

**INFLUENCES ON TRANSPORT POLICY MAKERS AND THEIR  
ATTITUDES TOWARDS PEAK OIL**

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## **Abstract**

Transport plays a vital role in society, and energy for transport relies on fossil fuels. However, the future of the transport system is uncertain due to a concept relating to the diminishing supply of fossil fuels, termed 'peak oil'.

Transport policy makers have an important role to play in planning for a possible reduction in the availability of fossil fuels, however it remains unclear how they perceive the issue, exactly who or what influences their perception, and even if they are prepared (or not) to put in place measures that could minimise the potential impacts. It is vital that we understand all the factors and the actors involved in transport policy making, in order to understand why this issue is not currently widely accepted as part of mainstream transport policy.

A conceptual model and theoretical framework have been developed to outline a method for gaining a better understanding of the characteristics of, and influences on, the transport policy makers at a local level, and how they view the peak oil problem. In order to test the theoretical framework, a series of case studies were conducted in three cities of varying sizes in New Zealand. The case studies involved interviews and surveys with transport policy makers.

The results of the case study established that many technical staff have major concerns about peak oil but their concerns are not translated into policy because the majority of elected officials, who give the final approval on policy, believe that alternative fuels and new technologies will mitigate any peak oil impacts. This view is reinforced by a lack of scientific evidence to the contrary, and a lack of political and financial support from Central government to plan for peak oil. A change in attitude towards peak oil by Central government is a pre-requisite to introducing planning for peak oil at the local level in New Zealand.

# Table of Contents

Abstract .....	ii
Table of Contents .....	iii
List of Figures .....	viii
List of Tables .....	xiii
List of Abbreviations .....	xv
Acknowledgements .....	xvii
1 Introduction .....	1
1.1 Background .....	1
1.2 Scientific Problem .....	2
1.3 Research Motivations .....	3
1.4 Research Objectives .....	4
1.5 Hypothesis .....	5
1.6 Thesis Structure .....	5
2 Literature review .....	6
2.1 Transport policy .....	6
2.2 Actors and their influences in transport policy making .....	7
2.2.1 Knowledge and Information .....	7
2.2.2 Political Influences .....	9
2.2.3 Interest groups .....	13
2.2.4 Business Groups/Industry Groups .....	15
2.2.5 The Public .....	19
2.2.6 Individuals .....	21

2.2.7	Organisations .....	23
2.2.8	Media .....	24
2.2.9	Other actors and influences.....	24
2.3	Current issues and directions in transport policy making .....	26
2.3.1	Barriers to implementing sustainable transport policy .....	30
2.3.2	Diversity in the transport policy process .....	32
2.3.3	Energy consumption in transport policy .....	33
2.4	Peak oil.....	34
2.5	Science behind peak oil.....	36
2.5.1	Alternatives to conventional oil.....	39
2.6	Peak oil and transport.....	41
2.6.1	Transport, peak oil and economic growth.....	42
2.6.2	Continuing the ‘status quo’ in a peak oil scenario.....	46
2.7	Transport policy actions addressing peak oil .....	48
2.7.1	New Zealand Peak Oil Policy and Planning .....	50
2.7.2	International Examples of Peak Oil Policy and Planning.....	52
2.8	Political science theory.....	54
2.8.1	Broad political concepts and theories .....	55
2.8.2	Policy making theories.....	56
2.9	Political science theory applied to the analysis of transport policy making’ actors and influences .....	61
2.9.1	Broad political theories and concepts linked to transport policy .....	61
2.9.2	Policy making theories, frameworks and models linked to transport policy .....	63
2.10	Other Policy Arenas.....	66

2.11	Survey Methods .....	69
2.12	Literature review conclusions .....	71
3	Conceptual Model Development .....	73
3.1	Economic growth – the dominant paradigm .....	73
3.2	An alternative paradigm .....	75
3.3	Dilemma for transport policy makers.....	76
3.4	Conceptual model diagram.....	77
4	Theoretical Framework.....	78
4.1	Introduction .....	78
4.2	Understanding the wider context: identifying key location factors .....	81
4.3	Gathering information on transport policy makers .....	83
4.3.1	Data collection method .....	86
4.3.2	Question type and structure .....	86
4.4	Results Collation .....	91
4.4.1	Key Location Factors .....	91
4.4.2	Interview Data.....	92
4.4.3	Online Survey Data.....	92
4.5	Results Analysis and Discussion.....	93
5	Case Studies .....	95
5.1	Introduction .....	95
5.2	Transport policy in New Zealand – Background .....	96
5.2.1	Political context .....	96
5.2.2	Economic context.....	97

5.2.3	National transport policy.....	97
5.2.4	Regional transport policy.....	103
5.2.5	Local transport policy .....	104
5.2.6	Key actors involved in transport policy formulation.....	105
5.3	Case study areas – Location factors .....	106
5.3.1	Transport and activity system characteristics .....	109
5.3.2	Transport budget .....	111
5.4	Case Study Areas – Transport Policy Documents .....	114
5.4.1	City 1.....	114
5.4.2	City 2.....	116
5.4.3	City 3.....	119
5.4.4	Existing Policy Documents: Level of Planning for Peak Oil .....	131
5.5	Survey Results Collation.....	132
5.5.1	Interview Results .....	132
5.5.2	Online Survey Results.....	141
6	Results Analysis and Discussion .....	193
6.1	Location Factors.....	194
6.2	Personal Factors .....	195
6.3	Beliefs about transport policy .....	195
6.3.1	Barriers to investment in sustainable transport policy .....	195
6.3.2	Economic growth paradigm.....	197
6.3.3	Incrementalism in policy making.....	197
6.4	Influential actors.....	199

6.4.1	Central government.....	199
6.4.2	Other influential actors .....	200
6.5	Knowledge of, and attitude towards, peak oil.....	200
6.5.1	Level of information about peak oil.....	202
6.6	Inter-relationships between criteria.....	203
6.7	Summary of influential criteria .....	207
6.8	Limitations of the results.....	209
6.8.1	Sample size .....	209
6.8.2	Question wording.....	210
7	Conclusions and Recommendations .....	211
7.1	Aims, Objectives and Hypothesis .....	211
7.2	Key Findings .....	211
7.2.1	Level of concern about peak oil.....	211
7.2.2	Barriers to sustainable transport policies .....	212
7.2.3	The role of Central government.....	213
7.3	Recommendations .....	214
7.4	Further Research .....	216
7.4.1	Additional data.....	216
7.4.2	Relationships between influential criteria.....	217
7.4.3	Other dimensions in the conceptual model .....	218
8	References.....	220
9	Appendices.....	240

## List of Figures

Figure 1 Global Oil Discoveries (ASPO, 2009, p.2) .....	37
Figure 2 Oil and Gas Production Profiles (2008 Base Case) (ASPO, 2009, p.2) .....	38
Figure 3 New Zealand Energy Use 2006 .....	42
Figure 4 Oil use versus GDP (PPP) per capita in 2004 for all countries with available data (OECD Transport Research Centre, 2008, p.49). .....	43
Figure 5 Global Economics and Energy (ExxonMobil, 2008, p.5) .....	43
Figure 6 Light-duty-vehicle penetration linked to GDP (ExxonMobil, 2008, p.8) .....	44
Figure 7 Global Transportation Growth (Exxon Mobil, 2008, p.10).....	45
Figure 8 Change in New Zealand diesel demand versus GDP (Brown-Santirso <i>et al</i> , 2006) .....	46
Figure 9 Conceptual model diagram .....	77
Figure 10 Influential actors and factors in transport policy planning for peak oil .....	79
Figure 11 Influential Factors: Transport and Activity Systems .....	82
Figure 12 Transport Policy Decision Making Process .....	85
Figure 13 Logical Question Structure .....	89
Figure 14 Sorting of Online Survey Results .....	92
Figure 15 Land Transport in New Zealand: Key Documents (Ministry of Transport, 2009, p.5) 99	
Figure 16 Land Transport Funding in New Zealand (adapted from NZTA, 2009, p.17 and Ministry of Transport <i>et al</i> , 2008, p.50).....	101
Figure 17 Funding alignment by activity area for the 30 year RLTS (ARTC, 2010, p.66).....	113
Figure 18 Future Challenges .....	145
Figure 19 Future Challenges – Average for Peak Oil .....	146



Figure 20 Future Challenges – By City .....	146
Figure 21 Future Challenges - By Policy Maker Role.....	147
Figure 22 Future Challenges – By Level of Concern about Peak Oil .....	147
Figure 23 Priority Vectors for Key Transport Objectives .....	150
Figure 24 Priority Vectors for Key Transport Objectives – By City .....	151
Figure 25 Priority Vectors for Key Transport Objectives – By Policy Making Role.....	151
Figure 26 Priority Vectors for Key Transport Objectives – By Level of Concern about Peak Oil .....	152
Figure 27 Economic Growth.....	152
Figure 28 Economic Growth – By City .....	153
Figure 29 Economic Growth – By Policy Making Role.....	153
Figure 30 Economic Growth – By Level of Concern about Peak Oil .....	154
Figure 31 Existing Investment in Sustainable Transport.....	154
Figure 32 Existing Investment in Sustainable Transport – By City .....	155
Figure 33 Existing Investment in Sustainable Transport – By Policy Making Role .....	155
Figure 34 Existing Investment in Sustainable Transport – By Level of Concern about Peak Oil .....	156
Figure 35 Priorities for Investment .....	157
Figure 36 Priorities for Investment – By City .....	158
Figure 37 Priorities for Investment – By Policy Making Role .....	158
Figure 38 Priorities for Investment – By Level of Concern about Peak Oil.....	159
Figure 39 Responsibility for Investment.....	160
Figure 40 Responsibility for Investment - By City.....	160
Figure 41 Responsibility for Investment - By Policy Making Role .....	161

Figure 42 Responsibility for Investment - By Level of Concern about Peak Oil.....	161
Figure 43 Barriers to Sustainable Transport Policy .....	162
Figure 44 Barriers to Sustainable Transport Policy – By City .....	163
Figure 45 Barriers to Sustainable Transport Policy – By Policy Making Role .....	163
Figure 46 Barriers to Sustainable Transport Policy – By Level of Concern about Peak Oil .....	164
Figure 47 Policy Making Style .....	165
Figure 48 Policy Making Style – By City.....	166
Figure 49 Policy Making Style – By Policy Making Role .....	166
Figure 50 Policy Making Style – By Level of Concern about Peak Oil.....	167
Figure 51 Influences on Transport Policy Content .....	168
Figure 52 Influences on Transport Policy Content – By City .....	169
Figure 53 Influences on Transport Policy Content – By Policy Making Role .....	169
Figure 54 Influences on Transport Policy Content – By Level of Concern about Peak Oil.....	170
Figure 55 Methods of Influencing Transport Policy Makers.....	171
Figure 56 Methods of Influencing Transport Policy Makers – By City .....	171
Figure 57 Methods of Influencing Transport Policy Makers – By Policy Making Role.....	172
Figure 58 Methods of Influencing Transport Policy Makers – By Level of Concern about Peak Oil .....	173
Figure 59 Level of Concern about Peak Oil .....	174
Figure 60 Level of Concern about Peak Oil – By City.....	174
Figure 61 Level of Concern about Peak Oil – By Policy Making Role .....	175
Figure 62 Level of Priority Placed on Planning for Peak Oil .....	175
Figure 63 Level of Priority Placed on Planning for Peak Oil – By City .....	176
Figure 64 Level of Priority Placed on Planning for Peak Oil – By Policy Making Role .....	176

Figure 65 Level of Priority Placed on Planning for Peak Oil – By Level of Concern about Peak Oil .....	177
Figure 66 Reasons for Not Prioritising Planning for Peak Oil .....	178
Figure 67 Reasons for Not Prioritising Planning for Peak Oil – By City .....	179
Figure 68 Reasons for Not Prioritising Planning for Peak Oil – By Policy Making Role .....	180
Figure 69 Reasons for Not Prioritising Planning for Peak Oil – By Level of Concern about Peak Oil .....	180
Figure 70 Potential Impacts from Peak Oil.....	181
Figure 71 Potential Impacts from Peak Oil – By City .....	182
Figure 72 Potential Impacts from Peak Oil – By Policy Making Role.....	183
Figure 73 Potential Impacts from Peak Oil – By Level of Concern about Peak Oil .....	183
Figure 74 Level of Information Available .....	184
Figure 75 Level of Information Available – By City .....	184
Figure 76 Level of Information Available – By Policy Making Role .....	185
Figure 77 Level of Information Available – By Level of Concern about Peak Oil.....	185
Figure 78 Additional Information Needed about Peak Oil .....	186
Figure 79 Additional Information Needed about Peak Oil – By City .....	187
Figure 80 Additional Information Needed about Peak Oil – By Policy Making Role .....	187
Figure 81 Additional Information Needed about Peak Oil – By Level of Concern about Peak Oil .....	188
Figure 82 Source of Information about Peak Oil.....	188
Figure 83 Source of Information about Peak Oil – By City .....	189
Figure 84 Source of Information about Peak Oil – By Policy Making Role.....	189
Figure 85 Source of Information about Peak Oil – By Level of Concern about Peak Oil .....	190

Figure 86 Knowledge of Peak Oil .....	190
Figure 87 Knowledge of Peak Oil - By City.....	191
Figure 88 Knowledge of Peak Oil - By Policy Maker Role .....	191
Figure 89 Knowledge of Peak Oil - By Level of Concern about Peak Oil.....	192
Figure 90 Inter-relationships between influential criteria that determine the level of planning for peak oil.....	208

## List of Tables

Table 1 Comparison of Policy Making Theories .....	61
Table 2 Statement, Answer and Level of Incrementalism .....	91
Table 3 Influential Factors .....	108
Table 4 RLTP Proposed Expenditure 2009-12 (\$M).....	111
Table 5 GPS Funding Changes .....	112
Table 6 City 1 RPS .....	114
Table 7 City 1 District Plan .....	115
Table 8 City 2 RPS .....	116
Table 9 City 2 City Plan.....	118
Table 10 City 3 RPS .....	120
Table 11 City 3/Local council A City Plan.....	124
Table 12 City 3/ Local council B City Plan.....	126
Table 13 City 3/ Local council C City Plan.....	128
Table 14 City 3/ Local council D City Plan.....	130
Table 15 Level of Planning for Peak Oil .....	132
Table 16 Interviewees by Level of Concern about Peak Oil .....	133
Table 17 Interviewees .....	134
Table 18 Beliefs about Transport Policy: All Responses .....	134
Table 19 Beliefs about Transport Policy: by city .....	135
Table 20 Beliefs about Transport Policy: by role .....	135
Table 21 Beliefs about Transport Policy: by level of concern about peak oil .....	136
Table 22 Influences on Transport Policy Makers: all responses .....	136

Table 23 Influences on Transport Policy Makers: by city .....	137
Table 24 Influences on Transport Policy Makers: by role.....	137
Table 25 Influences on Transport Policy Makers: by level of concern about peak oil .....	137
Table 26 Knowledge of, and Attitude towards Peak Oil: All responses .....	138
Table 27 Knowledge of, and Attitude towards Peak Oil: by city .....	139
Table 28 Knowledge of, and Attitude towards Peak Oil: by role.....	140
Table 29 Knowledge of, and Attitude towards Peak Oil: by level of concern about peak oil....	141
Table 30 Online Survey Respondents.....	142
Table 31 Online Survey: personal factors by city.....	143
Table 32 Online Survey: personal factors by policy maker role .....	143
Table 33 Online Survey: personal factors by level of concern about peak oil .....	144
Table 34 Pairwise Matrix.....	149
Table 35 Priority Vector Calculation.....	150

## List of Abbreviations

AA	Automobile Association
ADAC	Allgemeiner Deutscher Automobil Club (German Automobile Association)
ARC	Auckland Regional Council
ARTA	Auckland Regional Transport Authority
ARTC	Auckland Regional Transport Committee
ATA	Australian Trucking Association
ATP	Auckland Transport Plan
BCC	Brisbane City Council
BCR	Benefit cost ratio
DETR	UK Department for Transport
EROI	Energy return on investment
GDP	Gross domestic product
GPS	Government Policy Statement
IEA	International Energy Agency
LGA	Local Government Act (2002)
LTCCP	Long Term Council Community Plan
LTMA	Land Transport Management Act (2003)
NLTP	National Land Transport Programme
NRMA	National Roads and Motorists Association
NZEECS	New Zealand Energy Efficiency and Conservation Strategy
NZES	New Zealand Energy Strategy
NZTA	New Zealand Transport Authority

NZTS	New Zealand Transport Strategy
MoT	Ministry of Transport
MTAA	Motor Trade Association of Australia
RLTP	Regional Land Transport Programme
RLTS	Regional Land Transport Strategy
RMA	Resource Management Act (1991)
RPS	Regional Policy Statement
UKERC	UK Energy Research Centre
UKITPOES	UK Industry Taskforce on Peak Oil and Energy Security



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# 1 Introduction

## 1.1 Background

The efficient operation of transport systems, whether at a local, regional, national or global level, is essential in maintaining the economic and social systems. From the transportation of people, to the food we eat, to the importing and exporting of manufactured goods – all these elements and many more, rely on the transport system and the transport system, in turn, relies on the use of fossil fuels.

However, fossil fuels are a finite resource and evidence has emerged proposing we have reached, or are about to reach “the point at which total global oil production cannot grow any further and begins to decline” (Lerch, 2008, p.2). This point is commonly referred to as ‘peak oil’.

The existing global dependence on oil, and resulting disorder should significant oil supply restrictions eventuate, coupled with the negative impacts fossil fuel use has on the environment, are two major challenges facing transport planners and policy makers in the future. The International Energy Agency (IEA) demonstrates the importance of these issues in their annual publication, the World Energy Outlook (2008):

*“It is not an exaggeration to claim that the future of human prosperity depends on how successfully we tackle the two central energy challenges facing us today: securing the supply of reliable and affordable energy; and effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply. What is needed is nothing short of an energy revolution” (p.3).*

Despite these impending challenges, many transport policy makers have barely considered the possibility of significant reductions in fuel supplies in the near future, and how this could affect society. Whilst policy that attempts to protect the environment is now widely accepted as “best practice”, policy that effectively addresses potential fuel shortages in the future is uncommon. Only a small number of regions worldwide have recognised fuel shortages as a potential crisis and have formal planning in place to mitigate the effects (Lerch, 2008). Instead, transport policy making typically focuses on making transport systems more efficient, effective, and safe,

prioritising economic development whilst attempting to protect the environment (Key, 2008; Ministry of Transport, 2008; City of Melbourne, 2006; Greater London Authority, 2001).

Given the prospects of potential fuel shortages in the future, and the potential effects on the transport system, transport policy makers have an important role to play in addressing the issue. This thesis will study transport policy makers, examining their perceptions and behaviour towards the prospect of a reduction in the availability of fossil fuels, and will use political science theory to assist in the analysis.

## **1.2 Scientific Problem**

The current emphasis of transport policy making focuses on how best to use resources to enable the transport system to meet local, regional, national and global activity needs. Specifically, transport policy in the western world throughout most of the 20<sup>th</sup> century has been primarily based on securing the fast and efficient movement of people and goods. Air, sea, rail and road transport services and infrastructure are created, maintained and upgraded in order to support development, which is predominantly assessed in terms of economic growth.

Transport policies vary based on the actors and factors present in the area. Transport policy makers are influenced by a number of actors, including politicians, business communities, environmentalists, lobbyists and community groups. There are also a number of factors that influence transport policy makers: population, the characteristics of the transport system, history and culture, religion and geography, social and legal systems, and the availability of resources (Sammer 1999; Hansen, 1999). Transport policy makers also have a varying quantities and quality of information available to them to assist in the decision making process.

Although a number of transport agencies and policy makers have expressed concern about future fuel supplies, there is still the matter of *how* transport polices should address the issue. Transport policy makers have an important role to play, however it remains unclear how they perceive the issue, exactly who or what influences their perception, and even if they are prepared (or not) to put in place measures to minimise the potential impacts of fuel shortages and fuel price increases.

Based on the situation described above, the problem to be investigated in this thesis is: what are the characteristics of transport policy makers, and what influences their perception of the peak oil issue?

### **1.3 Research Motivations**

There are two motivations for carrying out this research – social and scientific.

The social motivation for this research is to make a contribution towards mitigating the potential negative effects peak oil could have on society.

The scientific motivation for this research is that there is insufficient research about planning for peak oil that looks specifically at understanding what the characteristics of transport policy actors are, and what influences their perception of the peak oil issue.

There has been a considerable amount of research about the potentially devastating consequences of peak oil, the impacts on society and the need for robust planning and policy to mitigate these impacts (Hirsh, 2005; DiPeso, 2005; McPherson and Wetzin, 2008; Connor, 2009; City of Portland Peak Oil Taskforce, 2007; Lerch, 2008). Such impacts include “high prices, economic and social turmoil, faster depletion as oil fields are depressurized from overproduction, and greater danger of international conflict...[and potentially] a crash program to boost energy production from coal and from carbon-heavy, unconventional oil such as tar sands, with resulting large-scale increases in heat-trapping carbon dioxide emissions and other pollutants” (DiPeso, 2005, p.111). It has been established that “of all the impacts of peak oil, the clearest are those on transportation, particularly use of the automobile” (City of Portland Peak Oil Taskforce, 2007, p.1). Given the transport sector is the single largest consumer of fossil fuels (60% of world oil consumption in 2006, an increase of 15% since 1973, was consumed in transport activities (International Sustainable Energy Exchange, 2006)), effective transport policies are required to reduce dependence on oil and mitigate the impacts of peak oil.

Despite the potentially devastating impacts of peak oil, policy to mitigate the effects of peak oil is absent from many government planning agendas (Lerch, 2008). Lee *et al* (2009) investigated the attitudes of local transport policy makers in New Zealand towards fuel price rises and found that “most councils (75%) are not planning on the basis of fuel price rises” (p.35).

Recent research has cited several possible factors explaining the apparent lack of concern about peak oil by transport policy makers, including conflicting information about the timing of peak oil, lack of political will to plan for peak oil, and the belief that alternative energy sources or new technologies will mitigate any peak oil impacts (Heinberg, 2007; Buchanan and Dantas, 2010).

A better understanding of the characteristics of, and influences on, transport policy makers is vital in order to understand why peak oil is not currently widely accepted as part of mainstream transport policy.

#### **1.4 Research Objectives**

In response to the scientific problem and motivations outlined above, the two main aims of this research are to:

1. To understand how transport policy makers perceive peak oil and what their are attitudes towards the issue; and
2. To understand why transport policy makers act the way they do when faced with the possibility of peak oil.

There are four specific objectives of this thesis:

1. To create a conceptual model, based on the economic growth paradigm, that looks at how transport policy actors interact at all geographical levels (globally, nationally, regionally and locally) and the factors that influence them. The conceptual model will be in the form of a diagram which shows these interactions and influences;
2. To create a theoretical framework, based on an appropriate political science theory, which outlines a method to identify the main actors and factors that influence local transport policy actors' awareness and responsiveness to the peak oil problem;
3. To conduct a case study in order to test whether or not the proposed conceptual model and the theoretical framework are applicable in reality. The case study will be carried out in three cities of varying sizes in New Zealand; and
4. To prepare recommendations as to how peak oil can be assigned a higher priority by transport policy makers.

## **1.5 Hypothesis**

The findings of the literature review suggest that transport policy makers are aware of the peak oil issue, however factors such as the on-going debate about the science behind peak oil and its timing, as well as beliefs that non-conventional oils and alternative energy sources will mitigate any future shortage in fossil fuels, have resulted in the majority of transport policy makers not prioritising planning for peak oil. Calls to adopt robust sustainable transport policies to address a problem such as peak oil are often met with lethargy because of fears of negative impacts on the economy, lack of precedence, the large timescale and ideological resistance to interventionist governance. Because of these factors, and the need for political and public acceptance of policy, transport policy makers are more likely to adopt a risk-averse, incremental policy making style.

## **1.6 Thesis Structure**

This thesis is organised into seven sections. Following this introduction, section two contains the literature review and section three outlines the conceptual model. The theoretical framework is presented in the fourth section, and the case study and results are presented in the fifth section. The sixth section details the analysis and discussion of the results of the case study. The seventh and final section gives the conclusions and recommendations of the research.

## 2 Literature review

This literature review will summarise relevant aspects within the concepts of transport policy, peak oil and political theory in order to provide background information to assist in understanding and developing this research.

### 2.1 Transport policy

Policy is described by Shaw and Eichbaum (2005) as “the sum of government activities that have an influence on the lives of citizens...[and as]... a web of decisions and actions that allocate values” (p.2). Policy is developed through a process that covers five stages: agenda setting, policy formulation, decision making, implementation and evaluation. Policy is developed by governments across many areas, including health, defence, immigration and transport, among others.

Transport policy covers all aspects of transport: land, sea and air; encompasses all geographical regions, from rural to urban; and can be formulated at local, regional and national levels. This research will concentrate specifically on *land* transport policy at the *local and regional level*.

