or metropolitan level (such as the City of Sydney), Sydney may encounter similar locality based politicking such as that which frustrated the New York proposal.

Others thought that by focussing the scheme into a narrower geographic area, and accordingly a more local authority, the potential range of conflicts would be reduced: “If it’s done at a state level, then you really open yourself up to a lot of communities. There’s always that city-country cross subsidy issue that people get worked up over, so maybe more local would be better. Maybe not like City of Sydney, but more like the bigger metropolitan council model like Brisbane.” (respondent 1). Also, “while the economic ideal is to charge everyone for all their road use, in effect you’re going to get the biggest gains and the greatest cost efficiency by focussing on just the metropolitan areas” (respondent 8).

Support for Federal tier of government developing and implementing a road pricing scheme came from unsurprising perspectives: the freight sector has an interest in national consistency due to cross-border operations. This research finds that the tier of government responsible for transport decision making has not been sufficiently addressed in the literature. While success

cases demonstrate that lower tiers of government *have been* successful, these instances do nothing to show that other tiers of government could not also be successful. Similarly, ‘failure’ cases, particularly Manchester, can show that the lowest tier of government does not guarantee success either. Just as optimal pricing schemes may vary contextually based on geographic spread, so too may optimal governance structures.

5.3 *The Knowledge Mismatch and Communication*

While not a focal point of this research, the issue of communication has emerged frequently throughout case analysis and interviews. There is a clear disjoint between what is known by subject matter experts (both practitioners and economists), political decision makers, and the public (or perhaps ‘road use consumers’ if including industry such as freight movers) respectively regarding concepts relevant to road pricing. More subtly, there may be a misperception regarding what each of these groups wants, expects or needs to know to make road pricing acceptable to them. Miller and Meyer (2001, pg. 60) confirm this problem, stating “one of the first difficulties in relating decision making to transportation planning is ... a wide variety of participants often requiring different forms of information support, including ... the characteristics, capabilities and ‘needs’ of the decision makers”.

As a case in point, communication, particularly understanding the information requirements of the public, was a major contributor to the failure of the Edinburgh proposal - “It was clear that it [the pricing scheme] was too complicated to be understood, never mind supported, by a majority of the public” (Gaunt, Rye and Allen, 2010, pg. 100) - but was a major contributor to the success of the London proposal: “Ensuring that a very high proportion of those who drive to London were aware of the scheme and how it would affect them was crucial to its smooth launch” (Lindsey, 2006, pg. 228). Nonetheless, a failure to communicate necessarily complex concepts in an easily digestible manner is understandable, as “marginal cost pricing is hard (or impossible) to explain to the public” (Viegas, 2001, pg. 291).

5.4 *An Evaluation of Road Pricing Acceptability in Sydney*

Based on the acceptability literature and the interviews conducted, some assessments can be made of factors that may promote or frustrate the acceptability of future road pricing schemes in Sydney. This account is not exhaustive, but reflects those issues which have been most resonant throughout the research.

5.4.1 Reasons for Optimism

While more comprehensive road pricing of some form has been largely avoided by political decision makers in New South Wales for some time, there are reasons for optimism for road pricing proponents in Sydney.

Firstly, the existence and expansion of toll roads increases public awareness of the concept of paying for road use, and provides an opportunity to implement pricing with a greater degree of differentiation on new infrastructure. Increasing the awareness of the concept alone is an important step in achieving acceptance - “tolls, if they make people aware of the virtues of road pricing, could eventually turn out to be a useful “Trojan Horse” for broader based congestion taxes” (Parry, 2002, pg. 356) – and in this sense Sydney has an advantage over cities that do not currently charge for any road use whatsoever. The pending expansion of the M2 motorway, and the duplication of the M4 motorway (both elements of the existing Sydney Orbital Network) provide opportunities to introduce differentiated pricing incrementally, as “planners are usually reluctant to charge for a good that has always been free and is conserved to be a right” (Albalade and Bel, 2009, pg. 964), but this aversion may be lessened on new infrastructure.