Transport policy is described by May (as cited in O’Flaherty 1997) as “the task of politicians, and of the skilled professionals who advise them, to identify the most appropriate solutions to today’s, and tomorrows, transport problems” (p.42). Tolley and Turton (1995) provide more detail, describing transport policy as “the process of regulating and controlling the provision of transport to facilitate the efficient operation of the economic, social and political life of the country at the lowest social cost. In practice this means assuring adequate transport capacity and efficient operations to meet the needs generated by the nation’s geographical array of activities.” (p.332)

Transport policy differs from transport planning but the two terms are often used interchangeably in literature. Transport planning is carried out by transport planners and engineers and involves identifying problems or needs, looking at alternative solutions, and presenting the information to decision makers (elected officials). This information is then used by decision makers to set the transport policy (Meyer and Miller, 1984).

May (1997) describes two approaches to transport policy making: the ‘problem oriented’ and ‘objectives led’ approaches. In the problem oriented approach policy is developed as a solution to an identified problem. In the objectives led approach policy is made by first establishing objectives, and then using different policies to meet these objectives.

## **2.2 Actors and their influences in transport policy making**

Transport policy is developed by politicians based on advice from by transport planners and engineers. However, it is not solely these two groups of people involved in transport policy making; there are numerous groups and individuals who influence the politicians, transport planners and engineers. Each has their own agenda and often seeks different, and competing, outcomes (Orski, 1980).

Transport policy makers are influenced by a number of actors, including other politicians, business communities, environmentalists, lobbyists, organisations, media and community groups. There are also a number of factors that influence transport policy makers: population, the characteristics of the transport system, history and culture, religion and geography, social and legal systems, and the availability of resources (Sammer 1999; Hansen, 1999).

This chapter will examine the main actors and influences in transport policy making. Many of these actors can be categorised into different groups, for example ‘political’ actors can also be described as ‘individuals’. Likewise ‘business/industry’ actors can also be considered ‘interest group’ actors.

### ***2.2.1 Knowledge and Information***

Transport policy makers are provided with knowledge and information by professionals in the industry (engineers and planners). However, technical knowledge is not always used in a rational way, and can often be “distorted, ignored or watered down” (Colombo and Karney, 2009, p.1) by policy makers.

There are seven ways knowledge can influence the policy making process, from the first instance when the information is received, right through to the impacts of policy implementation (Adapted from SWOV, 2009):



1. Reception: policy makers receive knowledge (for example, a report that lands on their desk);
2. Cognition: policy makers read and understand knowledge in a particular way;
3. Reference: knowledge can also influence the way in which the policy maker regards reality;
4. Effort: when the knowledge influences the behaviour of a policy maker;
5. Adoption: the influence of knowledge on the policy outcomes;
6. Implementation: if the policy that has been influenced is also actually carried out; and
7. Impact: when the implemented policy produces the desired effects.

The way in which technical information is presented or communicated to policy makers can often impact on its ability to influence decision making. Turnpenny *et al* (2003) carried out a project to determine how best to tailor climate change research in order that it would be most effectively used by policy makers. They discovered the importance of communication between the researchers and the policy makers to ensure that the research carried out is relevant, easily used and understood, and the importance of building trust between researchers and policy makers.

Transport policy makers rarely respond immediately to new technical knowledge, particularly when this knowledge requires implementing policy that would require a departure from the status quo. Instead, this new information and knowledge takes time to be acknowledged and implemented into policy. Sabatier (1991) proposes that “substantive policy information is typically used in an advocacy fashion, i.e. to buttress one's position or to attack an opponent's....only rarely does a specific piece of research strongly influence a major policy decision. When that happens, it is usually because a source respected by all participants has done an excellent job. Instead, the more normal pattern is for a process of “enlightenment”” (p.148).

Sabatier (1991) goes on to describe the term ‘enlightenment’ as the situation “whereby the findings accumulated over time gradually alter decision-makers' perceptions of the seriousness of

the problems, the relative importance of different causes, and/or the effects of major policy” (p.148).

Dudley and Richardson (1998) provide an example of the process of ‘enlightenment’ in their description of how British transport policy has changed in the years since World War 2: gradually the policy makers grew to understand and accept the problem of climate change and began to include policy measures to reduce the impacts of climate change.

The ‘enlightenment’ function can be likened to the concept of ‘policy learning’, which is a process by which policy makers make changes to policy through solving problems over time and learning from the success or failures of previous policies (Vigar, 2002).

### **2.2.2 Political Influences**

As the transport policy making process involves politicians, political influences play a significant role in the formulation of transport policy. The technical knowledge presented by engineers and planners can sometimes be ‘filtered’ by politicians in the highly contentious and politicised policy making arena.

Wachs (as cited in Hanson, 1995) concludes that “although we may study transportation patterns and theories, analyze data on travel volumes and the flows of goods and services, and formulate theories of travel, transportation policy decisions are inherently political” (p.285). Like Wachs, Richardson and Haywood (1996) comment on the political nature of transport policy: “... research has confirmed the political context of transport decisions: decisions on the construction of roads are political decisions. They do not fall out automatically from the application of analytical techniques” (p.51). Banks (2004) also describes how decision making in the transport planning process can be seen as being either rational or political. He mentions, however, that the purely rational perspective “rarely acknowledges that professional planners may themselves be actors in a political process” (p.388).

Transport policy can be used by politicians as a means of gaining or maintaining popularity, votes and re-election, and as a result politicians can be more concerned with achieving short-term political goals (re-election) rather than longer-term goals to improve the transport system (sustainability) (Jouve, 2002; Gummer, 2002; Hirschi *et al*, 2002; Tolley and Turton, 1995).

Batterbury (2003) also makes the connection between transport policy and votes. He states that in the UK, in relation to transport policy from an environmental protection perspective, the government's "hands are tied by questions of electability and anti-car accusations from voters" (p.165), and that "transport policy divides political parties, social classes and neighbourhoods, and any attacks on the ease of vehicle use tend to antagonize voters" (p.152). Despite concerns about congestion and the environment associated with private car use, the Transport Act in the UK favours car owners as a result of political factors:

*"Other factions within the Labour government felt Prescott's sweeping transport proposals...would be interpreted by voting public as anti-car in their sentiment and detail...[and] as a result of political jockeying, the binding legislation that followed...was a watered-down strategic document, a sop to the middle England car owning travelling public"(Batterbury, 2003, p154).*

Due to the crucial role transport plays in every aspect of urban living, it is an easy means by which politicians can gain votes. Jouve (2002) makes this link:

*"Urban transportation appears to be a cause that is embraced by some elected representatives seeking to give themselves the appearance of leaders. As a domain through which to assert-or, at least, attempt to assert-leadership, urban transportation serves well, given the range and magnitude of problems to be dealt with (pollution, saturation of public space, economic development policy) and the fact that they demand collective action to which institutional fragmentation is not necessarily conducive. Furthermore, as a highly charged symbolic issue with clear public visibility (e.g., construction of a streetcar system), urban transportation invites harnessing by a politician (Offner 2001). When a politician's actions become identified with massive facilities, the way is paved for an impressive entrance on the political scene, as well as for an identification of responsibilities by the electorate" (p.10).*

'Acceptability' is an important concept in policy making, as the public and political acceptability of a policy will determine the success of that policy. Banister (2008) makes the link between public and political acceptability: "Public acceptability drives political acceptability, and it is

only when there is sufficient public support for change, that action will take place” (p.76). Political barriers are cited as a major constraint for implementing sustainable transport policy measures, primarily due to a lack of public acceptability (May *et al*, 2001).

Donovan *et al* (2008) indicate that implementing sustainable transport policies (such as road pricing or increased parking charges) in New Zealand, a “highly vehicle dependant nation” (p.61), is difficult. Sustainable policies struggle to gain public acceptability because “the public may not immediately understand how increases in the perceived cost of private vehicle travel will improve land use options and transport system resilience” (p.61).

Altschuler (1979) believes that American politicians are only willing to introduce transport policies that incur minimal disruption to the status quo. He states that the “change strategies will vary in political acceptability in accord with the degree to which they inconvenience powerful institutions and large or well-organised blocks of voters” (p.85). Altschuler goes on to say that it appears that American politicians have a tendency to “serve” rather than “control” constituents when it comes to transport policy, finding it “extremely difficult to apply even gentle and highly cost-effective sticks when these would discomfort large numbers of voters” (p.84).

Former US President Carter, following the oil shortages in the 1970s, commented that action was necessary to reduce the United States’ reliance on fossil fuels. However, he recognised that the American public was highly reliant on their private vehicles and would be reluctant to change their travel behaviour. He said that “addressing it adequately...would require “the moral equivalent of war” and failure to do so might result in “national catastrophe”” (Carter as cited in Altschuler, 1979, p.124). His comments describe the dilemma faced by policy makers: introducing a policy that would require a ‘war’ against the public (and their votes), in order to prevent a ‘national catastrophe’.

The links between the public and political acceptability are discussed further in Section 2.2.5.

Pirie (1980) carried out research on accessibility in transport policy and describes how issues need to be highly politicised to have a chance of being dealt with in policy making. He describes the political nature of the policy process and the dilemma of making and implementing policy aimed at improving the situation for social groups that possess little political power, which may in turn be detrimental to groups that *do* possess political power:

*“...a policy on accessibility will almost certainly aim at alleviating the inaccessibility suffered by the carless. This group comprises housewives, elderly, young, handicapped and poor, and these folk command little political power or attention relative to those concerned with things like national security, prosperity or national health (Altshuler, 1979). These circumstances could interfere significantly with getting accessibility proposals onto a political agenda, never mind implementing a policy. The situation would be worse still if policy were simultaneously to require changes in the behaviour patterns of those who enjoy superior accessibility. In the United States anyway, policies that seek to regulate voter behaviour are notoriously ill-fated (Altshuler, 1979)” (p.379).*

It is not only public acceptability and votes that influence politicians in transport policy making, but their political affiliations and ideologies can also be a factor. May *et al* (2001) discovered that “in most core cities there are deep gaps in attitudes and priorities between the political parties. Left wing and centrist parties are normally more willing to accept public transport, while the more conservative factions are more supportive of private car use” (p.52). A study carried out in the UK (Else and Trinder, 1991) published similar findings. When interviewing transport policy makers in local government regarding their perceived major transport issues, they found that there were differences in views between Labour and Conservative controlled councils. Labour controlled councils were more concerned with public transport, whereas the Conservatives were more concerned with road construction and maintenance.

These political ideologies are reflected in a recent Gallup Poll in the USA (Newport, 2009). The public were asked about their views on energy use, environmental protection and economic growth. There were clear differences in the answers based on political ideology: republicans (centre-right) were strongly in favour of prioritising economic growth and energy production over environmental protection, whereas democrats (centre-left) were slightly more supportive of prioritising environmental protection over economic growth and strongly supportive of prioritising environmental protection over energy production.

A study carried out in Austria by Hossinger and Sammer (2003), that looked at the attitudes of various transport policy stakeholders towards different transport policies, also found that the

attitudes of politicians towards different transport policies were “strongly dependant” (p.6) on which political party they belonged to. Knox and Cullen (1981) surveyed planners in the UK and concluded that “planners (and other urban managers) may be seen as the functionaries of a political apparatus which exercises its power to create a physical landscape in its own ideological image and to sustain a social environment conducive to its own preservation” (p.897).

### **2.2.3 Interest groups**

Interest groups, also known as pressure groups, or lobby groups, can have a major influence on transport policy. The groups can vary in size and influence, ranging from local organisations with a small membership to large, well known and prestigious organisations such as Greenpeace. Much interest group influence on transport policy to date has been centred on environmental issues, as is indicated in the examples below.

Shaw and Eichbaum (2005) highlight five ways in which interest groups can influence the agenda setting or policy formulation element of the policy process:

- *“Shaping the climate of public opinion;*
- *Mobilising support for government policy;*
- *Mobilising opposition to government policy;*
- *Lobbying decision makers; and*
- *Promoting policy alternatives” (p.176).*

Zografos and Tsanos (2007) identify three different types of interest groups:

1. *“Interest groups with broad societal objectives (e.g., environmental action groups, groups supporting equal mobility of citizens);*
2. *Interest groups of narrow professional interests that exert pressure to secure benefits for their own group (e.g., truck owner unions, associations of taxi drivers); and*

3. *Ad hoc citizen groups with specific objectives, such as exerting opposition or pressure against specific transport policy decisions or infrastructure projects”* (p.16).

In this section we are mainly concerned with the first type. The second type is covered in Section 2.2.4 (Business/Industry influence) and the third in Section 2.2.5 (Public influence). Gummer (2002) also makes a distinction between different types of pressure groups – those who are defending their own personal interests, e.g. protesting about a new bypass on their property, and those who are defending more global interests, e.g. concerns about global warming. Gummer goes on to explain how pressure groups can impact policy making through influencing the perceptions of the wider public on certain issues:

*“Even if environmentalist groups [do] not always succeed completely, it is their influence that sometimes gives decisions the right shape in terms of environmental sustainability, and not only in terms of political or economic benefits. Of course there are a considerable number of unnecessary pressure groups supporting minor goals, but these won’t be able to exert substantial power as they do not affect a great number of people. However, pressure groups struggling for goals the broad public can agree to will always be a decisive factor in transport decision-making, and at least these groups make the public and the decision-takers think about the pressure groups’ ideals”* (p.10).

Gummer’s findings are confirmed by a survey of policy makers and planners carried out in Canada by Hatzopoulou and Miller (2008). Selected policy makers and planners were asked to comment on stakeholders who had the most influence on the transport policy decision making process. The results established that environmental groups were often cited as being influential. Most of those interviewed “acknowledge the growing influence of environmental activism and its improved structure and lobbying power” (p.156).

Richardson and Haywood (1996) investigated transport planning in the English Pennines and describe how a number of environmental lobby groups carried out “campaigning aimed to promote as much public debate as possible, by broadening the debate to address environmental concerns, and therefore introducing new policy options” (p.51).

There are a number of factors which determine the success of an interest group in influencing the policy making process. These include their connections with influential people, the clarity of their argument, their resources and their economic leverage, among others (Shaw and Eichbaum, 2005, p.180). However, even the most well connected, and well resourced groups can fail to achieve their goals. As Batterbury (2003) states, using the example of interest groups who campaign for sustainable practices, ultimately interest groups cannot *demand* sustainable practice from the public but can merely *promote* its benefits, as they do not have the power to actually create or implement policy. In order to actually force a change in behaviour, it is the government who must carry out “comprehensive urban planning [which] must be combined with more radical actions that promote, legislate, and enforce sustainable systems” (p.165).

#### **2.2.4 Business Groups/Industry Groups**

Business or industry groups are a type of interest group that typically have a business, professional or commercial interest in a given policy area. In western society, where economic growth is paramount, the protection and promotion of interests which support the business/industry sector is crucial to achieving economic success. Such support involves implementing transport policies that ensure the fast and efficient movement of goods and people. Unfortunately this often clashes with sustainability objectives, and as a result transport policy making has frequently become a task of balancing between the often conflicting objectives of economic growth and sustainability.

A report written by Jackson (2009) for the Sustainable Development Commission in the UK, titled *Prosperity Without Growth*, highlights three propositions that support the goal of economic growth: “that material opulence is (after all) necessary for flourishing...that economic growth is closely correlated with certain basic ‘entitlements’ – for health or education, perhaps – that are essential to prosperity... [and] that growth is functional in maintaining economic and social stability” (p.7). The report provides further explanation:

*“There is evidence in support of each of these propositions. Material possessions do play an important symbolic role in our lives, allowing us to participate in the life of society. There is some statistical correlation between economic growth and key*



*human development indicators. And economic resilience – the ability to protect jobs and livelihoods and avoid collapse in the face of external shocks – really does matter. Basic capabilities are threatened when economies collapse” (p.7).*

It is because of these links between economic growth and “maintaining economic and social stability...and protecting jobs and livelihoods” (Jackson, 2009, p.7) that economic growth has become an influential force. Governments therefore govern and set policy in a way that achieves economic growth, enabling businesses to operate efficiently and society to enjoy the lifestyle, stability and standard of living they have become accustomed to. The Sustainability Development Commission Report (Jackson, 2009) highlights major problems associated with the dominant paradigm of economic growth. The report states that continued economic growth is unachievable in a world in which we must contend with both climate change and increasing scarcity of the fossil fuels.

It can be argued that policy makers are heavily influenced by business and industry because they are bound to make policy that facilitates economic growth. Lindblom (1982) suggests, in his paper *The Market as a Prison*, that policy is “imprisoned” (p.331) by the market economy. He proposes that in a capitalist society “the free market constrains policymakers to reject out of hand virtually all policy changes that are detrimental to business. Within capitalist economies, any attempt to alter fundamental institutions automatically triggers “punishment,” in the form of unemployment or a sluggish economy” (Lindblom as cited in Hayes, 2001, p.56).

Lindblom (1982) has argued that corporations occupy “a privileged position” (p.326) in capitalist societies. Because prosperity helps government officials remain in office, these officials are “naturally solicitous of the needs of business. Business leaders receive automatic access, whereas other groups must compete to make their views heard” (Lindblom as cited in Hayes, 2001, p.55-56).

Hayes (2001) outlines several ways in which businesses wield significant power in policy making, namely because “business managers in effect serve as a second set of public officials in capitalist economies, insofar as a wide range of activities that affect the entire public are delegated into their hands” (p.58). He also proposes that businesses have an advantage over other groups in that they are often approached by government to provide technical expertise. He cites

the example of the US Government obtaining information about oil reserves from the oil industry and states that this relationship provides businesses with special access to policy makers, which is not available to all interest groups. Hayes describes businesses as having “unparalleled legitimacy...because capitalism is so entrenched within the Western democracies, the narrow class interests of business come to be equated with the broader national interest... in serving the interests of business and in helping capitalist enterprise to thrive, governments are really fulfilling their exalted roles as guardians of the good of all” (pp. 59-60).

Examples of the importance placed on business and economic growth in transport policy are numerous: Bulkeley and Rayner (2003) comment on the “local authorities’ fears of alienating their electorates and damaging economic competitiveness vis-a`-vis neighbouring authorities” (p.50) when attempting to implement travel demand management measures in transport policy. Scholler-Schwedes (2009), when analyzing German transport policy, noted that the policy is “dominated by criteria of economic efficiency, and environmental and socio-political measures are only a by-product” (p.1). In New Zealand, the priority for the government in terms of land transport funding is economic efficiency, as evidenced by the introductory statement in the Government Policy Statement on Land Transport Funding 2009/10-2018/19 (Ministry of Transport, 2009): “the government’s priority for its investment in land transport is to increase economic productivity and growth in New Zealand” (p.1).

Using climate change policy as an example, we can see how an attempt by the New Zealand government to put environmental objectives before economic growth received criticism from the influential farming sector. In commenting on the government’s emissions trading scheme, the Fonterra<sup>1</sup> chief executive said: “what is the point in New Zealand losing out economically for no potential global atmospheric gain... the existing scheme needs modification to ensure New Zealand makes the best possible contribution to long-term global climate stabilisation without compromising economic growth” (NZ Herald, 2009).

Laird *et al* (2001) describe the on-going dilemma in managing both economic growth and traffic growth in Australia: “with the steady growth of traffic on urban roads, and ever more ‘loads on

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<sup>1</sup> Fonterra is a multinational dairy company based in New Zealand.

roads', even government has reached the conclusion that 'something must be done'. The problem is what should be done that will not only not slow the economy, or upset the next election, but also not unduly offend a host of lobby groups associated with vehicles and road transport" (p.158).

Due to the domination of the private car in land based transport, groups in the car industry are powerful influences in transport policy making. Laird *et al* (2001) give examples of the pro-road/pro-car groups in Australia, including the National Roads and Motorists Association (NRMA), citing instances when NRMA lobbying was linked with the upgrade of major Australian highways. As in many other developed countries, Australia has a significant industry centred on supporting cars, including manufacturing, supply, repairs and services. In 1998-99 the Motor Trade Association of Australia (MTAA) turned over \$83 billion and employed more than 230,000 Australians. The MTAA has a strong presence in Canberra and the executive director said his role is to work with government "to stop processes happening which would be inimical to the interests of our members; the rest is about trying to create or direct favourable processes" (Laird *et al*, 2001, p.122). The Australian Trucking Association (ATA), Austroads and the National Road Transport Commission are other powerful influences on government transport policy making.

The German Automobile Association (ADAC) has 17 million members. Their monthly magazine "addresses directly 17 million voters and their family members, so it has a strong influence on policy makers" (Laird *et al*, 2001, p.194). The ADAC, like the NRMA, is a powerful lobby group for pro-roads policy in Germany (Rothengatter in Button and Hensher, 2001).

Businesses and industry can also influence policy through donations to political parties. In Australia companies such as Toyota, Ford, Hills Motorway Pty Ltd, the Bus and Coach Association and road construction companies all make political party donations (Laird *et al*,

2001). In New Zealand the Road Transport Forum (RTF)<sup>2</sup> made donations to political parties before the 2008 election totalling close to \$100,000 (Trevett, 2009).

As well as the car industry, the construction industry and developers who benefit from certain transport projects are powerful and wealthy groups who can influence transport policy. Meyer and Miller (1984) cite Hamer's finding in a study of planning for rail in the US. He found that "an interesting hypothesis links the advocacy of rail rapid transit to an unhealthy relationship between regional decision makers and various pressure groups. These include downtown property owners, contractors, and consultants who might be called on to build the recommended systems" (p.84).

Calavita and Caves's (1994) survey of planners in San Diego discovered that when "asked to comment on growth, the planners end up talking about the politics of growth, about the ways in which their goals of a rational and efficient development pattern are thwarted by powerful special interests, which usually have a strong interest in urban growth" (p.495). These powerful special interests are likely to be the developers, contractors and consultants whose businesses rely on such urban growth.

Hatzopoulou and Miller's (2008) study in Canada noted that the business and industry community was the second most influential stakeholder in transport policy related decision making, behind environmental groups. May *et al* (2001), in interviewing transport decision makers in several European cities, also highlighted the influence of business groups, saying that "a substantial majority consider that business interests and the general public have a strong influence on decisions" (p.21).

### **2.2.5 The Public**

The public can influence policy through a range of means, including public demonstrations, pressuring politicians using their voting power, through joining interest groups and through the public consultation process. The public consultation process has become entrenched in the policy

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<sup>2</sup> The Road Transport Forum is "a nationwide organisation of voluntary members drawn from the road transport industry and includes owner-drivers, fleet operators and providers of services to freight transport operators. The Forum provides services to and public policy advocacy for its members" (RTF, 2009).

making process in recent times (Booth and Richardson, 2001) and has been a source of debate in many countries. Wood and Blancher (1999) investigated the role of the public in influencing transport policy in France and the UK. They concluded that often there is a conflict between citizen groups and the decision makers, with citizen groups often being “branded as troublemakers” (p.255). Decision makers, on the other hand, were being accused of carrying out public consultation as “a mere marketing operation, or even sheer manipulation” (p.255).

Not only do the public use the consultation process to raise awareness about issues, but they can also join together to form citizen groups. Unlike interest groups, which are usually formally organised, or business groups with commercial interests, citizen groups are usually concerned with localised issues, for example a group of locals concerned about a new highway being constructed in their neighbourhood. As a result of advancements in media and knowledge availability via the internet, the public is now better informed on many transport related issues such as sustainability, health, safety and congestion, and consequently tend to be more vocal. This makes it easier for them to participate in groups or consultation, and make their views heard.

Hatzopoulou and Miller’s (2008) study in Canada noted that the public was the third most influential stakeholder in transport policy related decision making, behind environmental groups and the business and industry community. They highlighted that “participants recognise the growing influence of community leagues (groups of neighbours that get together through organized meetings and advocate on issues that affect communities such as recreation, sports and social activities; they have no legal status). In fact, if the results for community leagues and public at large are added together, they would lead to a significant stakeholder group indicating the growing importance of local citizens/affected populations” (p.156).

The way in which policy makers view and understand the public’s concerns can influence how they develop policy. Sammer (1999) concluded: whilst politicians do take into account the attitude of the public towards a proposed policy, sometimes their perception of the public’s attitude may be incorrect, resulting in problems with implementation and public acceptance. A number of other studies have also found that there are differences between what the policy makers perceive to be public opinion, and what public opinion *actually* is, with particular

reference to the acceptability of ‘anti-car’ sustainable transport policies (Schade and Schlag, 2000).

In one study in Europe (Blessington in Manners, 2002) “84% of the public and 85% of politicians supported investment in public transport; however, only 49% of politicians *believed* that the public agreed with them” (p.10). Another study in Sydney (Glazebrook in Manners, 2002) found that “70% of the residents of Greater Sydney and 89% of decision-makers supported using road budget funds to improve public transport development. However, decision-makers *thought* that only 56% of the public would support sustainable transport outcomes” (p.10).