Secondly, decision making for disparate transport modes in Sydney, including planning and delivery, has been combined into a single entity. As of July 2009, the major strategic planning and budgetary processes of the various transport agencies that existed within New South Wales - most notably RailCorp (metropolitan rail), the Roads and Traffic Authority (roads and associated operations), State Transit Authority (buses), Sydney Ferries, and a variety of smaller planning and construction bodies – were subsumed into a single entity called Transport NSW. As discussed above, the presence of a single authority that “has responsibility for the major road network, traffic (signal) control, and buses, and is also the charging authority” (Lindsey, 2006, pg. 225), and in the case of Sydney heavy rail as well, is advantageous to road pricing implementation. This is largely due to the well-documented need for the hypothecation of road pricing revenues to transport, but not exclusively roads, investment to support acceptability. At face value Transport NSW presents the opportunity for the movement of these funds between modes to facilitate effective hypothecation.

Thirdly, as noted above, New South Wales is due for a state election in early 2011. While conclusions should not be jumped to, many indicators suggest a change of government is

likely, and a large margin is possible. Not only does this present Sydney with the beginning of a new electoral cycle, which may be an opportune time to launch a road pricing proposal, but it may provide New South Wales with the stability in government (two terms has been speculated) that promotes brave policy decisions. In essence, whereas “the timing has just not been right” (respondent 1) in many of the years since electronic and sophisticated pricing became technically feasible, the time may be right in the near future.

Lastly, the notion of a discretionary tax (of which road pricing schemes is one) is not new to New South Wales motorists or the Australian population more generally. Examples cited in the interviews are the Goods and Services Tax (GST) established nationally in 2000 and the “3x3” tax established in New South Wales in 1989. The former received fierce opposition, but was implemented with enough time to at least partially disprove the strongest critics, and the government of the day was re-elected (albeit with a reduced majority, however this directly relates to the point above regarding the margin of the next government). The latter was levied on fuel sold in New South Wales at 3 cents per litre for an initial set three year period, with all revenues going “towards road improvements and road safety” (NSW Government, 2001, pg. 2). It was – anecdotally – relatively popular due to the specific “earmarking” (respondent 3), or hypothecation, of the funds towards nominated transport projects. These taxes are significant in that they both represent the relatively successful attempts to implement a pricing scheme – one for specifically for transport and the other not – that mirror *some* of the concepts relevant to road pricing. This precedent, and therefore (at least) partial awareness, may be beneficial in educating motorists of the “current inequity” of existing means of paying for road use, and the relative equity associated with broad-based road pricing strategies (Schweitzer and Taylor, 2008, pg. 810).

5.4.2 *Ongoing Frustrations*

None of this is to say that road pricing implementation in Sydney is assured. Certainly the communication issue will be problematic in any jurisdiction that attempts road pricing. The following are factors that may frustrate the implementation of road pricing in Sydney.

Firstly, while the combination of disparate transport bodies *within a single tier of government* into a single entity is seen as a positive step, it does not change the complexity of governance arrangements *across tiers of government*. Transport NSW, despite incorporating all modes and promoting network and administrative integration, still operates in an environment that

includes a major metropolitan council (the City of Sydney) and many local municipalities. This will continue to be an obstacle for effective policy implementation. Similarly, the ideals of national consistency between states and territories, and various national level authorities guiding major infrastructure development will frustrate the implementation of road pricing policy.

Secondly, an interesting point raised through the interview process is that of a “fiscally centralist style of government” (respondent 6). Such a style of government is not in the nature of any single political party, but embedded in the institutions of government: both the bureaucratic bodies and the tradition ways of operating. As such, this style is government, or more correctly, this style of governing, is likely to transcend political parties and single elections. The implications of a fiscally centralist government is that revenues from road pricing schemes cannot be easily hypothecated for transport initiatives, as a central monetary body – in this case NSW Treasury – retains control over the allocation of all state funds and has right of approval over major expenditure. As noted repeatedly above, the hypothecation of road pricing revenues is considered fundamental to acceptability of any given scheme. If, as in NSW, a central monetary body is unwilling (or at least not inclined) to hypothecate these funds in advance, then the overall acceptability of the scheme itself is threatened.