It is therefore vital that policy maker’s perceptions of the public’s attitudes are correct. Vang *et al* (2007) found that when transport planners were provided with more information about the public’s attitudes the planners “could change their own attitudes in accordance with public desires” (p.8). In this way communication between policy makers, planners and the public is vital to ensure the success of any policy. Manners (2002) concludes that increased public participation in the decision making process, resulting in “social learning” (p.ii) about sustainability in transport, will help to improve implementation of sustainable transport policy.

### **2.2.6 Individuals**

As well as interest and business groups and the general public there are certain individuals whose status, political influence and charismatic ability can be influential in the policy making process. Dudley and Richardson (2000) discovered that certain individuals played key roles in the shift in policy in the UK from road building as the dominant transport policy, to one of a more sustainable nature. They use the term “policy entrepreneur”(p.237) to describe “advocates who are willing to invest their resources – time, energy, reputation, money – to promote a position in return for anticipated future gain in the form of material, purposive, or solidary benefits” (p.237). These ‘policy entrepreneurs’ can be government ministers, leaders of groups or other influential members of society.

Dudley and Richardson (1998) give the example of John Tyme as a ‘policy entrepreneur’ in transport policy making in the UK. Tyme was instrumental in the shift in emphasis of transport policy in the UK away from a dominant culture of road building. He was described by Dudley

and Richardson as “a zealous individual who believed that the motorway programme posed a consummate evil, and constituted the greatest threat to the nation in all its history... he proved to be a shrewd political tactician, making particularly skilful use of the mass media to convey the new image and new message to a wider audience and to other arenas” (p.735).

Not only can individuals from outside the policy process have an impact, but also the attitudes, values and ethics of individual transport policy makers themselves play a role in influencing transport policy. Calavita and Caves (1994) comment that “while attitudes are of course not synonymous with behaviour or professional practice, they do influence our interpretations” (p.483). Wachs (1985) comments that transport planners have “a variety of personal agendas, priorities, educational backgrounds and experiences that influence policy making” (p.528). Howe and Kaufman (1981) came to a similar conclusion: “little is known about planners’ substantive values, but personal values do impinge on professional work” (p.266).

Howe and Kaufman (1981) found that the political views and professional role of planners were prominent factors in determining their attitudes towards different aspects of planning. It has also been established that “personal differences, rather than training or organisational setting, explained response patterns [when faced with a number of scenarios]” (Wachs, 1985, p.529). Planners can be put into different categories as to how they will act in a planning organisation (adapted from Wachs, 1985):

- Technicians: loyal to the organisations, less likely to be political, likely to follow rational comprehensive model of decision making;
- Politicians: planners had stronger ideological commitments and believed in using their positions within organisations to attain policy outcomes which they considered important. Weaker technical skills, stronger political skills (e.g. verbal communication);
- Entrepreneur: could operate effectively in both technical and political realms (rare); and
- Hybrids or Pretenders: planners who were to some extent technicians and to some extent politicians, but not particularly skilled at either.

It can be seen that political affiliations, up-bringing, race and values, among other things, will influence how policy makers, and those individuals who influence policy makers, perceive

certain situations. A more detailed discussion of these aspects of influence on policy makers would require more investigation into behavioural science, and is beyond the scope of this research.

### **2.2.7 Organisations**

Policy makers do not operate in isolation, but are influenced by the culture and structure of the organisation within which they are working. Hammond and Knott (1999) ask the question “To what extent can top-level appointed political executives make significant policy choices?” (p.35). In attempting to answer this question they comment: “at one extreme are arguments that public managers are so constrained by large-scale political and institutional forces that they have little room for significant choice....At the other extreme, however, are accounts of political executives who were able to forge great changes in public policies and so to appear to have been less constrained by political and institutional forces” (p.35-36).

Jouve (2002) comments on how institutional differences between cities in Europe influence transport policy: “according to neo-institutionalist literature, institutions do not emerge as mere political arenas but as constructs helping to define the preferences of actors and the way they conduct their strategies, permitting certain behaviours while valorising or forbidding others” (p.2).

Booth and Richardson (2001) comment on the organisational influence on policy, saying that the “organisational culture of transport planning [where] transport professionals are the experts, they know best what peoples transport needs are,...creates a cultural barrier to progress within the profession” (p.148). They also note that “political and statutory constraints continue to stifle the development of imaginative new policy approaches...the power of embedded organisational cultures should not be under-estimated” (p.148).

Dodson and Sipe (2005) highlight how institutional bias towards certain modes of transport can influence the implementation of sustainable transport policy, citing in particular:

*“The common subordination of public transport agencies relative to road agencies leads to transport policy outcomes that favour road investment over alternative modes....any consideration of the future impacts of rising fuel costs needs to be*



*undertaken with an appreciation of the influence of differing institutional prerogatives and preferences”(p.26).*

Organisational influence is strongly tied to the ‘political discourse’ and ‘storylines’, discussed in Section 2.2.9, as well as by the underlying political ideology of the organisation.

### **2.2.8 Media**

The ease with which information is both sent out and received has increased dramatically in past decades, through mediums such as the internet and satellite television. As a result, the ability of the media to influence policy has also increased. Howlett and Ramesh (1995) state that the “media portrayal of public problems and proposed solutions often conditions how they are understood by the public and government, thereby shutting out some alternatives and making the choice of another more likely” (p.59). The media can not only manipulate others, but also be manipulated themselves, by actors in the policy making process who can provide “selected information to media to bolster their case” (Howlett and Ramesh, 1995, p.59).

The media also plays a key role in assisting interest groups to bring their concerns into the public arena, for example Greenpeace’s protests often gain media attention, thereby publicising and politicising their viewpoint (Gummer, 2002).

### **2.2.9 Other actors and influences**

Other factors which also influence transport policy makers and planners include resources, the transport system, the activity system, legislation and discourse.

The resources available will play a large role in determining the makeup of transport policy, as policy makers must work within a set budget. In New Zealand, local transport policy is influenced from a funding perspective by the National Land Transport Programme (NLTP) and Government Policy Statement (GPS) on Land Transport Funding.

The activity system, comprised of geographical factors unique to the local environment, including population, landscape, and size, as well as economic factors such as the relative wealth of the area and the businesses or industries operating there, will also have an influence (Dantas *et al*, 2007). The operation of the transport system itself also naturally influences transport policy.

This includes factors such as the network configuration, the vehicles, the way the system operates and any technology used (Dantas *et al*, 2007).

Transport policy makers and planners are bound to act within the statutory and legal boundaries within which they operate. In New Zealand, local authorities' district plans, transport strategies and district roading programmes must be consistent with regional plans and strategies (including the regional land transport strategy (RLTS)) and national plans and strategies (including the New Zealand Transport Strategy (NZTS)). The Resource Management Act (1991) (RMA) and Land Transport Management Act (2003) (LTMA) must also be adhered to (Wilson, 2003)<sup>3</sup>.

'Policy discourse' is another important influence in the policy making process. Policy makers cannot be expected to view a problem or situation in a purely objective way. Instead they view situations and problems through a lens which is coloured by their "history, traditions, attitudes and beliefs" (Howlett and Ramesh, 1995, p.110) and the history and traditions of the organisation within which they work.

Another influence on actors in policy making is the concept of a 'storyline'. Hajer (as cited in Fischer, 2003) describes a 'storyline' as "a generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific or social phenomena" (p.86). The role of a 'storyline' is "to position social actors and institutional practices in ongoing, competing narratives. In the process they stress some aspects of an event and conceal or downplay others" (p.87). Examples of 'storylines' in transport policy are "that excessive demand for road space can be managed by congestion pricing" or that "building roads will bring economic growth" (Low in Albrechts, 2005, p.53). Similar 'storylines' were found in a study of transport planning documents produced in Auckland, New Zealand over the past 50 years (adapted from Matthews and Imran, 2010):

- Economic storylines focus on road building as a prerequisite for successful industry and freight movement;

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<sup>3</sup> More detail about the New Zealand legislation and policy documents related to transport can be found in Section 5.2.

- In terms of mobility storylines, the limitations of rail are used to argue for roading development in the region;
- Safety storylines, when used, are worded in a manner that promotes vehicle travel; and
- Consumer storylines focus on public preference to justify road building.

Matthews and Imran (2010) concluded that:

*“All these storylines have given priority to short term economic concerns while ignoring the ecological foundation of urban transport planning. In fact, these storylines promote a right and true solution for transport in Auckland based on road development. Therefore, the research concludes that language advances certain ideas, prompts certain values, defines certain roles and eventually proposes certain outcomes which shape overall knowledge and that these patterns of belief are ultimately hard to change” (p.4)*

In order for policy to change, ‘storylines’ must change or new storylines must be introduced (Dudley and Richardson, 2000). Matthews and Imran (2010) suggest that new ‘storylines’ may be being developed in Auckland as the most recent planning documents appear to focus more on multi-modal solutions than purely on roading.

### **2.3 Current issues and directions in transport policy making**

Transport policy making focuses on how best to use resources to enable the transport system to meet local, regional and global activity needs. Specifically, land transport policy in the western world throughout most of the 20<sup>th</sup> century has been primarily based on securing the fast and efficient movement of people and goods, and has largely focussed on providing for the private motor vehicle and heavy vehicles (freight) through building roads. Transport services and infrastructure are developed, maintained and upgraded in order to support economic development, and are mostly assessed in economic terms, using the benefit-cost ratio (BCR) as a measure. An example of the focus of economic growth can be seen in the New Zealand Government’s Statement of Intent, produced by Treasury (2010), which focuses on “optimising the contribution of infrastructure to economic growth by ensuring that the supply of

infrastructure is secure and reliable and that its use and management are efficient...[and] on reducing the barriers to growth caused by bottlenecks or deficits in infrastructure” (p. 20).

The traditional method of transport policy making and planning has been based on what is commonly referred to as the ‘predict and provide’ method, where transport planners predict future demand for transport and provide for this forecast demand through increasing capacity on the roading network (Bertolini *et al*, 2008; Vigar, 2002).

The ‘predict and provide’ method gained momentum in the last half of the 20<sup>th</sup> century along with the popularity of the private car. In this period, as private car use increased personal mobility, people began to move to the outer suburbs of cities resulting in urban sprawl. Compared to other modes, the private car has become incredibly popular due to its perceived low costs of travel, in terms of time, money and convenience. As an example, in New Zealand, the cost of purchasing and running a car is relatively cheap thanks to (a) cheap Japanese second hand car imports, (b) third party insurance not being compulsory, (c) vehicle registration being relatively cheap, (d) fuel price and the level of government tax on fuel being low, and (e) plentiful and cheap parking (Thull, 2009; Peterson, 2000). As a result, car ownership levels in New Zealand are one of the highest in the developed world (Chamon *et al*, 2008). External costs associated with car use, such as increased congestion and pollution, are not paid by the user.<sup>4</sup> Other factors such as social status, emotion, social norms and habit have also led to the dominance of the private car as a mode of transport (Thull, 2009). Transport planners have traditionally catered for the popularity of cars by building more roads to ‘provide’ for the demand. In the last half of the 20<sup>th</sup> century public transport use declined, an example being in Melbourne where “no major rail extensions have taken place since the 1930s, despite an extra 2.7 million residents” (Metropolitan Transport Forum, 2008, p.17).

Steg and Tertoolen (as cited in Terry, 2004) propose that there are very strong behavioural and social reasons for the dominance of car use, based around the attributes of the car: “speed, comfort, flexibility...feelings of power or superiority...the car has the potential to impress, while catering to feelings of self worth” (p.73). They go on to say “the advantages of car use encourage

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<sup>4</sup> See section 2.9.1 for more about the external costs of transport and policy

it to become a habit. People develop activity patterns and a lifestyle that are turned towards the use of a car. It appears that people will mostly reconsider habitual behaviour only when radical changes are introduced into the situation, causing them to re-evaluate the choices they have hitherto made automatically” (p.74).

All of these factors have resulted in what Banister (2008) describes as “car dependence and the increased decentralisation of cities...[which is a]...difficult processes to reverse” (p.73). However he believes that “sustainable mobility provides an alternative paradigm within which to investigate the complexity of cities, and to strengthen the links between land use and transport” (p.73). A desire for ‘sustainable mobility’ has arisen as a result of increasing concerns about congestion, the external costs associated with private car use, urban sprawl, the detrimental environmental, health and social impacts of increased road building and the ‘predict and provide’ paradigm of transport planning. As a result there has been a shift in emphasis to a broader, more multi-faceted style of transport planning that considers environmental protection, alternatives modes to the private car, and integration with land use planning (Bertolini *et al*, 2008).

This new style of transport planning has been termed ‘new realism’ (Bulkeley and Rayner, 2003; Donovan *et al*, 2008; Willson *et al*, 2003; Bertolini *et al*, 2008; Hine, 2000; Ward *et al*, 2007; Vigar, 2002). Bertolini *et al* (2008) outline four features of the new style of transport planning:

*1. The first defining feature of the emerging urban transportation planning is that it is a discipline in the midst of a paradigmatic transition (in the sense of Kuhn, 1962). New planning goals (achieving sustainable mobility), processes (collaborative planning), tools (such as accessibility measures) are being introduced and increasingly also applied, but this does not appear a consolidated body of knowledge or approach. Old goals (easing congestion), processes (rational-technical planning), and tools (such as the four-step model or level of service indicators) are still there, and...[are] deeply engrained in the existing institutions and practices.*

*2. The second distinctive feature of the emerging urban transportation planning is related to its overarching aim: achieving sustainable urban mobility, as part of a broader effort towards enhancing quality of life in cities.*

3. *The third distinctive feature of the emerging urban transportation planning: the importance of collaboration, integration and exchange with other professions and policy sectors. The emerging urban transportation planning is much more multi-inter- and trans-disciplinary than its traditional counterpart.*

4. *The fourth and final distinctive feature of the emerging urban transportation planning cuts across much of the above. It stems from the recognition that such things as collaboration across disciplines and policy sectors, stakeholder engagement, and public acceptability are key to progress. This demands that urban transportation planning becomes a much more communication-oriented activity” (Bertolini et al, 2008, p.71).*

The editorial in the Transport Policy Journal (Hine, 2000) describes the widespread nature of the shift towards this alternative paradigm of ‘sustainable mobility’:

*The recent UK Transport White Paper ‘A New Deal for Transport’ and subsequent ‘daughter documents’ have signalled the need for an overhaul of transport policy in the UK (DETR, 1998a,b,c, 1999, 2000a,b). Parallel developments in Europe, the United States and elsewhere have also signalled the importance and need for more sustainable and integrated transport systems (European Commission, 1998; Ministry of Transport, Public Works and Water Management, 1998; US Department of Transportation, 2000). The last 40 years have witnessed rising levels of car dependence and rapid social change. The increase in car dependence has been accompanied by a heightened sensitivity to the environmental impact of traffic and congestion and the health impacts of these transport trends (RCEP, 1994; Hine, 1998)... It is clear then that transport policy must engage increasingly with other sectors to deliver a truly integrated approach, ‘new realism’ (Goodwin et al., 1991) is now a national policy goal” (p.175).*

The same editorial elaborates on the new integrated approach being proposed by the UK Department for Transport (DETR):

- *“Integration within and between different types of transport-so that each contributes to its full potential and people can move easily between them;*

- *Integration with the environment-so that our transport choices support a better environment;*
- *Integration with land use planning-at national, regional and local level so that transport and planning work together to support more sustainable travel choices and reduce the need to travel;*
- *Integration with our policies for education, health and wealth creation-so that transport helps to make a fairer, more inclusive society (DETR, 1998a, p13)” (p.175).*

### **2.3.1 Barriers to implementing sustainable transport policy**

Despite the ‘predict and provide’ paradigm’s flaws being recognised, and the call for a more wide-reaching, integrated policy arena, the ‘predict and provide’ method is still present in transport planning – road construction tends to dominate policy (Ward *et al*, 2007). This is a major issue in current transport planning and policy making processes: there appears to be a reluctance to move away from the traditional ways of conceptualising and addressing transport problems, despite widespread understanding of its faults. Owens (1995) describes this problem in the UK:

*“UK transport policy in the mid 1990s presents a paradox. On one hand there is a pervasive sense of crisis, fluidity and change...on the other hand there is a feeling, amounting sometimes to resignation, that underlying rigidities, ideologies and interests will make it difficult, if not impossible, to move from where we are now to a more sustainable transport future” (p.43).*

Dominant ‘storylines’ that promote road building are often cited as barriers to implementing sustainable transport policy (Matthews and Imran, 2010; Albrechts, 2005). Albrechts (2005) uses this concept to describe the reluctance of different groups to move away from traditional methods of transport planning:

*“...the well known ‘predict and provide’ storyline...appeals to engineers who like the scientific appearance of statistical modelling...‘technical fix’ appeals to those who*

*like technical innovation: there is no need to worry about greenhouse emissions...because vehicles will soon be powered by hydrogen-based fuels cells. The storyline that excessive demand for road space can be managed by congestion pricing appeals to economists...planners have aligned with road building policy by the storyline that low-density cities cannot be served effectively by public transport. Politicians are particularly attracted by the storyline that building roads will bring economic growth. All these stories point to one solution: build more and better roads” (p,53).*

Studies in both New Zealand and the UK confirm that transport staff at the local government level often face several barriers in the implementation of sustainable transport policies (Hull *et al*, 2006; Hull *et al*, 2008; Lee *et al*, 2009). These studies carried out surveys with transport staff and discovered that they faced problems with funding for sustainable transport, organisational barriers (such as a lack of integration between agencies), political barriers, problems with public perception and acceptability, difficulties with modelling alternative modes (lack of data), and contradictory land use planning.

The NZ study (Lee *et al*, 2009) found that “current planning and transport policy appears to be directed towards accommodating the car before other modes” and that “major barriers to securing change are public perception, councillors (in their decision-making capacity) and funding” (p.8). The study concluded that there is a disconnect between planners and transport staff and a lack of robust data for sustainable modes (bus, walk, cycle) and that combined, these factors result in “mixed and uncoordinated messages” (p.6). This makes it difficult to “persuade the public and councillors of the need for a shift in emphasis away from car-based transport or to make significant investment in public transport, cycling, walking or other modes” (p.8).

It has been established that reduced travel time and travel cost are reasons why people will choose to drive rather than use public transport, and that in order to see a mode shift the public transport system needs to be highly efficient and cheap to use (Kamba *et al*, 2007). The cost of developing an efficient and cheap public transport system is often a barrier to implementing such a system, especially given the general lack of funding for sustainable transport (Hull *et al*, 2006; Hull *et al*, 2008; Lee *et al*, 2009, ARTC, 2010).



### 2.3.2 *Diversity in the transport policy process*

For transport policy makers and planners, the discipline has evolved to become far more complex than a simple technical exercise of predicting flows and providing for the demand. As described in Section 2.2, there are now a wide range of groups and influences that are involved in the transport planning process. Booth and Richardson (2001) describe how transport planners in the UK must take this into account:

*“Instead of ‘fixed route’ planning (Nijkamp and Blaas, 1994), transport planning has become a multi-agency, multi-sectoral, multi-modal process which must balance and engage with a wide range of interests, issues and policy arenas. Nijkamp and Blaas (1994) describe it as a ‘multi-dimensional activity focusing on multiple (public & private) interests with a strong emphasis on conflict resolution’. They argue that traditional technocentric approaches to transport planning and the associated decision support mechanisms are no longer capable of being responsive to this changing context” (p.142).*

Due to the increasingly diverse interests of the actors and stakeholders in today’s transportation systems, a transport planner or policy maker can no longer be purely technically minded, but must instead be “a facilitator of debate, a mediator who helps resolving disputes by structuring the negotiating and bargaining process” (Orski, 1980, p.40).

Due to the wide range of interests and influences, transport policy making and planning has become far more political, as described in Section 2.2.2. Manners (2002) describes the current situation in transport planning from a political viewpoint – what he terms a “transport planning gridlock” (p.9). In this ‘gridlock’ the politicians require support from the public in order to successfully implement sustainable transport policies, however policies that discourage car use are often perceived to be unpopular with the public. Conversely, there is often vocal opposition to road building projects, and as a result politicians are “hopelessly caught between public opinion *for* roads and public opinion *against* roads” (Manners, 2002, p.9). In a society in which private car use has become the dominant mode of travel, “governments perceive that to try to reduce road vehicle use would be very unpopular, particularly as road transport is seen as being

economically important and it is linked to “individual freedom” (Michaelis; IPCC; Hillman; Himanen *et al.*; Lyons; and Rajan in Trodhal, 2007, p.70).

Despite fears of a lack of public acceptability of introducing travel behaviour policy ‘sticks’, and a resulting lack of political will, there are examples where attempts have been made to impose the external costs of travel onto users, as in the case of the congestion charging system recently introduced in central London. Banister *et al* (2007) describe the situation in London:

*It represents a watershed in policy action. The idea had been around for many years, but no politician had the conviction of actually taking it forwards. Even with a new Mayor hugely committed to congestion charging, it was a struggle to get it through the legal, planning and political processes within a 30 month period (1st July 2000 to 17th February 2003). This relates strongly to the issue of the conflicts between long and short-term strategies (Banister, 2003). The long term view is that congestion charging is an essential element of a sustainable transport strategy, whilst the short-term view is that it is almost impossible to introduce in a four-year electoral cycle (as exists in the UK)” (p.17).*

Wachs (1985) believes there is a need for transportation research to be carried out on the softer sides of transport planning, in order to gain a better understanding of “the social, economic and political meaning of planning and decision-making processes, and the institutions that we have created for carrying them out” (p.522).

### **2.3.3 Energy consumption in transport policy**

Despite the “transport planning gridlock” (Manners, 2002, p.9) and social and political elements described above, the need to shift towards more integrated transport planning that embraces sustainability and accessibility concepts is now widely recognised. However, it appears that another fundamental concept for the future – energy consumption in transport – is not as widely recognised as being of importance in the development of transport policy. Rarely are energy policy and transport policy linked (Timney, 2007). This is despite an increasing number of studies and reports citing energy consumption as being a major concern for the transport industry in the future (Hirsch *et al*, 2005, OECD Transport Research Centre, 2008, UK Industry

Taskforce on Peak Oil and Energy Security, 2008). The Transportation Research Board produces a document called *Critical Issues in Transportation*. In the 2009 Update of this document energy consumption is cited as one of the critical issues for transportation (Transportation Research Board, 2009a).

Several papers have identified the problems associated with the link between urban sprawl and increased energy consumption (Transportation Research Board, 2009b, Banister *et al*, 1997, Anderson *et al*, 1996, Breheny and Rookwood, 1993). Dantas *et al* (2005) have recognised the critical part energy plays in transport and investigated the impacts energy shortages would have on suburban transport systems. They concluded:

*Recent fuel shortage events and soaring petroleum prices combined with urban sprawl development tendencies and serious concerns about fossil fuel reserves indicate that energy has to be carefully incorporated in the transportation planning process. Although many planning authorities and scholars have dedicated considerable efforts in relating energy consumption with urban development forms, energy constraints such as fuel shortage events or crisis have been practically ignored. Moreover, the long-term consequences of planning decisions have not totally contemplated extremely high energy requirements that society may face in the future versus the likelihood of oil total or partial depletion scenarios" (p.12).*

Concerns about future energy consumption in the transport sector are largely driven by an issue commonly referred to as 'peak oil'. Peak oil is discussed in further detail in the following section.