6 CONCLUSIONS

6.1 *Limitations of Research*

6.1.1 *Sample Size*

The empirical component of this research was based on the thoughts and opinions (albeit reasonably well-informed thoughts and opinions) of nine individuals (excluding the author). It is feasible that had a larger, different or more diverse sample been consulted the results of the research may have been different.

This is not to say that the outcomes of the research are necessarily incorrect or invalid. A body of literature exists that is based on similar research methods with comparable sample sizes (see Gaunt, Rye and Ison, 2008, for a particularly good example). The important qualification is that the research should not be considered definitive: the research aims to *contribute to* the broad literature on this topic, to complement it, and to articulate issues that are apparently under-represented in the literature in light of their perceived importance or significance in the decision making environment.

6.1.2 *Span of Issues Captured*

A purpose of this research was to capture a number of issues that that may be under-represented or completely neglected in the literature. It was not to capture *all possible* issues that could be described as such. For the purposes of elaborating on, and in doing so providing substantial analysis of, the few issues that appeared most pertinent, not all issues that could be identified were, and all that were identified received detailed analysis.

Focussing on certain issues at the expense of others threatens the ability of future research to replicate the results: often considered a key quality of robust research (Moravcsik, 2010). As with the limitation outlined in Section 5.1.1, this is overcome by considering the research to be read in parallel to other work: as being contributory to the literature, not definitive. Further, this research has followed the two principles of replicable qualitative research – rigor and transparency - set out by Moravcsik (2010, pp. 31-32) which are: “Any critical and contested substantive empirical point in a scholarly case study should be backed by a precise and annotated citation to one or more presumptively primary sources” and “Citations must contain a reproduction or transcript of some part of the source”, with the perceived benefits being

“Higher-Quality Scholarship”, “Wider Criticism”, “Richer Secondary and Meta-Analysis” and “More Intensive Interdisciplinary Engagement”.

6.2 Areas for Further Research

Identifying areas for further research was a core objective of this project. While there are numerous issues to have arisen from the literature review, case studies and interview process, three stand out as being considerable pieces of work that represent a significant gap or under-representation in the literature.

6.2.1 The Relationship Between Road Pricing Scheme Lead Times, Electoral Cycles and Political Feasibility.

The issues of timing in regards to scheme implementation and political feasibility arose consistently in interview, but were only mention summarily in the literature. A body of work exists on the merits (or not) of phased implementation of road pricing schemes, however even these do little to identify the temporal pressures, even in an order of magnitude, that exist between implementation considerations and political ones. A broad assessment of the literature has shown that the time from policy development and a decision to proceed to established implementation is often longer than may initially be anticipated or planned for. Also, political considerations such a consultation process with the community, which have the potential to add considerable time to the overall process, may be overlooked.

Problematically, the cases studies imply that a shorter policy debate and implementation lead time increase the likelihood of a road pricing scheme being accepted by the public. In essence, it would appear that implementation factors pressure the process to take more time, whereas political factors pressure the process to take less. What parameters or range that a successful approach may take in a time scale – some period of time that satisfies both pressures – is a core piece of work to be undertaken.

6.2.2 The Feasibility of Hypothecation in Fiscally-Centralist Government

Hypothecation of road pricing generated revenues into transport related projects and initiatives has been seen to be crucial in the public acceptability of road pricing schemes. It has been a feature of successful cases, and a stipulation or condition of opposing parties in unsuccessful schemes.

New South Wales, and Australian states more generally, operate in a form of government that has been labelled throughout the course of this research as *fiscally centralist*, implying that the vast majority of government revenues and expenditure are controlled by a central agency (Treasury). This tradition of government has transcended political parties and is unlikely to change dramatically in the near future. While New South Wales has been the specific subject of this research, this style of governance is not uncommon throughout the world.

Fiscal centralism is at odds with hypothecation. This is not to say that the two concepts are incompatible, but that the presence of the former does somewhat impede the latter.

Hypothecation, such as of road pricing revenues, is more easily attainable in modes of government and governance where authorities, be they specific to geography (i.e. Greater London Authority) or to policy areas (i.e. Department for Transport) have greater autonomy over their own revenue and expenditure.