## **2.4 Peak oil**

The concerns about energy consumption in transportation in the future relate to a concept known as peak oil. Peak oil has been defined as:

*"The maximum rate of the production of oil in any area under consideration, recognising that it is a finite natural resource, subject to depletion." (OECD Transport Research Centre, 2008, p.46)*

and:

*“The point at which the depletion of existing reserves can no longer be replaced by additions of new flow capacity” (UK Industry Taskforce on Peak Oil and Energy Security, 2008, p.4)*

One of the first reports to concentrate on peak oil was produced for the US Department of Energy and is commonly referred to as the Hirsch Report (Hirsch *et al*, 2005). This report provides a summary of key concepts about peak oil:

- 1. When world oil peaking will occur is not known with certainty. A fundamental problem in predicting oil peaking is the poor quality of and possible political biases in world oil reserves data. Some experts believe peaking may occur soon. This study indicates that “soon” is within 20 years.*
- 2. The problems associated with world oil production peaking will not be temporary, and past “energy crisis” experience will provide relatively little guidance. The challenge of oil peaking deserves immediate, serious attention, if risks are to be fully understood and mitigation begun on a timely basis.*
- 3. Oil peaking will create a severe liquid fuels problem for the transportation sector, not an “energy crisis” in the usual sense that term has been used.*
- 4. Peaking will result in dramatically higher oil prices, which will cause protracted economic hardship in the United States and the world. However, the problems are not insoluble. Timely, aggressive mitigation initiatives addressing both the supply and the demand sides of the issue will be required.*
- 5. In the developed nations, the problems will be especially serious. In the developing nations peaking problems have the potential to be much worse.*
- 6. Mitigation will require a minimum of a decade of intense, expensive effort, because the scale of liquid fuels mitigation is inherently extremely large.*
- 7. While greater end-use efficiency is essential, increased efficiency alone will be neither sufficient nor timely enough to solve the problem. Production of large*

*amounts of substitute liquid fuels will be required. A number of commercial or near-commercial substitute fuel production technologies are currently available for deployment, so the production of vast amounts of substitute liquid fuels is feasible with existing technology.*

*8. Intervention by governments will be required, because the economic and social implications of oil peaking would otherwise be chaotic. The experiences of the 1970s and 1980s offer important guides as to government actions that are desirable and those that are undesirable, but the process will not be easy.”(p.5)*

## **2.5 Science behind peak oil**

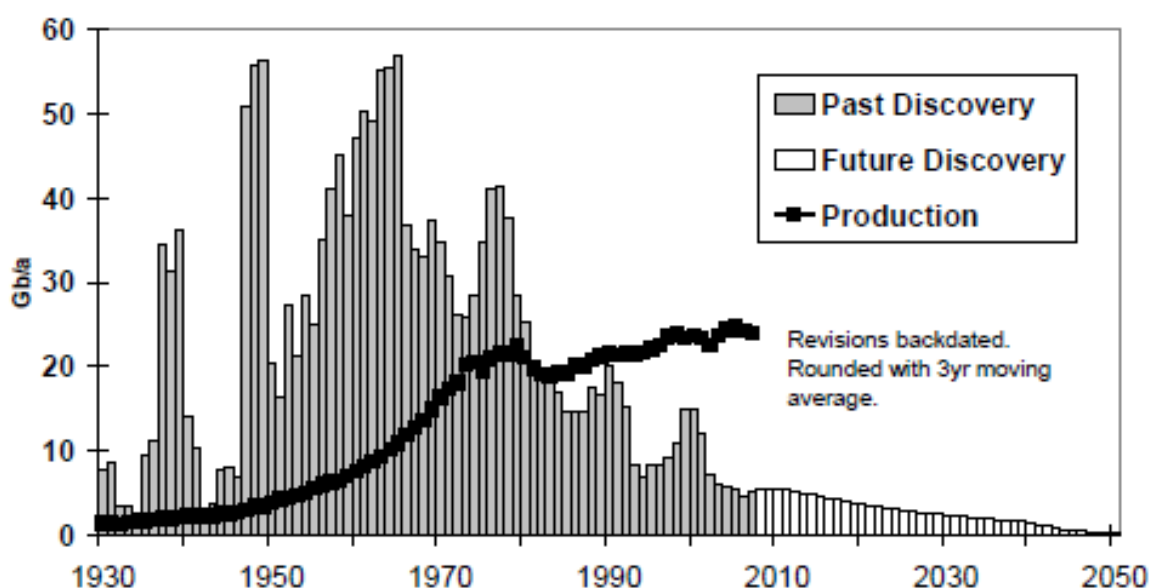
The Post Carbon Institute’s *Guidebook on Peak Oil and Global Warming for Local Governments* (Lerch, 2008) provides a good background on the science behind peak oil. They outline five key concepts about the theory of peak oil:

- 1. “Oil is a product of geological processes which ended about 85 million years ago, so there’s only a finite amount of it on the planet.*
- 2. Oil is scattered around the world in underground locations of varying size and accessibility, so while we have pretty good estimates, we don’t truly know how much oil there actually is until we’ve extracted it.*
- 3. There’s a time lag for oil to reach the global market – generally well over three years – after an oil source has been discovered. Plus, the more technologically challenging an oil source is to exploit, the longer it can take to bring it to production. The largest projects, and offshore projects in particular, are now taking six to nine years from discovery to regular oil delivery.*
- 4. Nearly half the global oil supply comes from around 120 “giant” oilfields (at least half of which are already in decline) in different parts of the world, each with its own set of technological, environmental and political factors that can disrupt the flow of oil.*

5. The price of oil depends on the flow of oil from the fields and reserves to the global market, which in turn depends on OPEC policies, geopolitical events and other factors. OPEC member states limited their oil production for years in order to keep the price of oil from dropping too low. Throughout much of 2005 and 2006, all OPEC producer (except possibly Saudi Arabia) appear to have produced at full capacity in order to keep the price of oil from rising too high”(p.9).

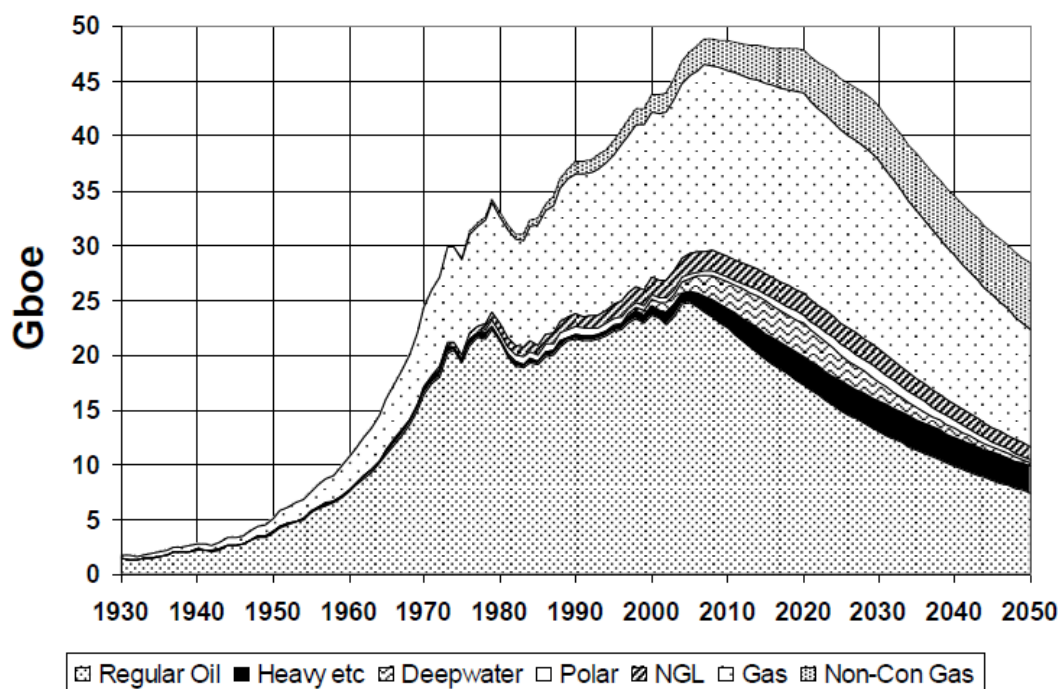
The *Guidebook* highlights the *flow* of oil as being the important factor, which is affected by the “inflexible and diminishing supply, growing demand and increasing potential for delivery disruption” (p.11). Figure 1 and Figure 2 provide a graphical representation of the peak oil theory.

Figure 1 Global Oil Discoveries (ASPO, 2009, p.2)<sup>5</sup>



<sup>5</sup> Gb/a = giga barrels of oil per annum

**Figure 2 Oil and Gas Production Profiles (2008 Base Case) (ASPO, 2009, p.2)<sup>6</sup>**



The peak oil theory is fiercely debated by industry experts. The *Guidebook* (Lerch, 2008) lists 14 different reputable sources who give projections of peak oil occurring anywhere between 2005 through to 2037, or not at all. A report produced by Sorrell *et al* (2009) for the UK Energy Research Centre (UKERC) in August 2009, reviewed all the current science and reporting on peak oil and stated that “on the basis of current evidence we suggest that a peak of conventional oil production before 2030 appears likely and there is a significant risk of a peak before 2020” (p.x).

The oil industry provides a more optimistic view of the situation: Shell places the peak at 2025 or later (Lerch, 2008); BP’s chief executive Tony Hayward “insisted there was enough crude to last 42 years at current consumption levels, roughly the same as last year (as cited in Macalister, 2009); and “Exxon Mobil believe peak (oil) production is nowhere in sight...global oil production can carry on rising for several decades to come” (UK Industry Taskforce on Peak Oil and Energy Security, 2008, p.19).

<sup>6</sup> Gboe = giga barrels of oil equivalent.

### 2.5.1 Alternatives to conventional oil

Peak oil is a concept relating to the supply of conventional oil. As a result of concerns about diminishing supplies there has been much investigation into the potential of unconventional oils (deepwater oil, polar oil, tar sands and oil shale) and alternative energy sources (coal, nuclear energy, hydrogen, biofuels, electricity, renewable energy (wind and hydro) and others), and their ability to mitigate a reduced supply of conventional oil.

As oil becomes more expensive to extract, investment in the development of alternative energy sources will become more economically viable. It is in this way that it is hoped the market will respond to any oil shortage or oil price increase by making the extraction and development of alternatives to conventional oil more cost effective. However, this belief may not be well-founded:

*“Pure market economics will never solve this [peak oil] problem. Markets do not account for the hidden and indirect costs of oil dependence. Businesses focussed on the highest return on investment are not always in a position to implement new solutions, many of which depend on technologies and fuels that cannot currently compete with the marginal cost of producing a barrel of oil” (Smith, F. and Kelly, P.X. in Lerch, 2008, p. 19)*

The IEA (2009) has expressed concerns about the current fall in investment in energy as a result of the financial crisis and a reduced demand for energy, stating: “falling energy investment will have far-reaching and, depending on how governments respond, potentially serious consequences for energy security, climate change and energy poverty” (p.5).

Even *with* a considerable increase in investment in alternative sources of energy, there are still doubts as to the ability of these sources to match the favourable energy characteristics of oil, including ease of transportation, wide ranging uses, and relatively high energy density (Lerch, 2008; Heinberg, 2005; Hicks and Nelder, 2008). The doubts are based on the energy return on investment (EROI)<sup>7</sup>, as well as the cost, availability and feasibility of developing and using these

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<sup>7</sup> EROI or energy return on investment is a concept that calculates the ratio between amount of energy input required to energy output



alternative sources. There are also concerns about the environmental costs associated with their extraction and use (e.g. extracting tar sands, burning coal). Questions have also been raised about the necessity of oil in developing the technology and infrastructure needed in many of the alternative energy sectors, from mining to construction and shipping to installation (Hicks and Nelder, 2008).

In terms of the ability of alternative fuel sources to replace the dependence on fossil fuels of the transportation system, there are a number of issues:

- Biofuels have a number of benefits, including ease of distribution and requiring only minor modifications to existing vehicles. However, the amount of land needed to grow crops for biofuels to replace fossil fuels in transport is prohibitive, and the EROI of biofuels is currently relatively low (Heinberg, 2005; Middleton, 2007);
- Electric cars also have benefits, including zero emissions; however the range and power of such vehicles, as well as the costs involved with developing this technology, mean they are unlikely to be able to replace the internal combustion engine in the near future (Middleton, 2007);
- Hydrogen fuel cells also have low emissions. However, presently the high costs, both in terms of money and energy, to develop this technology, as well as the infrastructure needed to utilise it, make it unlikely to be able to replace the need for oil in transportation in the near future (Middleton, 2007); and
- Whilst there are several alternative energy sources that could possibly power the private car, the energy required to power jet airplanes, boats and large trucks is currently very difficult to generate without fossil fuels (Hicks and Nelder, 2008), posing problems for the global transportation of goods and people.

Concerns about the ability of the market to create an environment that encourages the necessary investment in alternative energy, coupled with the questions surrounding the ability of alternatives to effectively replace fossil fuels, adds to the concerns about the peak oil concept. “Although many energy substitutions and conservation measures are possible, none in sight now have the quantity and quality to substitute for the rich fossil fuels to support the high levels of

structure and process of our current civilisation” (Odum, H. and Odum, E. in Heinberg, 2005, p.164).

## **2.6 Peak oil and transport**

The transport system is a vital component of society as we know it. From the transportation of people, to distributing the food we eat, to the importing and exporting of manufactured goods – all these elements and many more, rely on the transport system. The transport system, in turn, relies on the use of fossil fuels. Because of this vital role transport plays in the economy and society, transport policy makers have an important role to play in addressing the issue of potential shortages in energy for transport, to ensure that economy and society can continue to function.

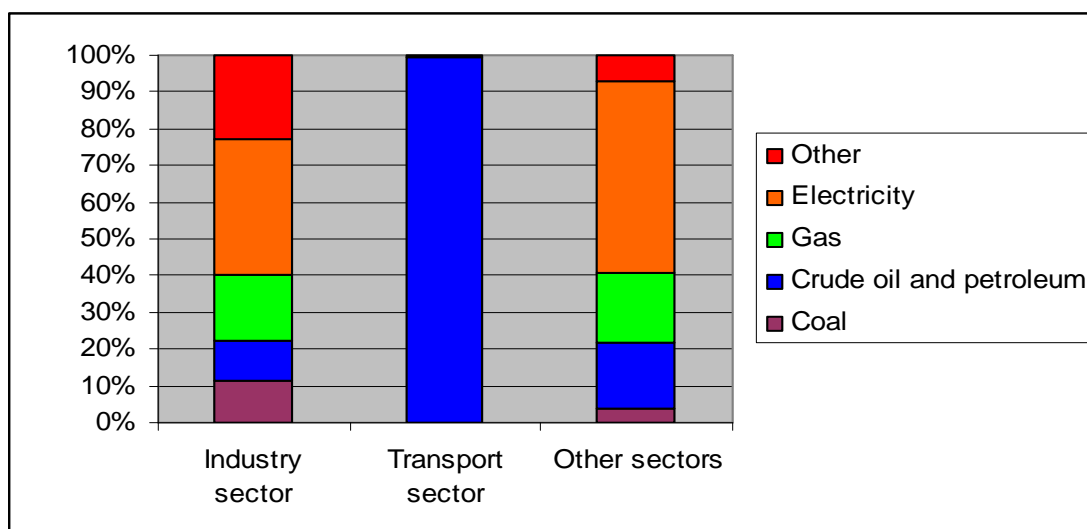
More than any other sector, transport is exposed to the potential consequences of peak oil. The City of Portland Peak Oil Taskforce’s report (2007) notes that “of all the impacts of peak oil, the clearest are those on transportation, particularly use of the automobile” (p.12). The World Business Council for Sustainable Development makes the following projections:

- *“By 2050 annual passenger kilometres are expected to more than double from just over 30 trillion in 2000 to over 70 trillion by 2050 (an annual rate of 1.7% per year);*
- *Freight traffic is expected to more than triple over the same period, growing at an average annual rate of 2.3% per year; and*
- *Worldwide transportation fuel use is projected to double by 2050 despite significant energy efficiency gain.” (as cited in OECD Transport Research Centre, 2008, p.122).*

The transport industry is the largest consumer of fossil fuels worldwide and is projected to double its consumption of fossil fuels by 2050. Over 60% of world oil was consumed in transport activities in 2006 (International Sustainable Energy Exchange, 2006). This is an increase of 15% since 1973. In New Zealand, 98% of all transport energy comes from crude oil and petroleum products (Sustainable Energy Forum, 2005), with the transport sector accounting

for 86% of total oil consumption (Ministry of Economic Development, 2007). The statistics for New Zealand's energy use in 2006 are shown in Figure 3<sup>8</sup>:

**Figure 3 New Zealand Energy Use 2006**



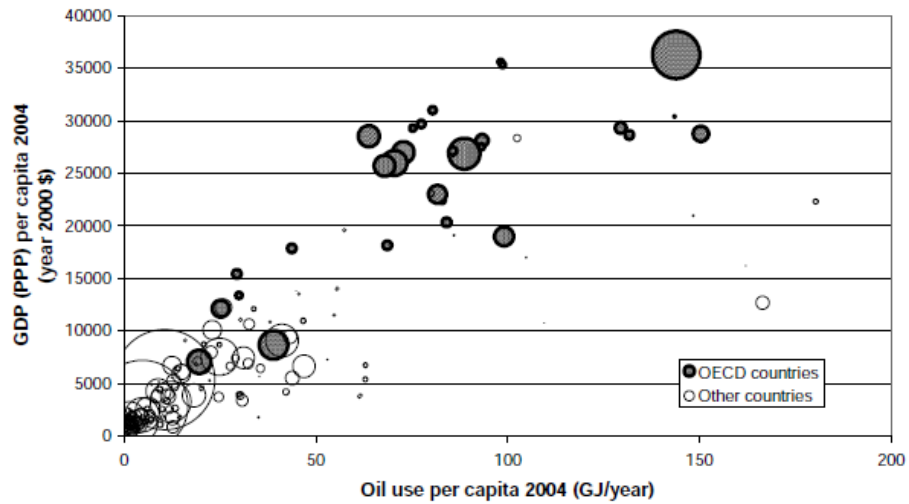
### **2.6.1 Transport, peak oil and economic growth**

There are strong links between the operation of the transport system and economic growth. Because economic growth is a fundamental aspiration, and the efficient operation of the transport system is closely linked to achieving economic growth, there are concerns about how to achieve economic growth in a scenario of fuel shortages. Currently, economic growth and oil consumption are directly linked, as shown in Figure 4.

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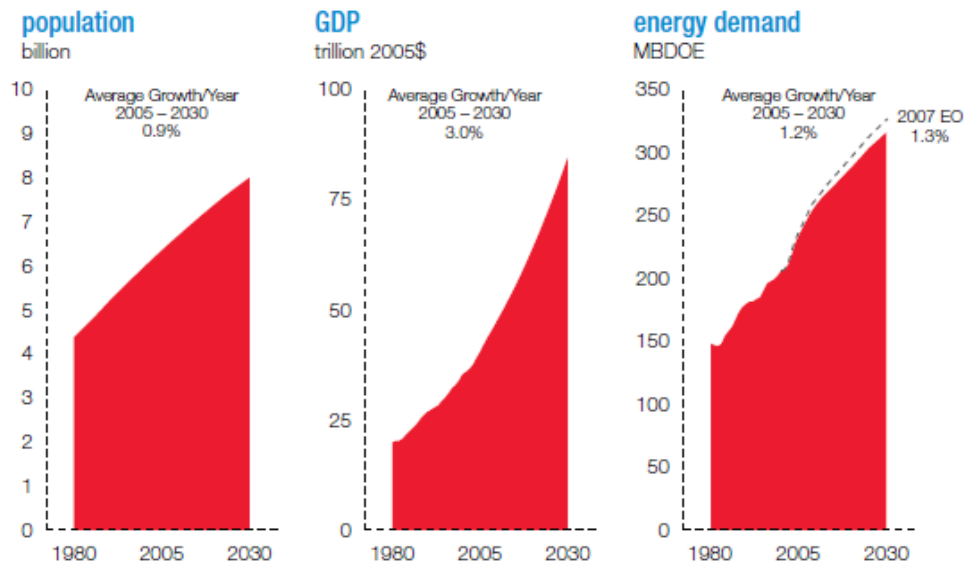
<sup>8</sup> Statistics sourced from IEA website [http://www.iea.org/textbase/stats/balancetable.asp?COUNTRY\\_CODE=NZ](http://www.iea.org/textbase/stats/balancetable.asp?COUNTRY_CODE=NZ)

**Figure 4 Oil use versus GDP (PPP) per capita in 2004 for all countries with available data (OECD Transport Research Centre, 2008, p.49).**



ExxonMobil, in their report *The Outlook for Energy, A View to 2030* (2008), describe how as the population is projected to increase, so too is economic growth, measured by gross domestic product (GDP), and therefore energy demand. This is shown in Figure 5.

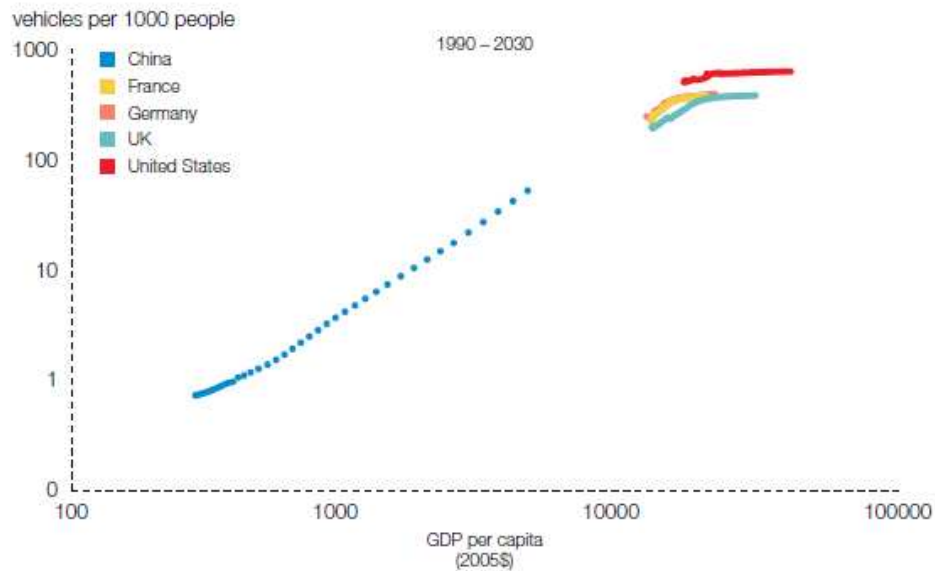
**Figure 5 Global Economics and Energy (ExxonMobil, 2008, p.5)<sup>9</sup>**



<sup>9</sup> MBDOE = million barrels per day of oil equivalent

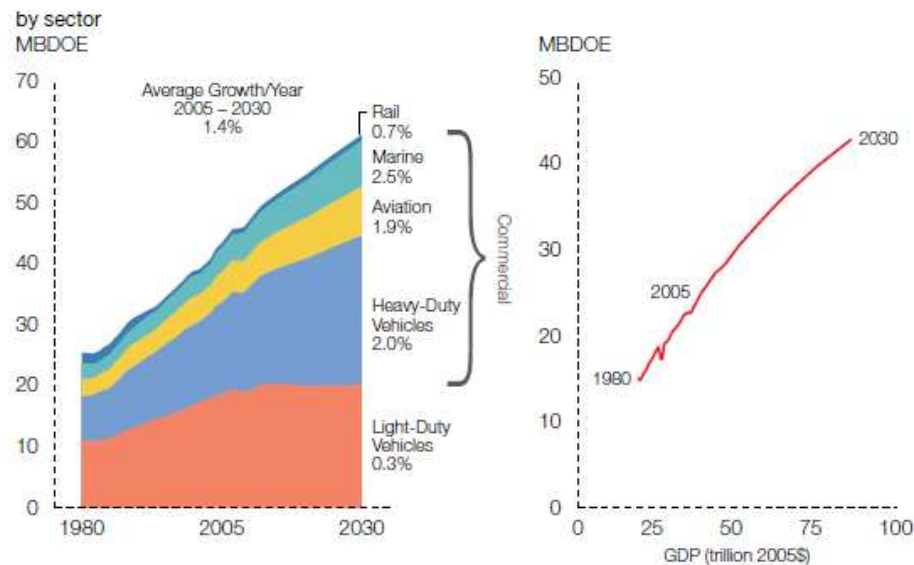
Oil consumption and economic growth are also linked to vehicle ownership statistics. As Figure 6 shows, light vehicle ownership is expected to increase along with projected economic growth through to 2030. Whilst many of the developed nations, such as the USA, will experience a plateau in the number of vehicles per capita, in developing nations such as China the forecast is for rapid growth in vehicle ownership.

**Figure 6 Light-duty-vehicle penetration linked to GDP (ExxonMobil, 2008, p.8)**



ExxonMobil also predicts that energy use for transportation is going to increase dramatically by 2030, following the same trends as GDP and population growth.

**Figure 7 Global Transportation Growth (Exxon Mobil, 2008, p.10)**



The figures above show that economic growth and oil consumption are ‘coupled’. ‘Decoupling’ is a concept that is being used in an attempt to break the link between economic growth and energy use in the face of growing concerns about energy use and the impacts on the environment. ‘Decoupling’ is described as “breaking the link between ‘environmental bads’ and ‘economic goods’... decoupling occurs when the growth rate of an environmental pressure is less than that of its economic driving force (e.g. GDP) over a given period” (Brown-Santirso, M. *et al*, 2006, p.4). ‘Decoupling’ is often associated with attempts to achieve economic growth, but at the same time reduce CO<sub>2</sub> emissions to mitigate the impacts of climate change.

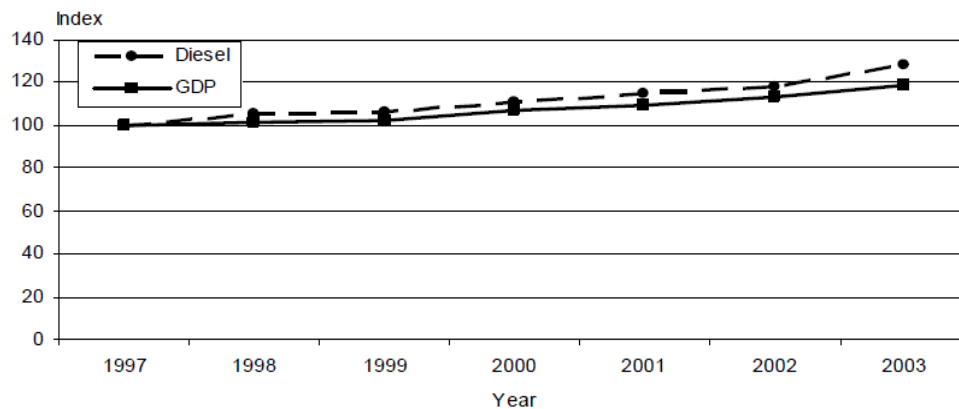
The ideal is to have ‘absolute decoupling’, in which economic growth is achieved whilst reducing energy consumption and protecting the environment.<sup>10</sup> This is very difficult to achieve with the existing reliance on fossil fuels. A report produced by Brown-Santirso *et al* (2006) for Statistics New Zealand investigated evidence of decoupling economic growth and energy use in

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10 “Decoupling can be either absolute or relative. Absolute decoupling occurs when the environmentally-relevant variable is stable or decreasing while the economic driving force is growing. Relative decoupling occurs when the growth rate of the environmentally-relevant variable is positive, but less than the growth rate of the economic variable,, (Brown-Santirso *et al*, 2006, p.4).

New Zealand. The report found that for the period 1997 to 2003 petrol demand increased by 9%, diesel increased by 28%, and economic growth, or GDP, increased by 19%. These results reflect the international trends shown in the figures above. Figure 8 shows the New Zealand results for diesel demand and economic growth:

**Figure 8 Change in New Zealand diesel demand versus GDP (Brown-Santirso *et al*, 2006)**



### **2.6.2 Continuing the ‘status quo’ in a peak oil scenario**

There are potentially devastating consequences of continuing to operate the transport system in a ‘business as usual’ fashion, should peak oil occur. DiPeso (2005) describes some of the potential consequences: “high prices, economic and social turmoil, faster depletion as oil fields are depressurized from overproduction, and greater danger of international conflict...[and potentially] a crash program to boost energy production from coal and from carbon-heavy, unconventional oil such as tar sands, with resulting large-scale increases in heat-trapping carbon dioxide emissions and other pollutants” (p.111). The potential impacts on transportation and land use are described in the City of Portland Peak Oil Task Force’s Report (2007):

- *“Automobile use will decline and people will seek alternative transportation for their needs;*
- *People and businesses will relocate to be closer to each other and to transportation options; population will likely shift to city centres, and density and mixed-use development will increase;*

- *Transportation of freight will become more costly, likely leading to mode shifts from air and truck to rail and boat;*
- *Air travel may decline significantly; and*
- *Maintenance of road infrastructure will be increasingly difficult because of loss of revenue and reliance on asphalt” (p.5).*

The fuel shortages experienced in the UK in 2000 provide a real world example of what can happen in a period of reduced availability of fossil fuels. The BBC News (2000) reported on the issue:

*“Motorists around Britain are facing increasing shortages of petrol as protests against soaring fuel prices gather pace...Six out of the country's nine oil refineries and four distribution depots are now subject to blockades by picketing lorry drivers and farmers...Panic buying by consumers has exacerbated the problem and hundreds of petrol stations, if they have not already run dry, have now resorted to rationing supplies...Supplies are simply drying up. The next thing I believe we're going to start seeing is food shortages on the shelves...”(BBC News, 2000).*

Transport policies have encouraged dependency on fossil fuels by prioritising private car use and investment in road building. We are now “addicted” to oil and the vehicles that use oil and this addiction has been reflected in the way transport policy and planning has been carried out (Buchanan and Dantas, 2010). Although, as discussed in Section 2.3 above, there has been a shift away from the desire for ever-increasing road capacity (‘predict and provide’) towards developing more sustainable transport policies (‘new realism’), the shift has not been significant enough to mitigate the potential consequences of peak oil.

The IEA’s chief economist Fatih Birol highlighted the urgency of the situation in an interview with Connor (2009) of The Independent Newspaper in the UK. He said:

*"One day we will run out of oil, it is not today or tomorrow, but one day we will run out of oil and we have to leave oil before oil leaves us, and we have to prepare ourselves for that day...The earlier we start, the better, because all of our economic*



*and social system is based on oil, so to change from that will take a lot of time and a lot of money and we should take this issue very seriously" (Connor, 2009).*

## **2.7 Transport policy actions addressing peak oil**

Despite the potential consequences of not planning for peak oil, the majority of transport policy makers do not prioritise planning for the possibility of fuel supply constraints happening in the near future, and how this could affect society. Whilst policy that attempts to protect the environment is widely accepted now as best practice, only a handful of governments, regions and communities around the world have actively recognised the scope of the potential problems peak oil could cause and have begun to plan accordingly. This includes some cities in the USA, Australia and the UK; however the number is limited in comparison with the scale of the impending problem (Lerch, 2008).

Several transport policies have indicated the need to address energy security, alongside climate change issues. An example of such is observed in the Ministry of Transport's (2008) NZTS:

*"New Zealand, as elsewhere, is highly dependent on fossil fuels such as petrol and diesel for transport. As such, the nation is vulnerable to potential fuel supply disruptions and future cost increases. If oil shortages or high costs occur before alternatives can be found, they would have an adverse impact on the New Zealand economy...High oil costs may increase the price of commodities that require a lot of energy to produce such as concrete and steel, as well as products made from oil such as bitumen. This would, in turn, increase costs for the transport sector. The costs of public transport services that use fossil fuels would also increase. Equally, high oil prices would have major implications for tourism, business, the price of goods that need to be transported and the ability of New Zealanders to get around...The challenge for New Zealand is to decrease energy use in the transport sector, while moving to sources of energy that are not based on fossil fuels, and are less vulnerable to changing international prices and availability. Although this is a key challenge, New Zealand is relatively well placed to do this because of its potential to generate renewable electricity and, in the future, to produce sustainable biofuels" (p.26).*

However, this is only a very small section of the NZTS and the remainder of the document does not place a significant emphasis on the potential impacts of a shortage of fossil fuels. Instead it proposes that alternative energy sources, such as biofuels, will be able to mitigate the effects of a reduction in the supply of fossil fuels.

In some instances, for example in Brisbane, Australia, despite the local governing body (the Brisbane City Council (BCC)) being well aware of the peak oil issue, transport policy decisions are still being made which disregard the peak oil problem. These include policies which support large roading projects based on traditional transport planning methods which forecast traffic increases (McCarthy, 2008). These projects result in billions of dollars being spent to provide for the private motor vehicle; projects which ultimately require an abundant supply of fossil fuels, or at least an equal alternative, to ensure their ongoing viability and success.

There are many possible factors that could result in this apparent lack of concern about peak oil by transport policy makers. Heinberg (2007) and Buchanan and Dantas (2010) make note of the following factors:

- Conflicting reports about the exact timing of peak oil, with assurances from experts that we still have time on our hands;
- Lack of political will to introduce bold policies to plan for peak oil at the expense of economic growth;
- The inability of people to comprehend the scale of the chaos that could ensue in a worst case scenario (Adapted from Heinberg, 2007);
- That “...*alternative sources of energy will be created, processed and managed in order to “fill” the gap between what is currently consumed and what can be supplied in term of fossil fuels. For example, many scholars and governmental agencies have claimed that renewable energy sources (solar, wind, ethanol etc) can be employed as a fuel replacement for petroleum;*
- *New oil reserves are being discovered all over the world and they will be sufficient to meet current and future generation needs; and*

- *People's behaviour will change in face of adversity, as previously observed in human kind history" (Buchanan and Dantas, 2008, p.19).*

The following sections look at examples of formal policy and planning for peak oil in New Zealand and around the world.

### **2.7.1 New Zealand Peak Oil Policy and Planning**

Samuelson (2008) produced a document for the Ministry of Economic Development titled *Oil: An Introduction for New Zealanders*, which describes world oil reserves, extraction, consumption, financial aspects and oil security:

*"The risk of a major disruption to New Zealand's internal oil infrastructure was well below 1% per year (less than 1 in every 100 years). However, the risk of an external disruption is up to 10 times greater. The IEA would normally be expected to respond to the latter type of disruption. Regardless of the type of event, the New Zealand government has broad emergency powers to deal with oil supply disruptions"* (Samuelson, 2008, p.78).

These emergency powers include "restraining demand, reducing consumption, or ensuring the equitable distribution of petroleum products in New Zealand" (Samuelson, 2008, p.79) under the Petroleum Demand Restraint Act (1981) and the International Energy Agreement Act (1976).

The Ministry of Economic Development (2008) has developed an *Oil Emergency Response Strategy*. This strategy outlines the legislation, methods and communication lines that would be used to manage a fuel shortage scenario. It also describes New Zealand's obligations to store fuel for supply-emergencies under the IEA. The strategy is focussed on mitigating the effects of a short-term disruption in supply and does not provide any mitigation options for a long-term reduction in oil supply.

Section 7 of the Ministry for Economic Development's (2007) New Zealand Energy Strategy (NZES) is dedicated to transport. It outlines ways in which the Government is committed to a transport system which reduces greenhouse gas emissions, the primary focus of the section.

Concerns about dependency on oil are mentioned, but only as a by-product of reducing greenhouse gas emissions:

*“Focusing on reducing greenhouse gas emissions from the transport sector will also help to reduce New Zealand's dependency on oil. This will increase the resilience of our transport system and economy to sudden disruptions in oil supply, as well as longer-term concerns about global oil supplies and price uncertainty. Energy security for transport can also be improved through measures that address short-term disruptions, increase diversity in the fuel mix, encourage greater use of domestic fuel supplies and reduce demand for transport energy”(p.46).*

The NZES (Ministry of Economic Development, 2007) does have a one-page section on peak oil. It summarises the key debates and takes a positive view of peak oil, stating that the “world's proven reserves (including non-conventional oil) could sustain current production levels for 42 years” (p.47) and that there are “immense quantities of these non-conventional sources of oil” (p.47). The NZES concludes that “while there will, at some point, be peak 'cheap' oil from conventional sources, the world has plentiful sources of fossil-based oil” (p.47). Biofuels, LPG, hydrogen and electricity are also proposed as possible alternative energy sources for transport. Managing the demand for transport, increasing energy efficiency of vehicles and promoting public transport, walking and cycling are all part of the NZES.

The Ministry of Economic Development (2010) produced the *New Zealand Energy Outlook for April 2010*. This document looks at ways to reduce New Zealand's reliance on imported oil. The section on transport recognises that oil prices are likely to increase and states that “travel demand reduction, vehicle efficiency gains, uptake of electric vehicles, and biofuels reduce the national demand for oil in 2030 by ~45% and ~25% in the High and Low Uptake cases relative to the Reference Scenario” (p.5).

At the local government level in New Zealand, a survey of transport staff (Lee *et al*, 2009) asked participants about possible significant increases in fuel prices. The study did not ask respondents to consider the implications of a sustained, long term reduction in supply of fossil fuels, but instead focussed on asking what they would expect to happen following significant fuel price increases, and what changes their organisation would be able to implement as a result. They

found that “most councils (75%) are not planning on the basis of fuel price rises. Half of respondents indicated that they do not have access to fuel price data” (p.35).

Further examples of the level of concern about, and level of planning for, peak oil in New Zealand relating specifically to transport can be found in Section 5.

### **2.7.2 International Examples of Peak Oil Policy and Planning**

The following section provides a sample of some of the current peak oil planning initiatives outside of New Zealand.

The IEA (2005) produced a book titled *Saving Oil in a Hurry* that outlines ways in which countries can save oil in the transport sector. Methods include carpooling, public transport, speed reductions and driving bans. The book outlines the effectiveness of the different methods in terms of amount of oil saved, implementation costs and popularity with the public. Whilst the focus of the book is on responding to an oil shortage emergency, the long-term benefits of some of the measures in reducing oil dependence are also explained.

In the UK the Local Government Association (2008) produced a booklet about transport and preparing for peak oil titled *Volatile Times: Transport, Climate Change and the Price of Oil*. The booklet provides advice for local councils about ways to reduce dependence on oil as well as ways in which Central Government can assist local councils.

The Oil Depletion Analysis Centre and the Post Carbon Institute (2008) in the UK produced a booklet called *Preparing for Peak Oil: Local Authorities and the Energy Crisis*. The booklet outlines the current best practice in policy measures to manage the issue of peak oil, providing a guide for local councils. The booklet summarises current initiatives in North America, listing several cities and towns, including large cities such as San Francisco and Austin, which have passed resolutions that recognise peak oil and have set up task forces to address the issue. Several of these cities have commissioned reports that investigate the vulnerability of the area to a peak oil scenario and make recommendations to mitigate the problems.

The UK Industry Taskforce on Peak Oil and Energy Security (UKITPOES) has been set up in the UK, comprised of businesses (consultants, energy companies, architects and transport

operators) that are concerned about peak oil. The UKITPOES (2008) produced a document titled *The Oil Crunch: Securing the UK's Energy Future* which outlines the risks of reduced availability of energy and makes recommendations to mitigate the risks. The report suggests Government implement policy to mitigate the risks and develop a National Energy Plan. One of the recommendations is:

*“Development and implementation of a long term sustainable transport policy, with renewable transport at its heart. This should include measures to increase transport fuelled by sustainable bio-liquids and electricity, and measures to reduce the amount of fossil-fuel-based road transport. If we are to significantly reduce oil consumption, the current measures being proposed in the renewable transport arena must be just the start, and measures well in excess of those proposed will be required” (p.6).*

In Australia, several cities and states have formally recognised the peak oil issue. The city of Maribyrnong in Victoria has a *Peak Oil Policy* (2008a), an *Action Plan* (2008b), and most recently has developed Australia's first *Peak Oil Contingency Plan* (Fishman *et al*, 2009) that aims “to maximise Council's business continuity ability in the face of either a short term supply crisis or a long term, gradual depletion in petroleum resources” (p.1). The Environmental Protection Agency (2008) of the Queensland Government has also been active in planning for peak oil. They produced a community information paper titled *Towards Oil Resilience*. The paper “is part of an ongoing process to develop an Oil Vulnerability Mitigation Strategy and Action Plan for Queensland... The paper is an information document that is not government policy...[it] is the first step in developing policy options for inclusion in the Oil Vulnerability Mitigation Strategy and Action Plan” (p.4).

The development of an *Oil Vulnerability Mitigation Strategy and Action Plan* was requested by the Queensland Government following the recommendations of a report produced by the Queensland Oil Vulnerability Taskforce (2007), called *Queensland's Vulnerability to Rising Oil Prices Taskforce Report*. The *Oil Vulnerability Mitigation Strategy and Action Plan* has yet to be produced; however a research paper (Waller, 2008) has been produced to assist in its development.

The BCC has also been active in planning for peak oil, creating a Climate Change and Energy Taskforce to “advise Council on preparing the city for climate change and peak oil. The ‘Final Report – A Call for Action’ represents the work of the Taskforce and its recommendations to Council” (Losee *et al*, 2007, p.ii). As a result, the BCC (2007) produced the *Plan for Action on Climate Change and Energy*, adopting 22 of the 31 recommendations from the taskforce’s report, including a number of actions to reduce the transport system’s reliance on fossil fuels. However, despite these reports and plans, the latest BCC’s latest Transport Plan (2008) does not mention the potential impact of peak oil, and is planning for new roading infrastructure that would seem to disregard the possible impacts of peak oil (McCarthy, 2008).

## **2.8 Political science theory**

In order to understand the current situation described in the sections above, it is important that we understand how transport policy makers perceive the peak oil issue, and their ensuing behaviour in the transport policy making process. Because there are numerous political influences on transport policy makers, as discussed in Section 2.2.2, political science theory may help to gain an understanding of the political context within which transport policy makers operate, and help to understand transport policy maker’s perceptions of, and actions towards, the issue of peak oil.

Goodwin (2007) describes political science theory as “the discipline which aims to explain, justify or criticize the disposition of power in society. It delineates the balance of power between states, groups and individuals (p.4)”. Farrelly (2004) gives a more detailed description:

*“From history of political thought to analysis of political concepts such as freedom, equality and democracy....topics from such diverse traditions as feminism, socialism, anarchism and liberalism, all fall under the general rubric of “political theory”...it is accurate to say that what unites these diverse traditions under the rubric of “political theory” is their concern for how we ought, collectively, to live together...the systematic thinking about the purposes of government.”(p.ix)*

Political science theory can be applied to a many aspects of politics. For the purpose of this research, political science theory is examined in terms of transport policy making. This literature

review briefly describes a selection of relevant theories that have been developed to help understand policy making.

### ***2.8.1 Broad political concepts and theories***

As noted by Farrelly (2004), political theory encompasses very “diverse traditions” (p.ix). A complete description of the full spectrum of the various political theories is outside the scope of this research. Instead the focus of this section will be on outlining three broad political theories which can be used to describe the political climate in New Zealand, providing a background to the case studies.

#### *2.8.1.1 Liberalism*

There are many different strands of liberalism, from classical, to modern to neo-liberalism (Shaw and Eichbaum, 2005). The basic concept of liberalism is that the rights of the individual are prioritised and the role of the state is purely to protect these individual rights and enable people to participate in the free market (Dryzek *et al*, 2006). Liberalism can be aligned to the centre-left, centre or centre-right of the political spectrum. In New Zealand the ACT party is most closely aligned with liberalism.

#### *2.8.1.2 Conservatism*

Conservatism is based around the concepts of “incremental change”, “traditional religious values” and family (Shaw and Eichbaum, 2005, p.139). Conservatism is part of the right wing movement. The National Party in New Zealand is aligned with conservatism, but has liberal elements, and can therefore be defined as adhering to liberal conservatism. The broad views of the National Party are (adapted from Shaw and Eichbaum, 2005, p.141):

- Loyalty to New Zealand, its democratic principles and to its Sovereign;
- National and personal security;
- Individual freedom and choice;
- Limited government;



- Strong families and caring communities; and
- Competition not state monopoly.

### *2.8.1.3 Socialism*

Socialism, or social democracy, is centred on the role of the state. The state is “a benign force and the custodian of public interest” (Shaw and Eichbaum, 2005, p.139). The Labour Party in New Zealand is based on social democracy and aligns with left wing politics. The broad views of the Labour Party are (adapted from Shaw and Eichbaum, 2005, p.141):

- The natural resources of New Zealand belong to all the people and should be managed for the benefit of all, including future generations;
- All people should have equal access to all social, economic, cultural, political and legal spheres, regardless of wealth or social position;
- Cooperation rather than competition should be the main governing factor in economic relations, in order that a greater amount and a just distribution of wealth can be ensured;...and
- The same basic human rights, protected by the state, apply to all people.

### *2.8.2 Policy making theories*

There are a wide variety of different concepts, theories, models and frameworks which have been developed to help explain how policy is made, including the rational comprehensive theory, incrementalism, the punctuated equilibrium theory, the advocacy coalition framework, institutionalism, policy network theory and others (Sabatier, 1999; Dudley and Richardson, 2000; Marsh and Stoker, 2002). The following sections will describe in more detail rational choice theory and incrementalism. These theories have been chosen for further analysis as they are common, yet contrasting ways of understanding decision making and the policy making process.

### 2.8.2.1 Rational Comprehensive theory

The rational comprehensive theory of policy making is based on rational choice theory which has its origins in economics. The rational comprehensive theory proposes that in making policy, individuals are self interested, will attempt to maximise their utility, have the time and ability to look at all the alternatives, and will then make choices to meet their own individual goals and achieve the best result for themselves (Ward as cited in Marsh and Stoker, 2002).

The rational comprehensive theory simplifies the policy making process into a series of steps, beginning with definition of the goal, development of alternatives, evaluation of all possible alternatives and then the choice of the best alternative to meet the goal (Shaw and Eichbaum, 2005). The rational comprehensive theory is based on a technical or scientific approach to policy making and follows six steps:

1. *“A problem is identified and defined;*
2. *The values, goals and objectives of those making the decision are made explicit and ranked in priority order;*
3. *All options that could achieve the goal are identified;*
4. *The costs and benefits of each option are made explicit;*
5. *Costs and benefits for each option are then compared; and*
6. *With information about costs and benefits the decision maker can choose the option that best achieves her or his values, goals and objectives” (Bridgman and Davis, 1998, p.43).*

These steps are closely aligned with the traditional decision, or problem oriented approach to transport planning, which follows four basic steps: problem identification, debate and policy formulation, implementation, evaluation and feedback (Meyer and Miller, 1994). The more desirable objectives-led approach follows the same steps but begins by defining broad objectives, which are “then used to identify problems” (May as cited in O’Flaherty, 2003, p.44).

Whilst the rational, step-by-step approach to policy making may appear to be desirable in terms of its ability in reviewing all alternatives and selecting the best course of action, in reality this

method is not always followed in such a definitive manner. As a result the rational comprehensive theory has been criticised for its assumption that policy makers have the skills and resources to fully review all available alternatives, and the assumption that policy makers make objective decisions based purely on technical knowledge (Camhis, 1979). Another criticism of the rational comprehensive theory is the assumption that:

*“Policy makers perceive and accurately define problems. It further assumes that they rank potential public problems in order of priority, with the most serious reaching the agenda first. In reality, there is no guarantee that problems will be perceived at all; in fact, items that do reach the agenda are often priorities because they have attracted political support from organised interests or the mass public. In addition, there is not a guarantee that all actors will define public problems in the same way or even agree on what distinguishes legitimately public problems from private concerns” (Morcol, 2007, p.40).*

The rational comprehensive model has been criticised for its inability to recognise the increasingly wide ranging interests and stakeholders in the decision making process, in particular political or institutional constraints on policy makers that may affect their decision (Lindblom, 1959). Institutional rational choice theory was developed to allow for these institutional constraints and describes “how institutional rules alter the behaviour of intendedly rational individuals motivated by self choice” (Sabatier, 1999, p.8). Individuals and groups, whilst they may be acting in their own self-interest, do not do so in a vacuum, but instead work in an environment in which their actions are influenced by the rules and cultures of the institutions within which they are operating.<sup>11</sup>

An alternative that takes a very different view of policy making is incrementalism, developed by Charles Lindblom. Incrementalism is discussed in more detail in the following section.

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<sup>11</sup> Institutions can be conceived as being an “organisational entity such as the US Congress, a business firm or political party” or as the “rules, norms and strategies adopted by individuals operating within or across organisations” (Sabatier, 1999). In this sense, institutions are considered to be the latter.

### 2.8.2.2 Incrementalism

The incremental theory describes policy making as a conservative, risk averse process by which only small changes to previous policies are made. The incremental decision making process is “a political process characterized by bargaining and compromise among self-interested decision makers. The decisions that are eventually made represent what is politically feasible rather than desirable” (Howlett and Raum, 1995, p.141). Policy makers often have differing views, interests and sources of information, as well as differing views about the best way to serve the public interest (Hayes, 2001). The best policy is one on which everyone agrees and “which commands consensus among policy makers and interest groups” (Bridgman and Davis, 1998, p.55).

Lindblom (1979) proposes a form of incrementalism labelled disjointed incrementalism. In this format he argues that small incremental steps, made quickly can be more effective at bringing about a major policy change than fewer larger steps because “they do not rock the boat, do not stir up the great antagonisms and paralyzing schisms as do proposals for more drastic change” (p.520).

Nice (1987) describes why policy makers adopt an incremental style of policy making: “small policy adjustments entail less uncertainty, and by avoiding drastic changes, policy makers reduce the danger of upsetting powerful political and bureaucratic interests. In short, according to the incremental model, policy makers can produce acceptable results and avoid controversy by changing policies in a sequence of minor adjustments” (p.145).

Lindblom’s (1958) description of incremental politics provides a good overview of the theory:

*“1. Political parties and leaders compete for votes by agreeing on fundamentals and offering only incrementally different policies in each of the policy areas in which they wish to compete. Since this has been well and frequently demonstrated to be a prerequisite condition for the survival of democracy itself, it is hardly to be questioned as a characteristic of political life in the Western democracies.*

*2. Each of the competing political parties shifts its own policies only incrementally at any one time. Such incremental alteration of party policies is in fact the normal*

*though not invariable rule in all two-party democracies and in some multiparty democracies.*

*3. Policy-making proceeds through a sequence of approximations. A policy is directed at a problem; it is tried, altered, tried in its altered form, altered again and so on. In short, incremental policies follow one upon the other in the solution to a given problem” (p.300).*

Like the rational comprehensive theory, incrementalism has its critics. Incrementalism is often criticised for its inability to explain radical policy change and innovation in policy making, for assuming that the environment in which policy is made is always stable, and for being too conservative and dismissive of goal setting and aspirations in policy making (Woodhouse and Collingridge, 1993). Goodin (as cited in Miyakawa, 2002) is critical of incrementalism, arguing that “the doctrine of incrementalism cannot be supported in prescriptive terms” (p.287). He believes that policy makers are able to make rational decisions based on past experiences in policy development and that sometimes policy makers can “think big” rather than merely “thinking small” as incrementalism proposes (p.287). Goodin’s opinion is better aligned with the mixed scanning model, developed by Etzioni, which is a combination of both the rational comprehensive model and the incremental model. The model prescribes “a cursory search (‘scanning’) for alternatives, followed by a detailed probe of the most promising alternative...[allowing] for more innovation than permitted by the incremental model, without imposing the unrealistic demands prescribed by the rational model” (Howlett and Ramesh, 1995, p.144).