This represents an interesting opportunity for further research. The conditions under which hypothecation is attainable in a fiscally centralist environment require clarification. The implication of this knowledge would also go beyond road pricing acceptability, as the concept of hypothecation is not limited to transport policy, but to almost any government function that generates revenues.

6.2.3 Perceptions of Congestion Experience and Expectations in Sydney and Surrounds

An interesting insight to come from the interview process was that of the difference between the perceptions and realities of congestion in Sydney. Congestion in Sydney is predominantly measured, both by the roads authority and the popular media, along several key corridors. While these corridors do carry vast volumes of traffic, they do not come close representing the total movements of all people in vehicles in Sydney. Thus these measures may dramatically over- or under-state the severity of congestion in Sydney. Taylor (2001, pg. 10) notes that equating “congestion in cities” with “freeway congestion” does a disservice to the overall road pricing debate as it skews measurements of actual congestion, and does not fully appreciate the value of all links in a trip chain.

Further, studies that quantify congestion costs in dollar terms (or any other measure for that matter) give an implicit message that successful congestion abatement requires this measure to be zero. This may not be the case. As noted by one respondent: “people expect and are

happy to accept a certain level of congestion”. This means that trying to eliminate congestion altogether, as well as being technically improbable, may also be politically inappropriate also. Taylor (2001, pg. 10) defends the place of road congestion, suggesting that “congestion is an unfortunate consequence of prosperity and a drag on otherwise high levels of accessibility, not a *cause* of economic decline or urban decay”. In essence, congestion, as long as it is not in debilitating magnitudes, is an inevitable product of economic vibrancy, and attempting to eliminate altogether rather than just reduce it, may be a sub-optimal strategy.

In a Sydney context, there is limited evidence of the congestion people *actually* experience, the level of congestion they *perceive* to experience, and the level of congestion that they *expect (and accept)* to experience. These three pieces of information will be critical to informing road pricing and, more broadly, traffic management more broadly, policy.

6.3 *Concluding Remarks*

Road pricing is, and will likely continue to be, an economically sound but politically fraught policy proposal. Despite supporting arguments coming from a wide variety of interest groups and policy areas, there remain issues that frustrate the public and political acceptability of road pricing. This paper has examined the concepts at the core of road pricing, outlined some cases studies of implementation failure of road pricing schemes, explored the various elements of notions of acceptability from the literature, presented the findings of a series of interviews with subject matter experts in NSW, and discussed how these elements may interact specifically within the context of Sydney.

The ability of road pricing techniques and approaches to ameliorate excessive congestion in urban areas is widely acknowledged. The environmental benefits of congestion reduction, as well as the ability of pricing measures to alter motorists behaviour to favour more environmentally choices, has been shown to be an important argument to increase public acceptability. A key lesson is that, no matter what primary objectives are for implementing a given scheme, emphasising environmental benefits above others is likely to improve acceptability. The use of road pricing for asset management purposes is both one of the original drivers of road pricing theory, and an area which holds great potential for communicating the benefits of pricing techniques for various stakeholders, as asset management concepts may act as a conduit between the abstract and the tangible or observable.

Public and political acceptability are complex concepts that are often used interchangeably in the literature, but which represent discrete ideas. This paper has used public acceptability as a sub-set of political acceptability, along with costs, technical feasibility and other political impacts. The elements that comprise public acceptability vary in the degree to which they influence the overall acceptability of a particular proposition. Most interestingly, the notion of socio-economic impacts being a significant factor in the acceptability problem receives limited support from empirical studies. Conversely, mobility related social norms have been consistently cited as having great influence over the acceptability of a proposal.

The collective sentiment of the interview group revealed some notable points for the discussion. Elements of the road pricing acceptability problem were generally agreed upon, however the relative importance placed on each varies considerably with the literature on the

issue of social norms. The respondent group consistently noted specific issues around ‘*timing*’ as being absent from the literature. While this research does not claim to ascribe responsibility for these gaps, it does at a minimum show that economists and theorists may need to more closely examine the influence of timing on road pricing schemes, and that ‘practitioners’ may need to more closely consider the effect of mobility related social norms on road pricing acceptability. There was considerable disagreement within the respondent group as to which layer of government being responsible for primary decision making for transport would be most conducive to successful road pricing implementation in Sydney.