Jones and Baumgartner (as cited in Sabatier, 1999) propose that punctuated equilibrium theory is a better model which stipulates that policy will go through periods of stability ‘punctuated’ with periods of major policy change.

In summary, Table 1 shows the main characteristics of the rational comprehensive and incremental theories of policy making (Source: Bridgman and Davis, 1998, p.55):

**Table 1 Comparison of Policy Making Theories**

<b>Rational policy making</b>	<b>Incrementalism</b>
Clarification of values or objectives distinct from and usually prerequisite to empirical analysis of alternative policies	Selection of value goals and empirical analysis of the needed action are not distinct but are closely intertwined
Policy formulation is therefore approached through means-end analysis: first the ends are isolated, then the means to achieve them are sought	Since ends and means are not distinct, means-end analysis is often inappropriate or limited
The test of a 'good' policy is that it can be shown to be the most appropriate means to a desired ends	The test of a 'good' policy is typically that various analysts find themselves agreeing on a policy (without their agreeing that it is the most appropriate means to an agreed objective)
Analysis is comprehensive Every important relevant factor is taken into account	Analysis is limited drastically: Important possible outcomes are neglected Important alternative potential policies are neglected Important affected values are neglected
Theory is often relied upon heavily	A succession of comparisons greatly reduces or eliminates reliance on theory

## **2.9 Political science theory applied to the analysis of transport policy making' actors and influences**

This section looks at both the broad political theories, outlined in Section 2.8.1, and the policymaking theories (rationalism and incrementalism), outlined in Section 2.8.2, and describes how they have been used to gain a better understanding of transport policy making.

### **2.9.1 Broad political theories and concepts linked to transport policy**

The broad transport policy perspectives of political parties are often linked to the political ideology of the party. In countries in Europe it has been found that left wing political parties are more supportive of public transport, whereas conservative parties are more likely to support private car use (May *et al*, 2001), a trend that is also reflected in New Zealand (Labour Party, 2008; National Party, 2008). However, for transport policy, as with any policy, there is a tension between the amount of government intervention (left wing politics and socialism) and individual, or market freedom (right wing politics, conservatism and liberalism) that is desirable and feasible. Reflecting this delicate balance, many political parties develop policies that are 'centrist', in that they are only considered to be slightly left or right of centre in their ideological position.

Tension between government intervention and individual freedom is evident in terms of the negative externalities associated with transport use. Negative externalities, such as congestion and pollution, require government policy to ensure that these costs are transferred to the transport user. In the case of congestion, congestion pricing is a tool used to transfer the social cost of congestion to the transport user. However, the political willingness to implement congestion pricing policy is often low due to a lack of public acceptability for such measures (Ieromonachou *et al*, 2008). Other external costs, such as the impacts on the environment and contribution to climate change, are more difficult to transfer to the user (OECD Transport Research Centre, 2008).

Hopkins (2006) links the concept of negative externalities to the theory of rational choice, suggesting that people, if they act purely in a way that will maximise their own utility, will take little notice of global environmental issues, and will therefore not recognise the cost to society of their actions. His research on consumers' attitudes towards sustainable action confirms this: "consumers are generally happy to act sustainably where it does not impinge on their key priorities and cause them inconvenience" (p.30).

Ryan and Turton (2007) believe that government intervention is paramount in order to achieve sustainability: "Critically, the rate at, and extent to which, transport system development can be redirected towards sustainability, depends substantially on the suite of policies implemented by governments around the world" (p.236).

In the USA, however, there is "a strong ideological resistance to many forms of government intervention...there is also a concern over the loss of competitiveness in the economy resulting from increased regulation and control" (Banister *et al*, 2007, p.25). This ideology is linked to liberal and conservatist theories of minimal government and individual freedom, and can be clearly seen in terms of transportation where there is a "culture...of self reliance and individualism and the thinking that there is no alternative to the car" (Banister *et al*, 2007, p.12). Such ideology makes sustainable policies politically difficult to implement in the USA (Banister *et al*, 2007).

Transport policy exists to control how people use the transport system and how the system operates, and currently government policy does not require people to bear the external costs of

consuming a non-renewable resource such as oil in an unsustainable manner. The OECD Transport Research Centre (2008) poses an interesting question on the issue of availability of energy for use in transport and government intervention, given the certainty surrounding the science of peak oil: “are uncertainty and import-dependency a basis for government intervention in energy or transport markets?” (p.23).

The following section looks at the policymaking theories of rationalism and incrementalism and how these theories can help explain why governments are not strictly interventionist, and why policy makers have difficulty implementing transport policy that demands more sustainable energy consumption behaviour from transport users.

### ***2.9.2 Policy making theories, frameworks and models linked to transport policy***

As described in Section 2.3, the dominant method of transport policy making and planning in the 20<sup>th</sup> century was based around the four-step model and a concept of ‘predict and provide’. This technically oriented process is linked to the rational comprehensive model of decision making, due to its similar step-by-step process. Wachs (1985) describes the rational comprehensive model as “the dominant one, shaping transportation institutions and research agendas...indeed, the daily practice of transportation planning, and the past 20 years of transportation research can virtually be interpreted as an elaboration of this model” (p.522).

As transport policy and planning has moved away from the predict and provide paradigm, public and stakeholder consultation has become more important, and the range of actors more diverse, other ways of conceptualising the process have developed. This has resulted in much criticism of the use of, and validity of, the rational model in transport planning and policy making (Goetz and Syzliowicz, 1997; Willson *et al*, 2003; Willson, 2001; Wachs, 1985; Kane and del Mistro, 2003).

Critics of the rational comprehensive model describe how the model does not represent reality: “Transportation planners rarely encounter the pure scientific rationality setting. Instead, they find differing points of view on decision-making boards, within agency departments, and among interest groups. Information is ideological and contested” (Willson *et al*, 2003, p.355).

Kane and del Mistro (2003), in their criticism of the traditional rational approach to transport planning, highlight the influence of political factors and cite Chisholm, who states: “coping with



the nations transport needs is as much a matter of politics as it is of technical expertise” (p.119). Bessant (2008) criticises the rational theory, stating that it ignores the important role policy networks, policy discourse and government politics play in influencing policy making process.

As outlined in Section 2.8.2, incrementalism was developed as an alternative to the rational comprehensive model, in an attempt to incorporate some of the political, less technical aspects of policy making.

Bush (1995) describes how past policies can shape the future and the incremental nature of local government policy in New Zealand: “two intangible but nonetheless very powerful influences which can shape policies are precedent and the status quo: the pressure to do either what has been done before, or to carry on with what is being done now, can be very strong. A policy profile of any council will bear a startling resemblance to that of its immediate predecessor” (p.227).

Incrementalism has been used by Yeung (2000) to describe the transport policy making process in Hong Kong, concluding that there were several reasons for an incremental policy style. Firstly it was easier for the policy makers to make small changes to existing policy rather than risk making significant mistakes with sweeping changes. The policy makers had a wide range of stakeholders to satisfy and compromises could be made to ensure broad support for the policies with the incremental process. The incremental style was also more attractive to ensure “the political feasibility and acceptability of the proposed solution....people are reluctant to changes...they tend to support incremental changes that are more familiar to them and usually have the least uncertainty” (Yeung, 2000, p.134).

As described in Section 2.7, questions surrounding the timing of peak oil and the ability of technology to mitigate the negative consequences of peak oil, have resulted in a lot of uncertainty about the future for transport policy makers. Headicar (2009) describes the underlying uncertainty for transport policy and planning in the future as being both technical (future technological advances in transportation, e.g. electric cars, energy use) and social (travel behaviour patterns, social norms regarding travel). This uncertainty makes long-term transport policy making and planning very difficult, especially in terms of making radical changes to existing policy and planning practices – the risks are too great. As a result transport policy tends

to be incremental. Headicar (2009) gives an example, describing the situation regarding transport policy making in the UK at present:

*“Politically the hazards of uncertainty provide reason for avoiding commitment to any particular long term strategy (individual schemes and developments continue to be approved, but on an incremental basis). ‘Muddling through’ enables flexibility to be retained. It also avoids having to present populations (hence voters) with costs or other disbenefits which are designed mainly to safeguard the interests of future generations.*

*These technical and political stances tend to encourage an approach to planning which is executed through successive ‘roll-forwards’ of existing programmes, rather than engaging with the more difficult and potentially controversial matter of where these are leading...it therefore implies an extremely conservative pattern of change over time. Not only does the pattern tend to follow the same trajectory but the longer it is maintained the more it reinforces and ‘legitimises’ established and dominant practices. These in turn generate a sense of inevitability about where we are heading. Even if the future consequences of ‘business as usual’ appear profoundly unattractive we seem to find the possibility of engaging with the changes needed to avoid it even more unpalatable.” (p.411)*

The theory of incrementalism proposes that “decision makers confront a relatively stable environment” (Nice, 1987, p.146). It could be argued that our environment will only become more unstable as fossil fuel supplies diminish and fuel prices fluctuate. With regards the current incremental style of policy making, Nice (1987) argues that:

*“If the environment changes dramatically...minor adjustments of current programs may be insufficient to cope with the new conditions. Major changes in the environment may therefore foster innovation, leading to a new and different response which is distinct from older programs...no environmental change is more likely to stimulate innovation than a crisis. A crisis may generate more pressure for substantial change than incremental routines can withstand. At the same time, a*

*crisis may increase the willingness of policy makers to take the risks that major policy changes entail” (p.146).*

This argument can be applied to concerns about peak oil. Should significant fossil fuel shortages occur in a relatively short period of time, the environment will change swiftly. As a result incremental transport policy shifts will not be effective and the ensuing ‘crisis’ will force policy makers to make major policy shifts.

## **2.10 Other Policy Arenas**

Other policy arenas, such as climate change, can assist in gaining a better understanding of the behaviour and actions of policy makers. Climate change offers an interesting example to analyse alongside peak oil, as it has similar characteristics in terms of contentious scientific evidence, global implications and an extended timeframe of possible impacts. Both policies also attempt to address fossil fuel use, one in terms of consumption, the other in terms of emissions generated.

Climate change policy in the USA has been described as incremental, with only relatively small changes to the status quo being implemented by some states and cities and no overarching, comprehensive national strategic policy (Coglianese *et al*, 2008). Because of the global nature and immense scale of the climate change problem, it can be argued that incremental policy making to address the issues will not make a sufficient impact. Coglianese *et al* (2008) argue that whilst “*some* action is better than *no* action at all” (p.1), incremental policymaking can in fact be harmful as it can “lull the public into thinking climate change is being addressed, thus dampening demand for the costly and comprehensive policies that will achieve the most meaningful results” (p.17).

Coglianese *et al* also argue that as well as creating the illusion that the problem is being addressed, employing an incremental policy style creates barriers to developing more robust policy at a later stage because:

*“Incremental policies can create a path dependence that prevents or inhibits the development of better alternatives. Implementing, monitoring, and maintaining any policy requires start-up costs, making it harder to change policies mid-stream...when legislators and voters think an issue has already been addressed, it requires a lot of*

*political heavy lifting to change established policies. And perhaps most importantly, those who have an interest in the status quo under an incremental policy can be expected to resist policy change—including the regulators, the regulated companies that make compliance investments, and the advocates of the initial incremental approaches” (p.15).*

Existing climate change policy is often criticised for being too weak and ineffective to make a significant difference in the long term (Helm, 2005; McKibbin and Wilcoxon 2002). Stephen Hale (2008) of the Green Alliance, a body that aims to bring environmental issues to the forefront of British politics, produced a report titled *The New Politics of Climate Change*. The report outlines five reasons for governments relative ‘lethargy’ when it comes to action on climate change, which are also relevant to peak oil. These reasons provide an insight into why policy in areas such as climate change and peak oil tend to be incremental in nature (adapted from Hale, 2008, pp. 5-8):

- The timescale is so great that the impacts of climate change are not immediately felt, resulting in unresponsiveness;
- Democratic culture inhibits political leadership;
- Shift in power from national governments to global corporations, and government fear of negative effects on the market;
- “Ideological handcuffs” in which there is resistance to interventionist style of government needed to address issues such as peak oil; and
- Weak global and national institutions and processes: there is nothing like it before, need a long term coordinated response, both globally and nationally.

A major difference between the issues of climate change and peak oil is that for climate change there is widespread concern at the global, national and local levels, as is demonstrated by the publicity and media surrounding the 2009 United Nations Climate Change Conference in Copenhagen. However, despite the widespread publicity, there is still ‘lethargy’ and reluctance to make robust climate change policy (Hale, 2008).

Another policy arena that is helpful to examine alongside peak oil is that of civil defence emergency management planning. The likelihood of some key emergency events in New Zealand has been estimated as follows (adapted from Department of Internal Affairs, 2008):

- 15% chance of a major earthquake in Wellington in the next 50 years;
- 20% chance of a major earthquake on South Island alpine fault in the next 20 years; and
- 4% chance of a volcanic eruption in Auckland in the next 50 years (considerable uncertainty surrounds this figure). An eruption in Auckland could trigger as much as a 14% decline in GDP for New Zealand.

Despite the relatively low probability of such major natural disaster events occurring, planning and procedures are in place to help to prepare for and mitigate against the effects of a natural disaster, including a comprehensive *National Civil Defence Emergency Management Plan* (Ministry of Civil Defence and Emergency Management, 2009) and public education campaigns.

If we compare the likelihood of a decrease in oil supplies and the related planning with the likelihood of a natural disaster and the related planning we can see a gap in the oil related planning compared with the likelihood of occurrence. Obviously peak oil impacts are not seen to be directly life-threatening, as a natural disaster would be, however, some predict the impacts of a worst case peak oil scenario to be widespread and severe (DiPeso, 2005), and on a much wider scale compared with a localised natural disaster.

Possible reasons for such comprehensive planning for low probability events include the fact that planning for a civil defence emergency does not require people to significantly change their lifestyles or habits, nor does it threaten major business interests or the economy. If we compare this to peak oil or climate change, it is much more difficult for policy makers to develop and introduce policy that plans for such events, because such policy involves a major shift from the status quo and current thinking and often poses a threat to major business interests and the economy.

## 2.11 Survey Methods

There are several methods available to researchers, including survey research, evaluation research and field research (Dantzker and Hunter, 2006). Dantzker and Hunter (2006) identify survey research as the most appropriate method “when researchers are interested in the experiences, attitudes, perceptions or beliefs of individuals” (p.85). As described in Section 1.4, the aims of this research are to understand how transport policy makers *perceive* peak oil and *why they act the way they do* when faced with the issue. Survey research has been identified as the most appropriate method for obtaining this information.

Survey research can be carried out in a variety of ways, including face-to-face interviews, telephone surveys, mail surveys and online surveys via the internet (Folwer, 2003; Dantzker and Hunter, 2006; Babbie, 2010). Each method has advantages and disadvantages. Face-to-face interviews enable interviewers to get a better feeling for the attitudes of the respondents, but can be time-consuming and expensive to conduct. Telephone, mail or online surveys offer the researcher a means by which they can gather data from a large sample size relatively easily. However, these methods can be impersonal and often endure low response rates.

Surveys can be designed in different ways depending on the information that needs to be obtained and the sample size. ‘Open-ended’ questions allow the respondent to express his or her feelings and answer the question whichever way they choose, whereas ‘closed-ended’ questions restrict the respondent by forcing them to choose from a set of pre-determined answers (Babbie, 2010). Each method of questioning has advantages and disadvantages (adapted from Babbie, 2010, p. 256): open-ended questions enable the respondent to answer freely without the restriction of having to choose from a list of responses, whereas closed-ended questions force the respondent to choose from a list of responses and the list of responses given may overlook some important responses. On the other hand closed-ended questions are easily analysed, whereas answers to open-ended questions must be coded before analysis, requiring the researcher to interpret the meaning of responses which can result in misunderstanding of responses and researcher bias.

There are several techniques available for the design of closed-ended questions in surveys. A pair-wise comparison can be used to determine priorities between a set of alternatives.

Participants could be asked to rank the importance of one alternative over another to determine the weighting policy makers place on each of the alternatives. The alternatives would be compared using the scale described below (adapted from Banai, 1999, p.136).

- 1: Equal importance
- 3: Moderate importance of one over another
- 5: Essential or strong importance of one over another
- 7: Very strong importance of one over another
- 9: Extreme importance of one over another
- 2, 4, 6, 8: Intermediate values between two adjacent judgments.

Negative values for each number can be used to indicate *less* importance of one over another, e.g. -9 indicates x extremely *less* important than y. Respondents could chose a value between -9 and 9.

A popular method for measuring attitudes is known as attitude scaling (Oppenheim, 1992). The Likert scale is a traditional method of attitude scaling, where respondents are asked to indicate their attitude towards a particular statement, as indicated below:

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

The survey methods chosen for this research are discussed further in the theoretical framework section (Section 4.3).

## 2.12 Literature review conclusions

There are several key points that can be drawn from the literature review. These key points are used to develop the hypothesis, conceptual model and theoretical framework for this research.

The key points are summarised below:

- The main influences in transport policy making come from the political and business sectors, however environmental issues are becoming more important;
- There is an underlying tension between economic growth and environmental protection in transport policy making;
- Transport policy making is going through a paradigmatic shift from being a purely technical process of “predict and provide” centred around road building, to a time of “new realism” in which there are a wide range of factors and actors involved and concerns about the environment are being advocated;
- Despite the paradigmatic shift, transport policy makers still seem to continue to focus on the private car, having difficulty gaining political and public acceptability for “anti-car” measures;
- The transport system is heavily reliant on fossil fuels;
- Fossil fuels will become scarce and more expensive under a peak oil scenario;
- Scientific evidence suggests peak oil is very likely to happen, but there is uncertainty surrounding the timing and whether or not technological advances in energy generation for transport will mitigate the impacts of peak oil;
- Some cities around the world are formally acknowledging peak oil in planning documents, however, despite these advances some of these cities continue to build roads;
- Climate change is a useful policy arena with which to compare policies on peak oil;
- Political science theory is helpful to gain an understanding about the policy making process and the perceptions of transport policy makers, and their ensuing behaviour; and



- Despite its links to the technical rational comprehensive style of policy making, transport policy can often be described as being incrementalist in nature as radical changes to transport policy are not politically or publicly acceptable. As a result of this finding incrementalism will be carried through into the development of the theoretical framework for this research.

### **3 Conceptual Model Development**

Drawing on the findings of the literature review, a conceptual model has been developed in the form of a schematic diagram that represents how the concepts of transport policy and peak oil fit together on the global scale. The following sections describe the background to the development of the conceptual model. The schematic diagram is presented in Section 3.4.

#### **3.1 Economic growth – the dominant paradigm**

With the invention of the oil powered combustion engine at the beginning of the 20<sup>th</sup> century, oil became the principal fuel source for industry and transport, replacing coal and wood. Consequently there were major advances in the transportation industry: cars became more popular and people could move more freely, agricultural production increased as the efficiency of machinery improved, and transportation of goods became easier and cheaper resulting in companies being able to expand into new and far-reaching markets (Roberts, 2004). This resulted in increased economic growth, globalisation and an increasing demand for energy to sustain the economic system. Presently people are accustomed to a lifestyle in which they can move independently, can acquire goods from around the world, and can live in cities with easy access to food, shops, services and entertainment. The process of urbanisation resulted in the growth of cities, and now for the first time in history more people live in urban areas than rural areas (United Nations Population Fund, 2007).

Economic growth has become the dominant paradigm that supports globalisation and urbanisation. The economy grows when more goods and services are produced and consumed. This equates to more jobs, more income, and more profits and as a result people experience a higher standard of living. As economic growth is equated with profits and higher standards of living it is therefore the main policy goal of most nations (Jackson, 2009). In times of recession, or economic decline, unemployment rises, business profits and incomes drop and as a result standards of living are affected as people struggle to purchase the goods and services they would like, further compounding the situation as the health of the economy relies on consumers to consume.

Supporting this economic system, that requires production and consumption of goods and services to grow, is fossil fuel consumption. There is clear link between economic growth and fossil fuel use: as one increases so does the other; and conversely as the economy goes into recession fossil fuel use declines, as was seen in the global recession in 2008 (Kopits, 2009). This clear link is related to the transport system, a major consumer of fossil fuels. The transport system plays an important role in achieving economic growth by facilitating the movement of people and goods, to enable production and consumption of goods and services.

Due to the dominance of the economic growth paradigm and the role the transport system plays in facilitating it, governments make efficiency of movement a priority for transport policy. This policy position is supported by businesses and industries that rely on the transport system to operate, and by the public who rely on the transport system to travel for work and leisure purposes. Therefore, policies such as improving the roading network to increase capacity and reduce congestion, with the aim of increasing efficiency, are politically and publicly acceptable, resulting in increased popularity of the government amongst the majority of voters, businesses and industry groups. The current transport policy stance of the New Zealand Government provides an example of the priority placed on economic growth, as indicated by the forward to the Ministry of Transport's (2009) GPS:

*“The government’s priority for its investment in land transport is to increase economic productivity and growth in New Zealand...The GPS aligns investment in the land transport sector more closely with this priority. Further, the GPS closely reflects the modal choices that are realistically available to New Zealanders. Approximately 70 percent of all freight in New Zealand goes by road, and 84 percent of people go to work by car, truck or motorbike, so we need good roads to move freight and people. The government supports some mode shift over time, especially in our major cities of Wellington, Auckland and Christchurch, but considers that this should not be accelerated to the point where the outcomes are economically inefficient...Investing in economic growth and productivity is particularly important at this time, as the global economic downturn is impacting on New Zealand’s economy...”*

*...The GPS also notes there are a number of Roads of National Significance in the vicinity of our five largest urban centres. Further development of these will have national benefits to the roading network and to national economic development. I am confident the GPS provides the right signals to ensure that the land transport network makes a positive contribution to New Zealand's economic well-being and assists in achieving the priority of economic growth and productivity... ” (p.1).*

### **3.2 An alternative paradigm**

The current links between fossil fuel consumption and economic growth suggest that if a scenario of reduced fossil fuel availability were to eventuate, economic growth would be very difficult to achieve. Despite attempts to ‘decouple’ economic growth and fossil fuel use, the fact remains that economic growth depends on fossil fuel use, and, as discussed in Section 2.5.1, presently there is no equal alternative to fossil fuels that will enable us to continue to pursue economic growth without the consumption of fossil fuels. This poses fundamental concerns about the prevailing goal of economic growth when faced with the possibility of a future of fossil fuel shortages. If fossil fuels become scarce and we cannot achieve economic growth how would society function and survive under the current social system? Is there an alternative paradigm under which we could organise ourselves, one in which fossil fuel shortages force us to look to another way of organising society, perhaps “prosperity *without* growth” (Jackson, 2009)?

For transport policy makers, this poses significantly difficult questions about the direction future transport policy should take. Should they tailor policy to prepare for the possibility that fossil fuels may be unaffordable and scarce? Should transport policy prioritise sustainability and reduced fossil fuel consumption at the expense of economic growth? Or should transport policy assume that fossil fuels, or some equal alternative fuel source, will always be available to enable us to continue to travel in the highly mobile manner that the economy and our society requires?

These complex questions facing transport policy makers should be taken in the context within which they operate: in an environment which is highly politicised, in which economic growth is a prevailing goal for society, and in which there are many actors and factors influencing the decision making process. The ongoing debate amongst scientists and energy industry experts

surrounding the concept of peak oil, its existence, timing, and possible alternative fuels, provides little direction or certainty for transport policy makers as to how they should plan for the future.

### **3.3 Dilemma for transport policy makers**

The context described above creates a dilemma for transport policy makers – between the dominant paradigm and status quo, and alternative paradigms that propose a significant departure from the status quo. This conflict is represented in the conceptual model diagram in Section 3.4. The diagram shows how transport policy makers are influenced by a wide range of actors in society, and factors, such as legislation and geography. Economic growth, depicted in green in the diagram, is the dominant paradigm, because it enables society to enjoy a comfortable standard of living. As a result, those actors who help to facilitate economic growth (business and industry) are likely to be more influential than others in determining the makeup of transport policy. Transport policy makers are encouraged to implement transport policy that facilitates economic growth, thereby contributing to a comfortable standard of living. As a result these policies will be publicly and politically acceptable, persuading the transport policy makers to continue with such a policy strategy.

As described in Section 2.2.4 of the literature review, Lindblom (1982) proposes that policy makers in capitalist societies are ‘imprisoned’ by the market economy, and as a result are far more likely to favour policy that aids economic growth over any policy that may threaten it. As well as facilitating economic growth, transport policy makers must also achieve a wide variety of other goals for the transport system, including safety and sustainability.

Concepts such as peak oil, depicted in red in the diagram, which could threaten the economic growth paradigm (unless economic growth and fossil fuel use are effectively ‘decoupled’), are likely to be met with scepticism from those policy makers and actors in society who place a strong emphasis on economic growth. In order to prepare effectively for the possibility of peak oil it has been suggested that we need to make fundamental changes to the way we conceptualise and operate our transport systems (Hirsch, 2006; McPherson and Wetzin, 2008; Lerch 2008). However, radical changes to the transport policy status quo could threaten the economy and be politically and publicly unacceptable, therefore transport policy makers have little incentive to

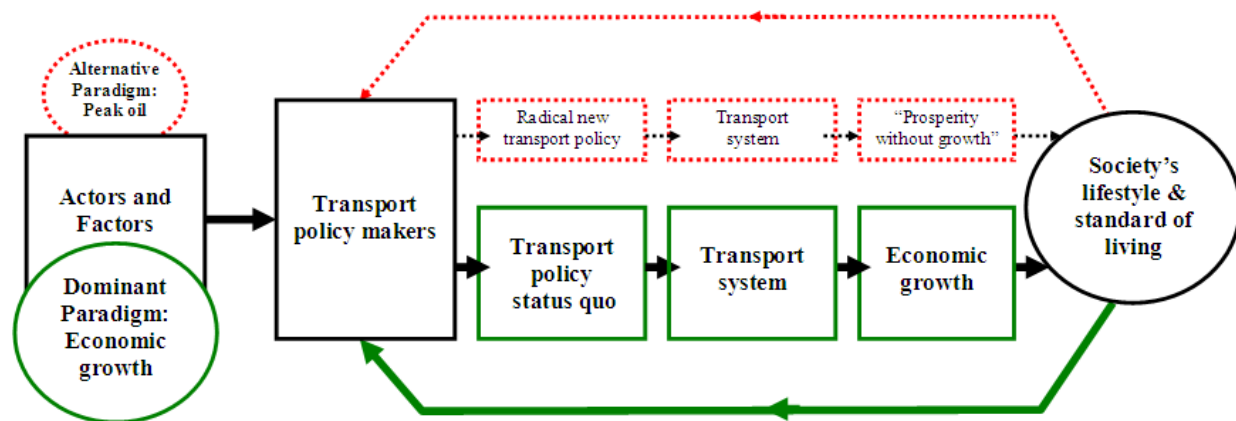
make such changes, especially given the uncertainties and lack of widespread public concern about the possibility of peak oil and its potential impacts.

### 3.4 Conceptual model diagram

The conceptual model diagram is shown in Figure 9. The diagram shows how transport policy makers are influenced by the dominant paradigm of economic growth (in green), resulting in them developing transport policy that continues to adopt the status quo, leading to a transport system which has the main aim of facilitating economic growth in order to maintain the lifestyle and standard of living society has come to expect.

An alternative path (in red) shows how transport policy makers could be influenced by a new paradigm under the peak oil scenario, in which they would need to develop radical new transport policies, that would result in a transport system that facilitates ‘prosperity’, thereby maintaining a comfortable lifestyle and standard of living.

Figure 9 Conceptual model diagram



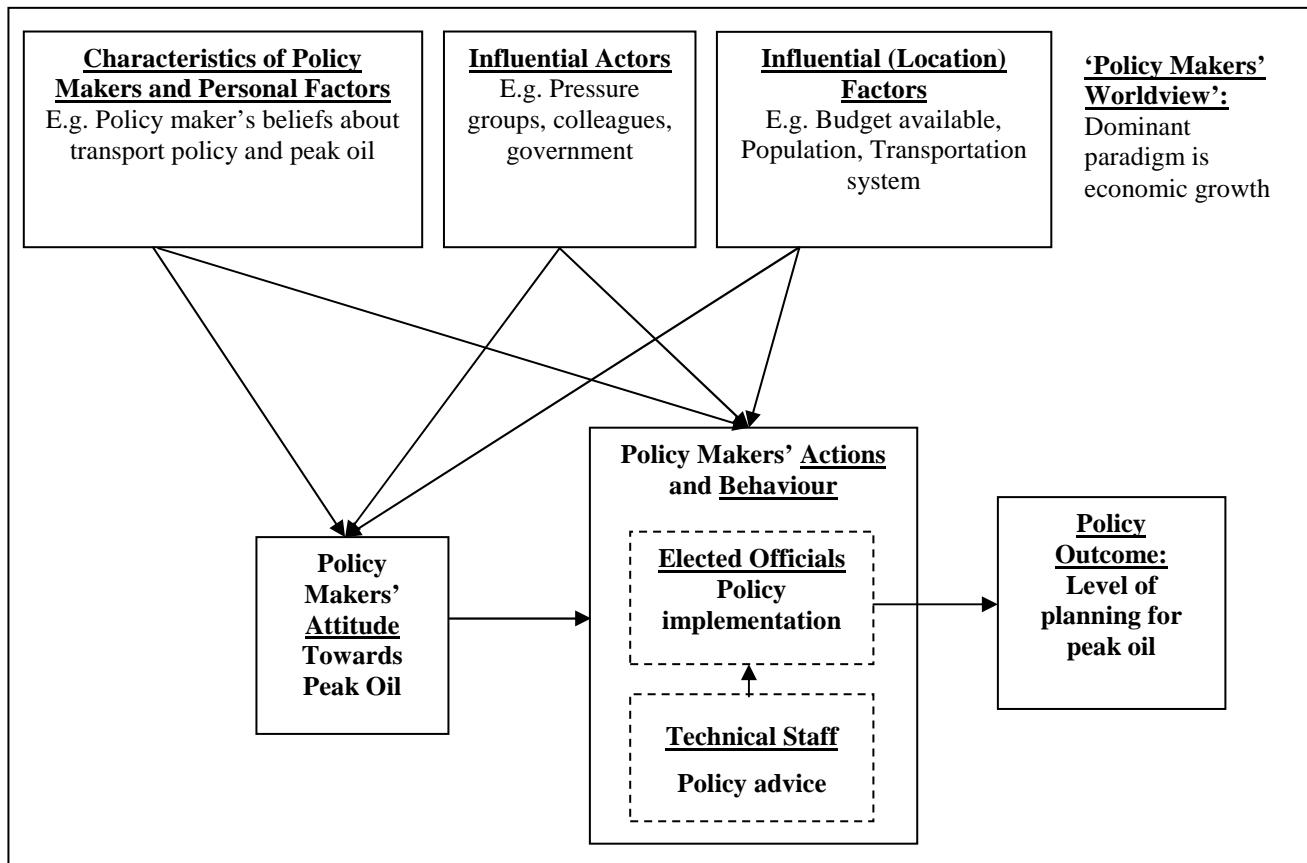
## **4 Theoretical Framework**

### **4.1 Introduction**

The conceptual model described in Section 3 provides the background to the development of the theoretical framework for the research. The theoretical framework will provide a platform from which to understand and explain the perceptions and actions of the transport policy makers in terms of the peak oil problem.

In order to understand transport policy makers' actions and behaviour towards peak oil, we can first look at the actors, factors and attitudes of the policy makers which combine to influence the behaviour of transport policy makers (the policy outcomes). The three main determinants of transport policy makers' behaviour (policy outcomes) are (1) the perceptions and attitude of the transport policy maker, (2) the influencing variables (actors and factors) and (3) the dominant paradigm (as described in the conceptual model). These three elements combine to shape how transport policy makers will react to a scenario such as peak oil. Figure 10 shows the interactions between the characteristics of policy makers, the influencing variables, and the attitudes and behaviour of transport policy makers towards peak oil.

**Figure 10 Influential actors and factors in transport policy planning for peak oil**



As shown in Figure 10, the perceptions and attitude of a policy maker towards peak oil influence their behaviour. Their perceptions and attitudes are shaped by the influencing variables (actors and factors) and by the characteristics of policy makers, such as their beliefs about challenges for the future in the transport system. The policy maker's attitude towards peak oil is shaped by their personal thoughts on how they would like the transport system to operate in the future. It will also be shaped by the views of people around them (colleagues, government, and pressure groups) and factors that are unique to the location in which they operate. The policy maker will then form a personal attitude towards peak oil which will in turn shape their corresponding level of concern about the issue. This personal attitude towards peak oil will then be one of the factors that determine their actions and behaviour and the policy outcome (level of planning for peak oil).



Due to the highly complex and democratic policy making arena that is transport policy, the attitude of a transport policy maker towards peak oil is not the only indicator of how they will behave and the policy outcomes. The same influences that helped to shape their view of peak oil will also influence how they behave in the policy making arena. For example, a single policy maker may hold serious concerns about the peak oil issue, however opposing views held by colleagues, central government policy, concerns about public acceptability of policies to address the issue and limited funding, may result in a policy outcome that does not truly reflect the concerns of this individual policy maker.

Naturally in a democracy it is the majority that determines the policy outcome, and compromises must be made between policy makers in order to obtain consensus. A policy maker with an attitude that is in the minority will be unlikely to be able to transfer his or her views into action without the support of the other policy makers. Therefore, marked differences in policy makers' attitudes and behaviour could suggest that certain actors and factors have been able to directly influence policy makers' behaviour, regardless of their attitude towards the subject, or that they are in the minority and are unable to gain sufficient support from other policy makers.

A distinction must be made here between the parties involved in transport policy making, as is shown in Figure 10. Transport policy makers have been defined in this research as elected officials and technical staff members. It is important to note that elected officials are responsible for giving the final approval on policies. Therefore the attitudes and behaviour of technical staff members, as indicated by the advice they give to elected officials, will only be translated into policy outcomes if the majority of elected officials agree that the advice being presented should become policy.

The dominant paradigm of economic growth will also be an important factor, because it will determine the 'worldview' of all transport policy makers, and those who influence transport policy makers, and will determine how they conceptualise the function and purpose of the transport system in society. The paradigm will also play a role in shaping the location factors such as the budget and activity systems.

The process of understanding how transport policy makers perceive peak oil and how they respond towards the issue involves four steps:

- Understanding the wider context: identifying the location factors involved in transport policy making;
- Gathering information, through survey research, about the characteristics of transport policy makers that shape their *attitudes* towards peak oil and transport policy in general. Identifying who the influential actors are and how these and the location factors work to shape their attitudes, and then how these combine to determine the policy makers actions;
- Collation of the results of the data from the wider context and the interview/survey process; and
- Analysing the results and carrying out an assessment of the perceptions of peak oil and the policy outcomes.

The following sub-sections describe these four stages in detail.

#### **4.2 Understanding the wider context: identifying key location factors**

This first step involves gathering information which provides a wider context within which to analyse the actions and attitudes of the transport policy makers. First we must define the study area: a city, region or country. We then can identify the key influential factors involved in transport policy making in this area.

A number of influential factors are likely to play a role in determining transport policy, including:

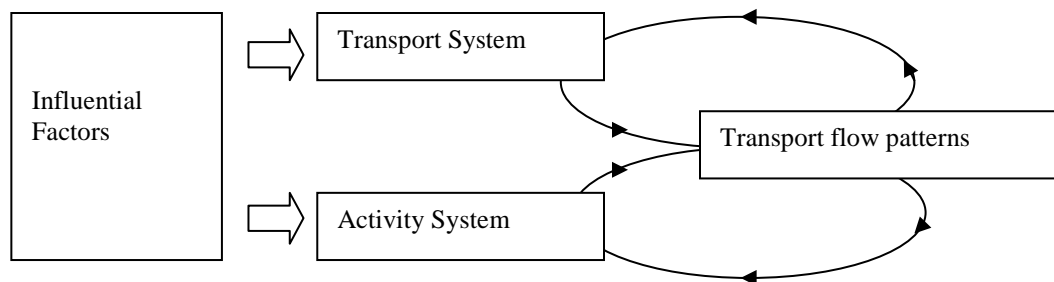
- Standard of living;
- Population size;
- Economic climate;
- Transport system;
- Activity system;
- Budget for transport projects;
- Statutory requirements; and

- Existing policy documents.

The existing national level political and economic climates are important factors, as it has been established that there are typically differences between social and conservative style governments and their transport policies, as described in Section 2.2.2 of the literature review. The economic climate is also important as it has been seen that in times of economic hardship people are more likely to support policies that promote short term economic growth rather than those promoting long term sustainability (Newport, 2009).

Other factors that influence transport policy makers are the dynamics of the transport and activity systems. Transport systems represent the facilities and services that enable people to travel (e.g. the road network and the public transport services). The activity system can be defined as the spatial distribution of people and activities within an urban region. How the transport and activity systems interact to result in the flow of people and goods around a city can be demonstrated in Figure 11 (adapted from Mannheim, 1980, p.13).

**Figure 11 Influential Factors: Transport and Activity Systems**



Large and highly populated cities will have complex transport systems such as motorways and public transport. Cities which have low density housing spread over a wide area will often have predominantly car-oriented transport systems, due to difficulties of providing public transport in lower density urban areas. Any location which attracts people, such as retail outlets, the central business district, industrial areas, airports or ports, will have an impact on the transport flow patterns. Such factors are all inter-linked and provide the framework within which policy in any given city is made.

An analysis of the local policy documents, such as transport strategies and plans will provide an indication of how the influential factors described above, such as population, the economy, the transport system and activity system, contribute to the development of transport policy. These documents will indicate which factors are important in any given city or region. For example, the provision of public transport will not be a highly influential factor in a low density rural setting compared with a metropolitan area, and this will be reflected in their respective transport policy documents. The survey process will also provide an insight into what the key location factors are in each case study city.

The policy documents, strategies and plans will also give an indication of the level of planning for peak oil. There are two basic policy outcomes regarding peak oil: at one end of the spectrum is robust planning for peak oil and at the other end is complete disregard for peak oil planning. Naturally there are also policy outcomes which can fall in the middle of the two extremes, for example *some* planning for peak oil may be evident, but it is not a priority. As an example, asking the following questions in an analysis of policy documents and giving them a rating of “high/medium/low” will give a basic indication of the level of planning for peak oil:

- Are fossil fuel price increases/shortages mentioned as a key challenge for the future?;
- Are transport systems that could mitigate the effects of fuel price rises or fuel shortages being implemented (e.g. walking, cycling, and public transport)?;
- Are travel demand management policies being implemented?; and
- Is land use planning integrated with transport planning in order to reduce demand for the use of the private motor vehicle?

#### **4.3 Gathering information on transport policy makers**

Once information on the wider context in which the transport policy makers operate is obtained we can narrow the focus to the transport policy makers themselves to understand how they perceive the peak oil problem and why they act the way they do.

Whilst an analysis of existing policy documents will provide an insight into the actions of transport policy makers as a group, it is important to then look closely at the characteristics and

attitudes of the individuals involved in transport policy making and how they perceive peak oil to try and understand how they came to develop the policy. These characteristics are shown in Figure 12, indicating the five main criteria that are likely to influence a transport policy maker's ability to implement planning for peak oil (policy outcomes):

- Location factors;
- Personal factors;
- Beliefs about transport policy;
- Influential actors in transport policy decisions; and
- Knowledge of, and attitude towards, peak oil.

The diagram shows each of the main criteria and their corresponding sub criteria. Each of the sub criteria has different levels which influence the level of planning for peak oil. For example, a transport policy maker could have either a low or high level of information available to plan for peak oil, and the difference could change the level of priority they place on peak oil planning. Determining how each of the criteria influences the level of planning for peak oil is one of the objectives of this research.

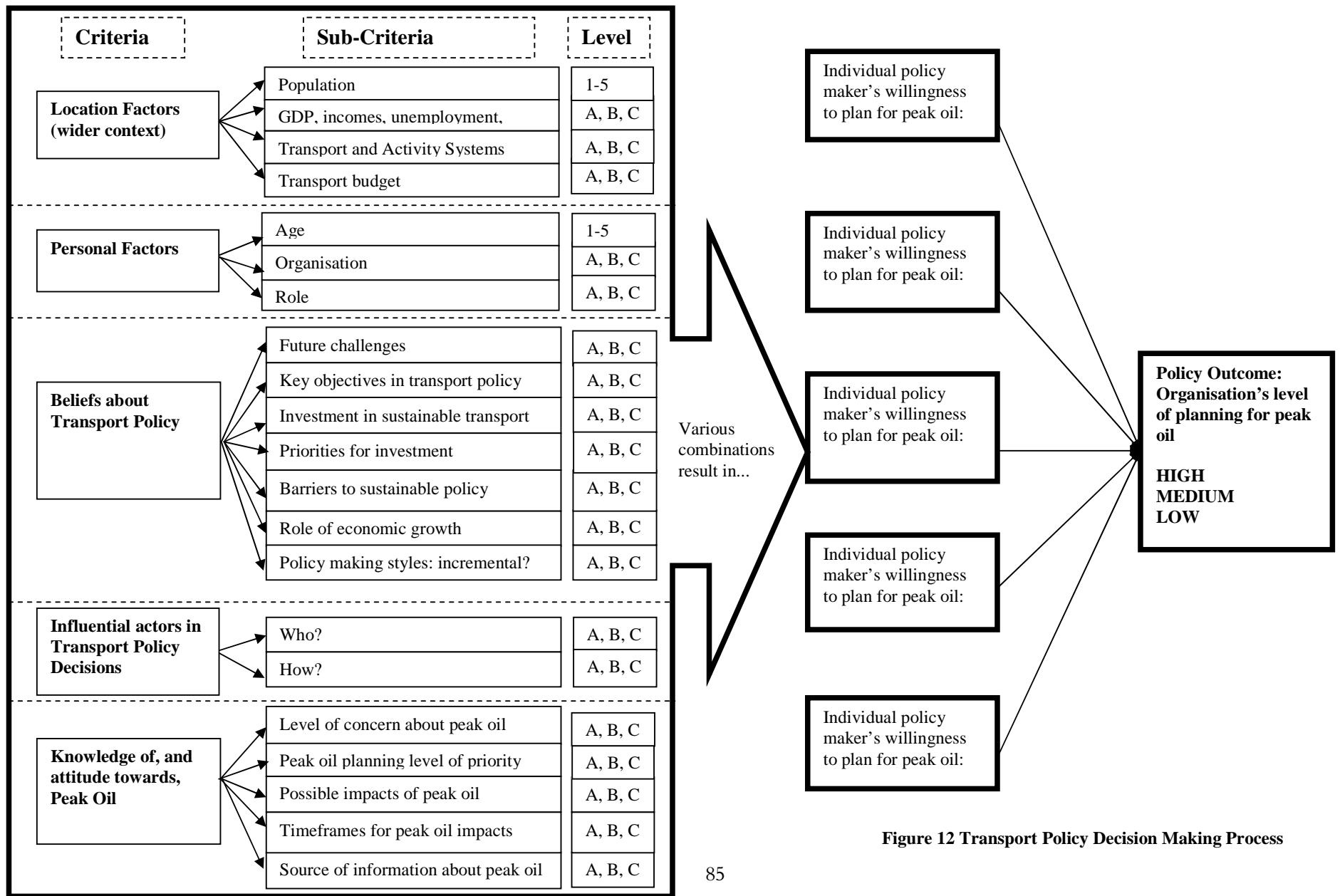


Figure 12 Transport Policy Decision Making Process

#### ***4.3.1 Data collection method***

An effective method for obtaining information about the five main criteria is to conduct interviews and surveys with transport policy makers. This assists in determining which of the sub-criteria are influential in shaping the characteristics of transport policy makers, their attitudes and perceptions, and ultimately their behaviour and actions, in the form of policy outcomes and their ability to plan for peak oil.

#### ***4.3.2 Question type and structure***

The main aim of the questions is to determine which of the different levels of each sub-criterion the transport policy makers fit into. There are several methods of questioning available in order to obtain this information from transport policy makers. The technique chosen for the case study is a mixture of face-to-face interviews, which use ‘open-ended’ questions in a conversation style, and an online survey, which uses ‘closed-ended’ questions answered with rankings or multiple choice. These different styles are discussed in the following sections.

##### ***4.3.2.1 Face to Face Interviews***

The design of the interview, in particular the wording of the questions, is crucial in order to gain robust information. It is vital that the interviewer does not impose any bias towards one argument or the other, either in the design of the interview or in conducting the interview itself.

Therefore the face-to-face interviews use ‘open-ended’ questions in order to allow the interviewee to express his or her feelings and attitudes without the interviewer asking lengthy questions that may have led the interviewee to say what they thought the interviewer wished to hear. The interview is carried out in a conversation style without a strict set of questions and using topics as prompts for the interviewees depending on the flow of the conversation. A specific project example relating to the city is used to help to focus the attention of the respondents to a real life scenario, with the aim of gaining a more robust response when compared to questions of a more generic nature.

The interviews begin with questions of a general nature about transport and various issues and influences. Questions about oil and energy are only raised towards the end to ensure this topic does not influence the way other questions are answered.

The interviews use the following questions as prompts for conversation:

- What do you think the transport system would look like in the future (30-40 years time)?;
- What do you think will be the main challenges for transport in your City in the future?;
- Whom or what do you think is influential when transport policy is developed in your Council?;
- In terms of sustainable transport policies do you consider there to be any major barriers to implementing such policies?;
- What are your views on the current government's policy of directing funding towards roads in order to facilitate economic growth?;
- Do you perceive there to be a clash between economic and sustainability objectives in transport policy? Do you think the two objectives can be achieved together?; and
- Do you think there will be issues for your City with significant fuel shortages and price increases in the future?
  - *Answer YES:* What kind of problems do you think this will pose? What do you think should be done to address the risk of future fuel shortages? Is there any planning for fuel shortages proposed?
  - *Answer NO:* Why do you think peak oil will not occur or cause problems?

#### *4.3.2.2 Online Survey*

An online survey is an effective way to distribute questions and collect data. Online surveys can be made completely anonymous, which gives participants the freedom to express attitudes that they may not feel comfortable expressing in an interview situation.

The online survey can pose 'closed-ended' questions along the same subject lines as the questions in the interviews. The multiple choice answer options for each question are designed to



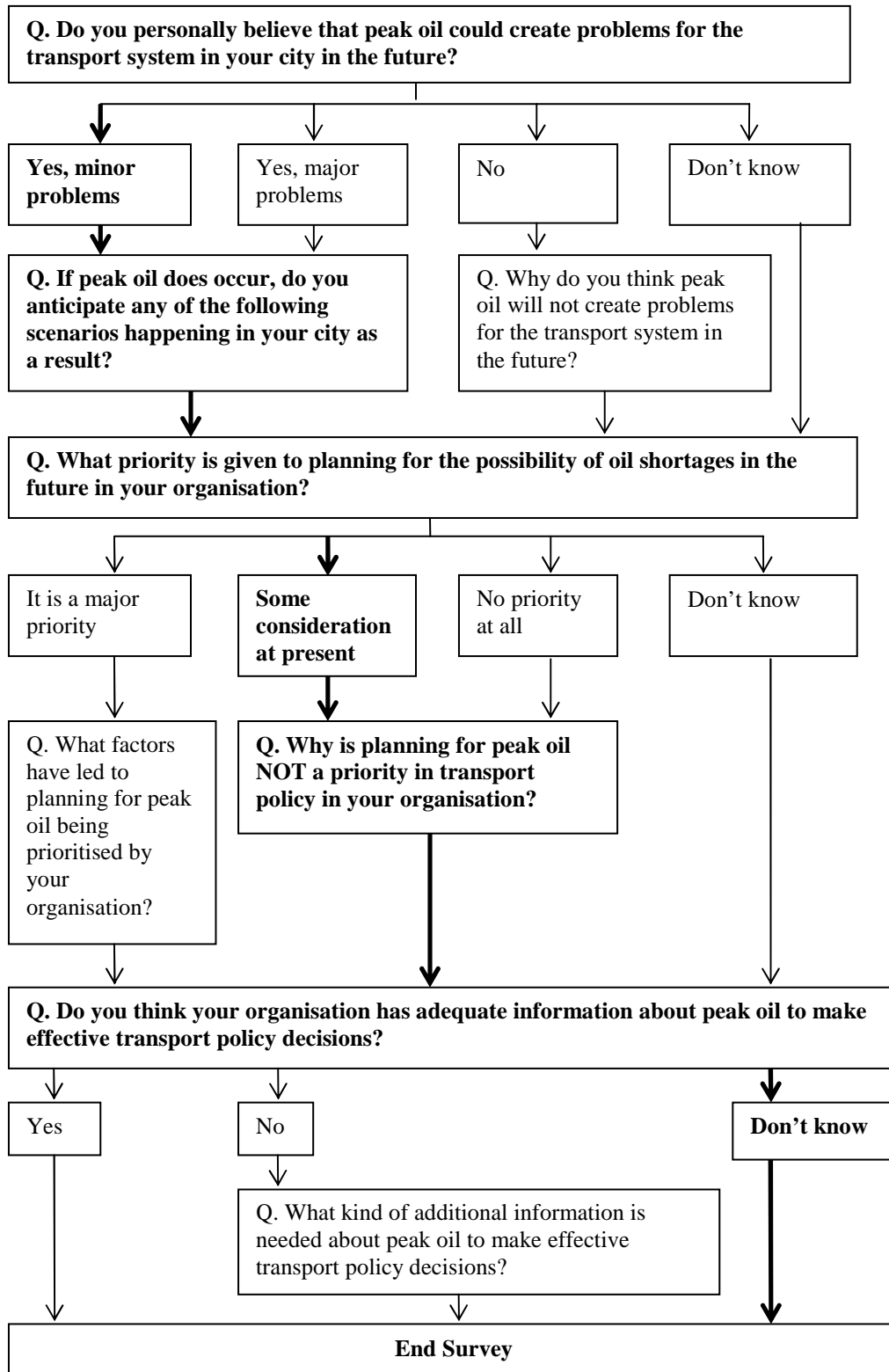
give the participant the opportunity to make further comment in case the choices given do not fit with how they wish to answer.