The prospects for the implementation of broader road pricing in Sydney are decent. Sydney has a population who are not foreign to the concepts of paying for road use on some corridors, and is embarking on infrastructure expansion that may provide opportunities to more widely apply differentiated pricing. In a political acceptability sense, Sydney is approaching the end of a political cycle, and therefore the beginning of a new one. As suggested throughout the later part of the paper, a new electoral cycle may be an opportune time to commence a road pricing initiative. Further, various features of Sydney’s recent political history have suggested that Sydney is currently well placed in its own history to drive road pricing, and that the next government may be well placed to make brave policy decisions. Road pricing in Sydney will not, however, be without its obstacles. The role and nature of the institution of a powerful centralised Treasury may frustrate the hypothecation of funds that is deemed to be an integral part of pricing acceptability. Sydney, and the NSW government, whilst having consolidated the governmental transport functions, still operates within a complex set of local, state and national institutions; institutions that are beyond the power of any one state to change. Complexity of the institutional environment has been shown to increase the difficulty of implement potentially divisive policy proposals such as road pricing. On the whole, the prospects of implementation of some form of reasonably sophisticated model of road pricing in Sydney are not great (as they would arguably not be ‘great’ in any city), but they are as positive as could be hoped for at any time in the road pricing debate. The eventuality relies on understanding the information needs of theorists, economists, political decision makers and the public, and those needs being met.

References

- Ahlstrand, I. 2001. "The politics and economics of transport investment and pricing in Stockholm", *Journal of Transport Economics and Policy*, vol. 35, no. 3, pp. 475-489.
- Albalade, D. and Bel, G. 2008. "Shaping urban traffic patterns through congestion charging: What factors drive success or failure?", Working Papers 2008/01, published by the Research Institute of Applied Economics, Barcelona.
- Albalade, D. and Bel, G. 2009. "What local makers should know about urban road charging: lessons from worldwide experience", *Public Administration Review*, vol. 69, no. 5, pp. 962-975.
- Balwani, A. and Singh, S. 2009. "Network impacts of distance based road user charging", *Netnomics*, vol. 10, no. 1, pp. 53-75.
- Binns, S. 2008. "New business group forms to support TIF bid" *Crains Manchester Business*, available at <http://www.crainsmanchesterbusiness.co.uk/apps/pbcs.dll/article?AID=/20080605/FR/EE/140095200>, published 5 June 2008, accessed 7 November 2010.
- Bliemer, M., Rose, J. and Hensher, D.A. 2009 "Efficient stated choice experiments for estimating nested logit models" *Transportation Research B*, vol. 43, no. 1, pp. 19-35.
- Booz Allen Hamilton, 2006. "Review of Urban Congestion Trends, Impacts and Solutions: Study of successful congestion management approaches and the role of charging, taxes, levies and infrastructure and service pricing in travel demand management", final report prepared for the Council of Australian Governments (COAG), Canberra.
- Button, K. 1990 "Environmental Externalities and Transport Policy", *Oxford Review of Economic Policy*, vol. 6, no. 2, pp. 61-75.
- Button, K.J. and Hensher, D.A. 2005. *Handbook of Transport Strategy, Policy and Institutions*, Elsevier, Oxford.
- Calthrop, E. and Proost, S. 1998. "Road Transport Externalities", *Environmental and Resource Economics*, vol. 11, no. 3-4, pp. 335-348.
- Christainsen, G.B. 2006 "Road Pricing in Singapore after 30 Years" *Cato Journal*, vol. 26, no. 1, pp. 71-88.
- Clarke, H. and Prentice, D. 2009. "A conceptual framework for the reform of taxes related to roads and transport", report prepared for the Australian Government Treasury, Canberra.
- Clean Air Now, 2008. "Why we're nuts about TIF", website available at <http://www.manchesterfoe.org.uk/can/whyvoteyes.php>, accessed 7 November 2010.

- de Palma, A., Lindsey, R. and Niskanen, E. 2006. "Policy insights from the urban road pricing case studies", *Transport Policy*, vol. 13, no. 2, pp. 149-161.
- Forkenbrock, D.J. 2005. "Implementing a mileage based road user charge", *Public Works Management Policy*, vol. 10, no. 2, pp. 87-100.
- Gaunt, M., Rye, T. and Allen, S. 2007. "Public acceptability of road user charging: The case of Edinburgh and the 2005 referendum", *Transport Reviews*, vol. 27, no. 1, pp. 85-102.
- Goodwin, P.B. 1995. "Road Pricing or Transport Planning", in Johansson, B., and Mattsson, L.G. (eds) *Road Pricing: Theory, Empirical Assessment and Policy*, Kluwer, Boston.
- Greater Manchester Future Transport. 2008. *Why the Transport Innovation Fund? - An analysis of the rationale behind the Greater Manchester TIF package*, Consultation paper available online at http://www.manchester.gov.uk/egov_downloads/Background_1_.pdf
- Guardian News Agency, 2007. "Manchester makes move towards congestion charge" website available at <http://www.guardian.co.uk/society/2007/jul/27/communities.environment> Published 27 July 2007, accessed 7 November 2010.
- Harrington, W., Krupnick, A.J. and Alberini, A. 2001. "Overcoming aversion to congestion pricing", *Transportation Research Part A*, vol. 35, no. 2, pp. 87-105.
- Henry, K. 2009. "Australia's Future Tax System – Final Report", published by the Australian Commonwealth Treasury, Canberra.
- Hensher, D.A. and Puckett, S.M. 2005. "Refocusing the modelling of freight distribution: Development of an economic based framework to evaluate supply chain behaviour in response to congestion charging", *Transportation*, vol. 32, no. 6, pp. 573-602.
- Hensher, D.A., Rose, J.M. and Greene W.H. 2005. *Applied Choice Analysis: A Primer*, Cambridge University Press, Cambridge.
- Jaensirisak, S., Wardman, M. and May, A.D. 2005. "Explaining variations in public acceptability of road pricing schemes", *Journal of Transport Economics and Policy*, vol. 39, no. 2, pp. 127-153.
- Jakobson, C., Fujii, S. and Garling, T. 2000. "Determinants of Private Car Users Acceptance of Road Pricing", *Transport Policy*, Vol. 7, No. 2, pp. 153-158.
- King, D., Manville, M. and Shoup, D. 2007. "The Political Calculus of Congestion Pricing", *Transport Policy*, Vol. 14, No. 2, pp. 111-123.

- Kinnock, N. 1995. *Towards Fair and Efficient Pricing in Transport*, Communication to the European Union.
- Laurel, B. 2003. *Design research: methods and perspectives*, Massachusetts Institute of Technology, Cambridge.
- Lay, M.G. 2010 "Road Pricing at Amsterdam" *Supplementary report prepared for Roads Australia Road Pricing Conference*, July 2010, Sydney, Australia.
- Lindsey, R. 2006 "Do Economists Reach A Conclusion On Road Pricing? An Intellectual History of an Idea" *Econ Journal Watch*, Vol. 3, No 2, pp. 292-379.
- Lipsey, M., and Wilson D.B. 2001. *Practical meta-analysis*, Sage Publications, Thousand Oaks, California.
- Malyshev, N. 2006. "Regulatory Policy: OECD Experience and Evidence", *Oxford Review of Economic Policy*, Vol. 22, No. 2, pp. 274-299.
- McNabb, D.E. 2008. *Research methods in public administration and non-profit management: quantitative and qualitative approaches*, M.E. Sharpe publications, New York.
- McNabb, D.E. 2009. *Research methods for political science: quantitative and qualitative approaches*, M.E. Sharpe publications, New York.
- Meyer, M.D. and Miller, E.J. 2001. "Transportation Planning and Decision Making" in *Urban Transportation Planning: A Decision-Oriented Approach*, McGraw-Hill, Boston.
- Moravcsik, A. 2010. "Active Citation: A Precondition for Replicable Qualitative Research", *PS: Political Science and Politics*, Vol. 43, No. 1, pp. 29-35.
- Mustafa, A. 2008. *Case Study Method, Theory And Practice, Research And Management Approaches*, Atlantic Publishers, New Delhi.
- Newbery, D. M. 1990. "Pricing and Congestion: Economic Principles Relevant to Pricing Roads", *Oxford Review of Economic Policy*, Vol 6, No 2, pp. 22-38.
- NSW Government, 2001."Submission to the Commonwealth Governments enquiry into fuel taxation", published November 2001. Available online at http://fueltaxinquiry.treasury.gov.au/content/Submissions/Government/NSWGovt_270.asp. Accessed 26 October 2010.
- NSW Treasury. 2009. "Infrastructure and Service Delivery" in *Budget Paper 4 – 2010/11 Infrastructure Statement*, NSW Government Printing Service, Sydney.
- Oberholzer-Gee, F. and Weck-Hannemann, H. 2002. "Pricing road use: politico-economic and fairness considerations", *Transportation Research Part D*, vol. 7, no. 5, pp. 357-371.

- Parkhurst, G. 2004, "Air quality and the environmental transport policy discourse in Oxford", *Transportation Research Part D* 9, pp. 419-436
- Parry, I.W.H. 2002. "Comparing the efficiency of alternative policies for reducing traffic congestion", *Journal of Public Economics*, vol. 85, no. 3, pp. 333-362.
- Parry, T. 2003. "Ministerial Inquiry into Sustainable Transport in NSW: A Framework for the Future – Final Report", available online at <http://www.transport.nsw.gov.au/sites/default/file/inquiries/parry-final-report.pdf>
- Pigou, A.C. 1920. *The Economics of Welfare*. London: Macmillan.
- Raux, C. and Souche, S. 2004. "The acceptability of urban road pricing: A theoretical analysis applied to experience in Lyon", *Journal of Transport Economics and Policy*, vol. 38, no. 2, pp. 191-216.
- Rayfield, D., Longhurst, J.W.S, Ramsden, P.S, Dinsdale, J.A., Elliott, R.M. and Conlan, D.E. 1998 "The impacts of road transport on air quality in the Greater Manchester region, UK: policies towards a sustainable transport system", *The Environmentalist*, vol. 18, pp3-13.
- Richards, M. 2006. *Congestion Charging in London: The Policy and the Politics*, Palgrave Macmillan, New York.
- Roads and Traffic Authority NSW. 2005. *Road traffic crashes in New South Wales - Statistical Statement: year ended 31 December 2005*, Roads and Traffic Authority NSW, Sydney.
- Roads and Traffic Authority NSW. 2009. *Annual Report 2008-2009*, Roads and Traffic Authority NSW, Sydney.
- Roson, R. 2000. "Social cost pricing when public transport is an option value", *Innovation*, vol. 13, no. 1, pp. 81-94.
- Rye, T., Gaunt, M., and Ison, S. 2008. "Edinburgh's Congestion Charging Plans: An Analysis of Reasons for Non-Implementation", *Transportation Planning and Technology*, Vol. 31, No. 6, pp. 641-661.
- Salter, A. 2007. "C-charge details revealed" Manchester Evening News, available at http://menmedia.co.uk/manchestereveningnews/news/s/1007736_ccharge_details_revealed on 25 May 2007, accessed 7 November 2010.
- Schade, J. and Schlag, B. 2003. "Acceptability of urban transport pricing strategies", *Transportation Research Part F*, vol. 6, no. 2, pp. 45-61.

- Schaller, B. 2010. "New York City's congestion pricing experience and implications for road pricing acceptance in the United States", *Transport Policy*, Vol. 17, No. 4, pp. 266-273.
- Schweitzer, L. and Taylor, B.D. 2008. "Just pricing: the distributional effects of congestion pricing and sales taxes", *Transportation*, vol. 35, no. 6, pp. 797-812.
- Smeed, R.J. 1964. *Road pricing: the economic and technical possibilities*. Her Majesties Stationary Office, London.
- Smith, A. 1937. *An Inquiry into the Nature and Causes of the Wealth of Nations*, Modern Library edition. Edwin Cannan ed. New York: The Modern Library.
- Stake, R.E. 1995. *The art of case study research*, Sage Publications, Thousand Oaks, California.
- Stalebrink, O.J. and Gifford, J.L, 2005. "Transportation Asset Management" in Button, K.J. and Hensher, D.A. 2005. *Handbook of Transport Strategy, Policy and Institutions*, Elsevier, Oxford.
- Stopher, P.R. and Stecher, C. (editors) 2006 *Travel Survey Methods Quality and Future Directions*, Elsevier Science, Oxford.
- Taylor, B.D. 2002. "Rethinking traffic congestion", *Access: The magazine of the University of California Transportation Center*, vol. 21, pp. 8-16.
- Vickrey, W.S. 1963 "Pricing in Urban and Suburban Transport" *American Economic Review*, vol. 53, pp. 452-465.
- Victorian Competition and Efficiency Commission, 2006. "Making the right choices: Options for managing transport congestion", VCEC, Melbourne.
- Viegas, J.M. 2001. "Making urban road pricing acceptable and effective: searching for quality and equity in urban mobility", *Transport Policy*, vol. 8, no. 4, pp. 289-294.
- Wachs, M. 1993 "Learning from Los Angeles: transport, urban form and air quality", *Transportation*, vol 20, pp 329-354.
- Yin, R.K. 2003. *Applications of case study research – 2nd Ed*, Sage Publications, Thousand Oaks, California.

Appendix 1: Interviewee Biographies

Respondent 1 – A senior executive in the NSW government agency responsible for the provision of integrated transport services and infrastructure in NSW, in the section responsible for community engagement and policy development. Previous relevant position included being Chief of Staff within the Office of the [former] Minister for Transport.

Respondent 2 – A senior manager in the NSW government agency responsible for the planning and delivery of road infrastructure, road safety, registration and licensing, and associated services. Originally from a law background, respondent 2 has led the agency's efforts on road pricing within a broader suite of road use strategies for over ten years.

Respondent 3 – The head of the peak body of Australian Road agencies. This position oversees efforts of policy standardisation or integration between states, the commissioning of research on behalf of all jurisdictions, and is responsible for reporting to international committees on various aspects of roads administration.

Respondent 4 – An academic at one of Australia's leading transport and logistics schools, specialising in integrated transport planning and land use and environmental evaluation. Has also previously worked within NSW state government in environmental, public transport and planning departments.

Respondent 5 - A senior manager in the NSW government agency responsible for the provision of integrated transport services and infrastructure in NSW, in the section responsible for overall business strategy and performance measurement. Previous experience has been in the NSW roads agency, and in various other NSW state government departments. Specialises in policy strategy.

Respondent 6 – A senior executive in the NSW government agency responsible for the provision of integrated transport services and infrastructure in NSW, with general oversight of the strategy, policy and operations of the agency, and interfacing with the Minister for Roads. Originally from a civil engineering background, respondent 6 has previously lead the division of the NSW roads agency that manages network operations, and considers road pricing to be a key interest.

Respondent 7 – A senior manager at the national body responsible for regulating heavy vehicles and aspects of road freight, and ensuring consistency between Australian jurisdictions. Leads the policy development division of the national body. Has previously managed freight regulation, including pilot schemes heavy vehicle pricing, in NSW and Victoria.

Respondent 8 – A senior transport economist at a leading global professional services, management and financial consultancy firm. Advises both public and private sector organisations on transport and logistics related strategy, and undertakes commissioned transport research. Areas of particular interest include sustainability in transport and supply chain optimisation.

Respondent 9 – A senior manager of a leading Australian logistics company that makes extensive use of the road network for freight purposes and has been involved in pilot program for intelligent access schemes in NSW. Leads the strategy, business development and government relations division of this company. Originally from a civil engineering and infrastructure background.

A number of further ‘informal’ conversations were had with several academics from within the Institute of Transport and Logistics Studies (Sydney University); from within transport related bodies in NSW state government; and with officers from most other Australian states and the relevant Federal department at a conference attended by the author in September 2010 in Adelaide, South Australia. While greatly insightful and informative, many of these conversations occurred without prior preparation, and as such were not documented in the same manner as the semi-structured interviews.