The online survey begins with questions about basic personal information such as the organisation represented, age and role. These questions enable results to be sorted to determine how factors such as the city the respondent works in, their age and their role (type of transport policy maker – technical staff member or elected official) affect their views on transport policy and peak oil.

Similarly to the interviews, the online survey has a general section about future challenges in the transport sector, sustainable transport policy, economic growth and influences in transport policy at the start, which aims to understand the general views of policymakers on the subject of peak oil and transport policy making.

There are various different question styles available, as described in Section 2.11. For example, a pair-wise comparison can be carried out to determine which objectives policy makers think are most important in the development of transport policy. The Likert scale can be used to measure transport policy maker's attitudes towards certain statements or topics. The survey questions can contain 'logic rules', meaning that respondents are given different questions depending on how they answer certain questions, enabling a logical line of questioning to take place. Figure 13 shows how answers to different questions would result in respondents following a different line of questioning. The figure shows an example of how a respondent could answer, as indicated by the questions and answers in bold.

Figure 13 Logical Question Structure



Information about the level of concern about peak oil is obtained by simply looking at the answer to the question: “*Do you personally believe that peak oil could create problems for the transport system in your city in the future?*”. From the answers to this question each respondent can then be categorized into one of the three categories as below:

Category 1: No concern about peak oil (Low)

Category 2: Minor concerns about peak oil (Medium)

Category 3: Major concerns about peak oil (High)

This categorisation enables the level of concern about peak oil to be cross examined with other criteria to determine what influences the level of concern.

The final section of the survey asks respondents about their views on the subject of peak oil. Like the interviews, this subject is at the end of the survey in order to ensure that the subject of peak oil is not the focus when answering the general questions about transport policy.

#### *4.3.2.3 Using Political Science Theory – Incrementalism*

Due to the political nature of transport policy making, it is important to include questions that will help in understanding the policy decision making process from a political viewpoint. Incrementalism, which is described in detail in Section 2.8.2.2 of the literature review, provides a theoretical foundation for analysing the policy decision making process of transport policy makers.

Incrementalist theory would suggest that policy makers are unable to make purely ‘rational’ decisions based on technical steps, but the policy making process is instead one of “bargaining and compromise (‘partisan mutual adjustment’) among a multiplicity of actors who possess different information, different personal or institutional interests, and different views of the public interest” (Hayes, 2001, p.3). In the context of peak oil and transport policy, the problem is that incremental changes to transport policy may not be soon enough or robust enough to mitigate the potential impacts of peak oil. Because of the potential scale of peak oil impacts and the need for “massive mitigation at least a decade before the fact” (Hirsch, 2006, p.7), a radical departure from the transport policy status quo in the near future may be necessary.

In order to determine what role incrementalism plays in transport policy making, certain questions are posed to transport policy makers to better understand their views on policy and how it should be developed. For example, policy makers are asked to comment on whether they agree or disagree with the certain statements about policy making. Their level of agreement would correspond to a level of agreement with an incrementalist policy making style. An example is shown in Table 2.

**Table 2 Statement, Answer and Level of Incrementalism**

<b>Statement</b>	<b>Answer</b>	<b>Level of Incrementalism</b>
It is better to make small incremental changes to existing policy rather than risk making mistakes with major changes to policy	Strongly agree	High
	Agree	Medium/High
	Neither agree or disagree	Medium
	Disagree	Medium/Low
	Strongly disagree	Low
There are a wide range of stakeholders to satisfy therefore compromises need to be made to ensure broad support for policies	Strongly agree	High
	Agree	Medium/High
	Neither agree or disagree	Medium
	Disagree	Medium/Low
	Strongly disagree	Low
Making small changes to existing policy rather than introducing major new changes helps to ensure the political feasibility and acceptability of any proposed policy	Strongly agree	High
	Agree	Medium/High
	Neither agree or disagree	Medium
	Disagree	Medium/Low
	Strongly disagree	Low
Major changes to policy should be made regardless of lack of public support if such changes are necessary for the long term greater good of the public.	Strongly agree	Low
	Agree	Medium/Low
	Neither agree or disagree	Medium
	Disagree	Medium/High
	Strongly disagree	High

## **4.4 Results Collation**

### **4.4.1 Key Location Factors**

The key location factors identified through the process of analysing the relevant policy documents and statistics about population, the transport and activity systems and the economy are collated in a way that can be easily analysed. This data is cross-referenced with the interview and survey data. Tables are a good way to present the data in an accessible manner.

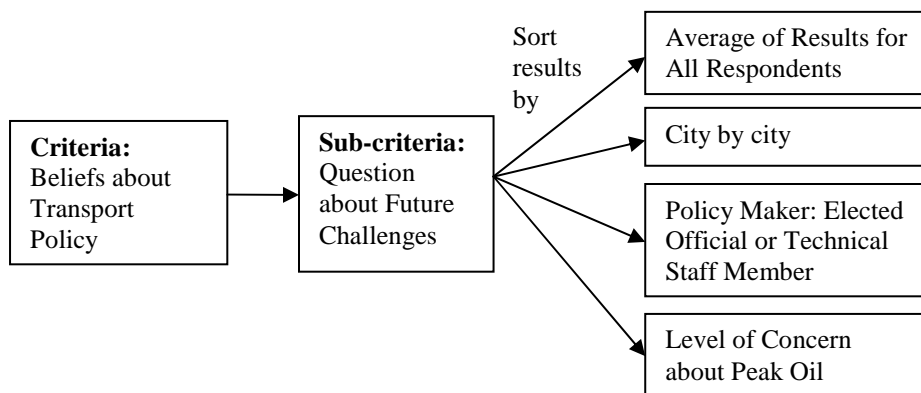
#### 4.4.2 Interview Data

Results from interviews can be difficult to analyse, because of the nature of ‘open-ended questions’ and a wide variety of answers given in a conversation style interview. Interviews are recorded, if possible, for ease of analysis. The answers given are then grouped into broad statements which capture the general idea being expressed in order to make post-interview analysis easier (Fowler, 1993). Only those responses expressed by several respondents are grouped into broad statements. Responses only expressed by a single person are filtered out to minimise the amount of data from the interviews. The broad statements can then be matched to each of the five main influential criteria. A sorting of interview responses by city, role and level of concern is undertaken.

#### 4.4.3 Online Survey Data

Data for the online questionnaire is collected electronically and collated for analysis. The results can be collected for each sub-criteria level, as listed in Figure 12 . The results are then sorted in different ways, based on the answers to certain questions in the survey, as shown by the example in Figure 14.

**Figure 14 Sorting of Online Survey Results**



The online survey results remain anonymous in order to protect the identity of the respondents; therefore it is not possible to check individual’s responses in the survey against individual’s responses in the interviews. However the interview data as a whole can be used to check and verify the general content of the online survey data, and vice versa.

The results are collected for all the respondents and the average calculated to give a profile of a typical transport policy maker's response across the case study areas. The results are sorted by each city, by different groups of policy makers (technical staff and elected officials), and by each of the three levels of concern about peak oil, as described in Section 4.3.2.2 above. Each of these different sortings can be cross referenced with the other. For example a city-by-city sorting can be carried out, followed by a 'level of concern about peak oil' sorting, to show different levels of concern in each city.

#### **4.5 Results Analysis and Discussion**

Once the previous steps have been consolidated, the results are then analysed and an assessment of the different influences on transport policy makers discussed. This involves determining which of the five main criteria, their sub-criteria and respective levels are most influential in shaping the attitudes and behaviour of policy makers.

From the sorting groups it can be determined if relationships and patterns emerge that provide an insight into how different levels of the sub-criteria influence perceptions about transport policy making, in particular in relation to peak oil. For example, the sorting by *level of concern about peak oil* will reveal what transport policy makers who have no concern about peak oil consider to be priorities for investment in transportation, what role they play, why they consider peak oil will not be a problem, what level of information they have about peak oil, etc. This will help to gain an understanding of why these transport policy makers do not have any concern about the peak oil issue.

Likewise, sorting by city can enable the policy documents for that city to be analysed to determine if there is a match between the attitudes of the transport policy makers and their behaviour. For example if a city has a relatively low level of planning for peak oil in its policy documents but many of its transport policy makers are concerned about peak oil, the differences in sub-criteria levels in each of these cities may provide an insight as to why. The sub-criterion *policy making style* may provide an insight: a high level of agreement with an incrementalist style of policy making could indicate that despite knowledge of, and concern about peak oil, that would require a major policy shift towards sustainable transport solutions to address the issue, a

transport policy maker may only make small adjustments to policy to ensure political and public acceptability remains high.

This assessment will enable us finally to return to the influential actors and factors in transport policy planning for peak oil (as shown in Figure 10 in Section 4.1) and elaborate on the relationships between them to define:

- To what extent the personal characteristics of transport policy makers determine how they think and act towards peak oil;
- To what extent influential actors determine how transport policy makers, think and act towards peak oil;
- To what extent the location factors determine how transport policy makers, think and act towards peak oil;
- What role the paradigm of economic growth plays in determining how transport policy makers, think and act towards peak oil;
- What influence a transport policy maker's attitude towards peak oil has on his or her actions towards it; and
- The relationships between technical staff and elected officials, their respective attitudes towards peak oil and how these relationships determine the policy outcomes (level of planning for peak oil).

## 5 Case Studies

### 5.1 Introduction

In order to test the hypothesis, the conceptual model and the theoretical framework, three case studies were carried out in New Zealand. The case studies involved an analysis of three different sized areas: a rural area (population <21,000), a medium city (population <500,000) and a large city (population >1,000,000), each chosen to cover a wide range of views, issues, challenges and location factors.

The research was limited in scope to the three cities and their respective technical transport staff and elected officials. The focus of the case studies was solely on transport policy makers at the local and regional government level, and did not extend to the national level.

Due to the small sample size, and in order to protect the identity of the organisations and persons interviewed, the names of the local councils used in the case studies will remain anonymous, in accordance with the guidelines of the University of Canterbury Human Ethics Committee<sup>12</sup>. As the medium and small cities have only one local council the names of these cities will remain anonymous. The identity of the large city, Auckland, is made public because it is the only city in New Zealand with a population greater than 1,000,000. However, Auckland is made up of seven different local councils, only four of which were used in the case study. The four local councils used will remain anonymous.<sup>13</sup>

Throughout the remainder of this thesis, the rural area will be referred to as “city 1”, the medium city as “city 2” and the large city as “city 3”. City 1 is not a city in the usual sense of the word; the term city has been used for ease of analysis. City 1 is a predominately rural district with a single major urban centre (Population <15,000). City 2 comprises a single city council. Each case study involved face to face interviews and an online survey with selected technical staff and

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<sup>12</sup> Ethical approval of the research was obtained from the University of Canterbury Human Ethics Committee to carry out this research. A copy of the application form and acceptance letter can be found in Appendix 2.

<sup>13</sup> Because territorial authorities are anonymous, full references to documents produced by or for the authorities cannot be named. Instead any reference will be shown in brackets and will indicate the type of document.



elected officials at the local and regional councils.<sup>14</sup> An analysis of the location factors that influence transport policy makers, following the methods outlined in the theoretical framework, was also carried out.

The following sections provide background information on transport policy in New Zealand, including the relevant legislation, policy documents and funding system details.

## **5.2 Transport policy in New Zealand – Background**

### **5.2.1 Political context**

In transport policy, as with any policy, there is always tension between the amount of government intervention (socialism) and individual freedom (conservatism or liberalism) required. In New Zealand, the broad transport policy perspectives of the two leading political parties (National and Labour) are linked to the political ideology of the party.

Labour's transport policy is generally supportive of the socialist theory of government ownership and the development of policies 'for the public'. Examples of this can be seen in actions such as investment in public transport and the government's purchase of KiwiRail (Labour Party, 2008).

Conversely, National's transport policy is traditionally more supportive of individual freedom and the free market and as a result tends to be more supportive of road based transport. This is evidenced by the current National government's commitment to road building in the National Government Infrastructure Plan (National Party, 2008), in the most recent NLTP (New Zealand Transport Agency, 2009), the current GPS (Ministry of Transport, 2009) and in comments from Prime Minister John Key (2008) when addressing the Road Transport Forum:

*"I make no apologies for the fact that roading will play a significant part in National's transport plans. Like you, National knows that economic growth and demand for efficient road transport are linked. We also know that when road congestion is reduced, emissions from vehicles fall as well. So there's a good environmental rationale for building an efficient roading network. National agrees with the Road Transport Forum on these points" (Key, 2008).*

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<sup>14</sup> Interviews and surveys were not conducted with regional council staff from city 1 as they declined to participate in the research.

The National government is also more focused on economic gains and is aligned with the views of roading groups including the RTF and the Automobile Association (AA). When announcing the preferred option for the development of the Western Ring Route in Auckland, which would require 365 homes to be demolished, Transport Minister Steven Joyce said he believed it struck "a fair balance between the needs of the local community and those of the country and the economy". The RTF and AA were also in favour of the project, considering it "a boost to the economy" (Dearnaley, 2009b).

### **5.2.2 Economic context**

The comments of Prime Minister John Key regarding the 2010 Budget give an indication of the economic situation in New Zealand at the time of writing, signifying that the country is recovering from recession (Key, 2010):

*"Prime Minister John Key says this year's Budget is about building on our economic recovery and providing opportunities for New Zealanders: "Budget 2009 mapped out a plan to get the Government's finances on a firmer footing in the face of the recession, while maintaining existing services and entitlements to New Zealanders and their families. The centrepiece of this year's Budget is a major tax package aimed at reforming the tax system to make it fairer, more sustainable and a better support for economic growth. Economic growth is vital to providing New Zealanders and their families with the services and living standards they want and deserve...Budget 2010 is all about Building our Recovery. New Zealand has the opportunity to come out of this downturn in a better position than many other countries, partly because of our lower debt levels and competitive tax rates by world standards..But Budget 2010 also shows we are not out of the woods yet, which is why there will be a continued focus on Crown debt levels, the quality and quantity of Government spending and our overall economic performance""(Key, 2010).*

### **5.2.3 National transport policy**

Land transport in New Zealand is governed under the legislation of the LTMA. The purpose of the LTMA is to "contribute to the aim of achieving an affordable, integrated, safe, responsive and sustainable land transport system...[and] provide the framework for allocating central

government funding to land transport activities such as State Highways, local roads and public transport services, as well as the associated planning processes” (Ministry of Transport *et al*, 2008, p.11-12). The LTMA requires that a GPS, NLTP, RLTS and Regional Land Transport Plan (RLTP) be prepared and allows for the development of the NZTS, all of which indicate the direction that local government transport policy and strategic documents should take.

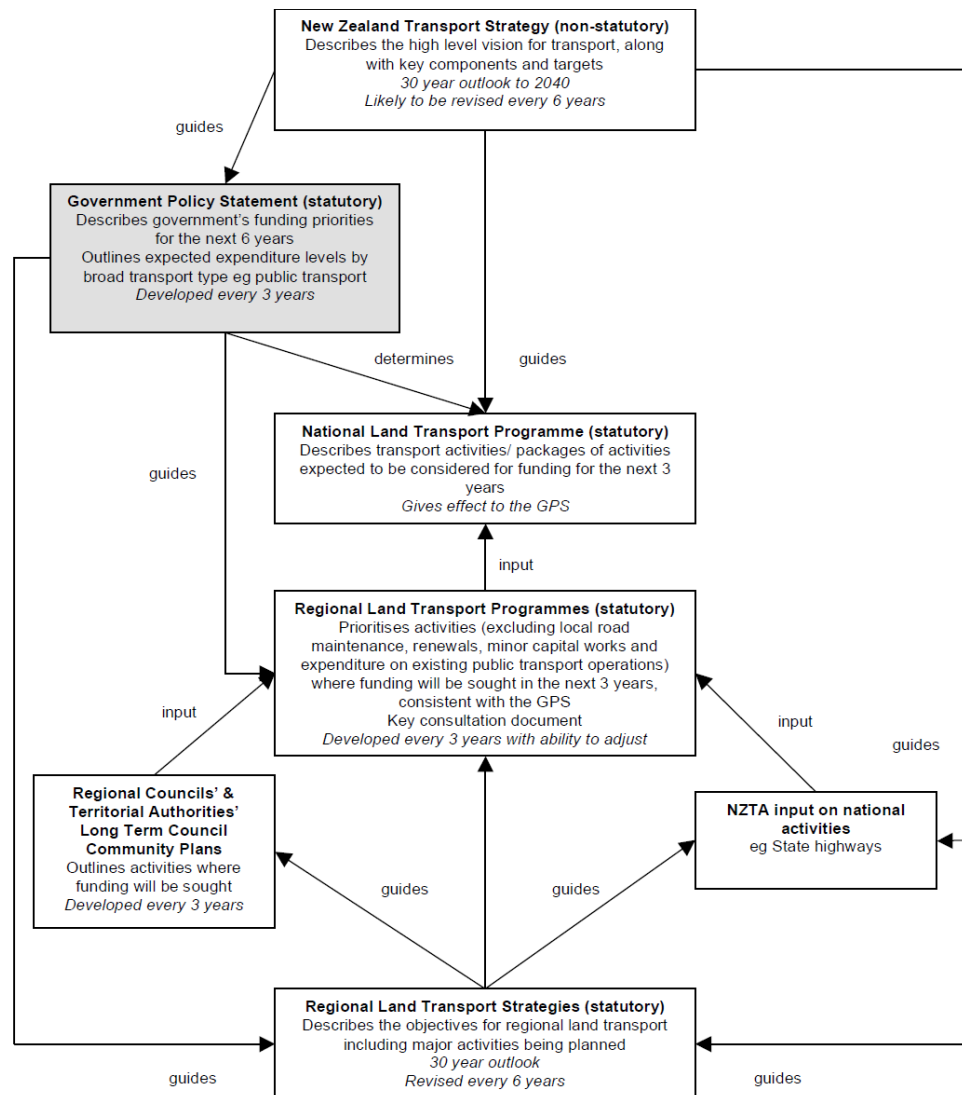
Wilson (2003) describes the various factions involved in transport policy making in New Zealand: Transport policy is made at the national level by the Ministry of Transport (MoT), at the regional level by regional council and at the local level by territorial authorities (local government). The Ministry of Transport develops the GPS and the NZTS. The NZTA prepares the NLTP.

Regional councils develop a RLTP and RLTS under the LTMA and a Regional Policy Statement (RPS) under the RMA, all of which provide direction for transport at a regional level. The RLTP must be consistent with any relevant national or regional policy statement and take into account the NZTS, New Zealand Energy Efficiency and Conservation Strategy (NZECS) and any relevant national or regional policy statement (LTMA, 2003, Section 14). The RLTS must be consistent with the NZTS and any relevant national or regional policy statement and must take into account the GPS, NZECS and any relevant District Plan (LTMA, 2003, Section 75). The RPS must give effect to policy documents at the national level (RMA, 1991, Section 62). Regional councils must produce LTCCPs under the Local Government Act (2002) (LGA) and may develop Annual Plans. Regional councils are also responsible for planning and contracting of passenger transport services. Some regional councils choose to produce a non-statutory growth strategy with the help of, or in partnership with, the local councils, to manage future population and business growth in the region.

District or City Councils (also known as local councils or territorial authorities) are responsible for the local road network (excluding State Highways) and usually provide any public transport infrastructure. Local councils are required to produce District Plans under the RMA, and LTCCPs under the LGA, and may produce Annual Plans, all of which enable Councils to fulfil their obligations under the LTMA and other Acts for the operation of the local transport network. All of these documents, from the local to the national level, set objectives (e.g. economic

efficiency, safety, social equity) and outline policies to meet these objectives. Figure 15 shows how some of these transport policy and planning documents work together.

**Figure 15 Land Transport in New Zealand: Key Documents (Ministry of Transport, 2009, p.5)**



### 5.2.3.1 National land transport funding

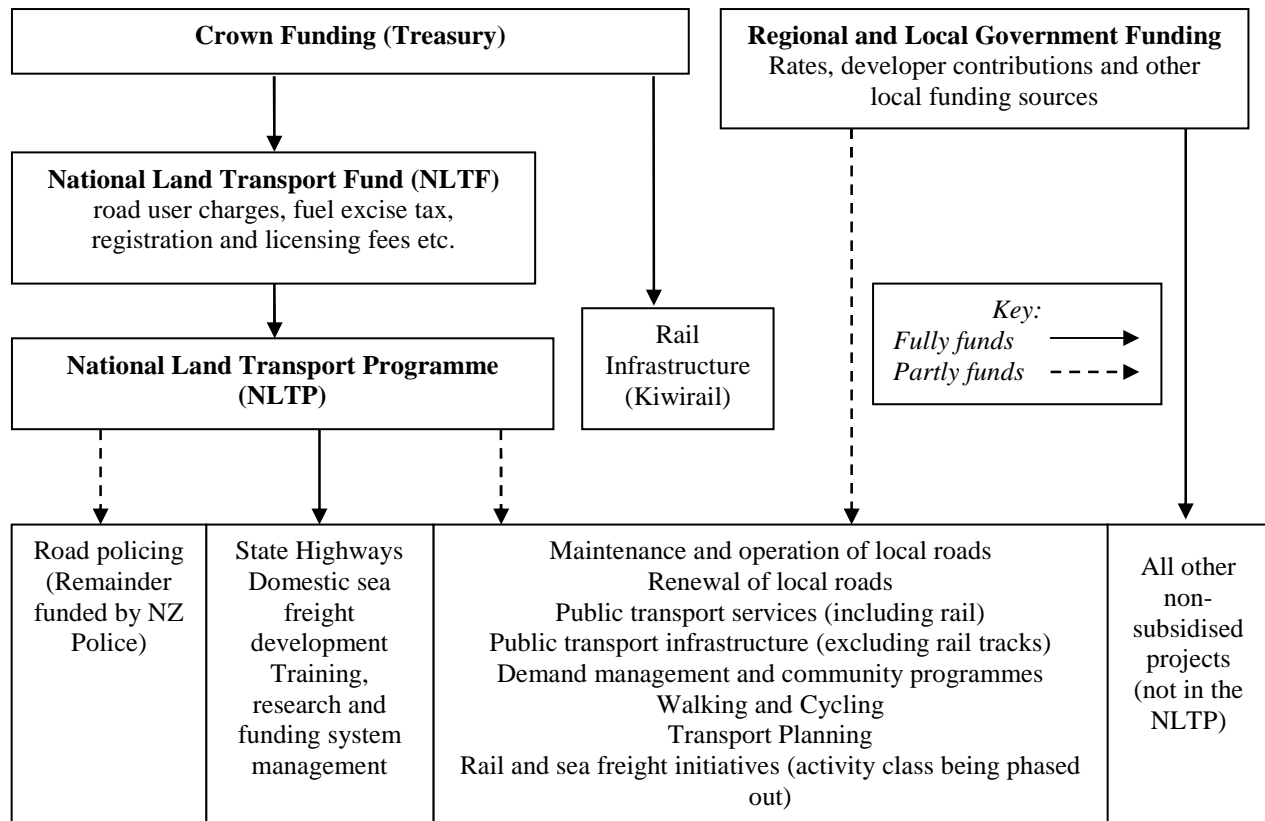
The NZTA funds 100% of State Highway projects and subsidises projects delivered by councils or other approved organisations (e.g. Auckland Regional Transport Authority (ARTA) and the Department of Conservation) based on a series of assessment criteria that determine if a project will be included into the NLTP for funding approval. The criteria include contributions to the objectives of the LTMA and NZTS as well as indicators related to strategic fit, effectiveness and

economic efficiency. An average of 50% of maintenance projects in the NLTP (apart from State Highways) are funded via the NLTF, with the remainder coming from local government funding sources (NZTA, 2009). In order to be included in the NLTP for national funding, a project must first be included in the RLTP.

Regional authorities prepare a RLTP for their region, which sets out its land transport programme and funding needs and priorities. The RLTP “prioritises the planned transport activities...for which government funding is sought from the NZTA” (ARTA, 2009a). Some of these activities will have assistance from NZTA subsidies, with the balance being funded through local sources, mainly local rates. The NZTA funding ranges for each activity class are designated in the GPS. A breakdown of current funding figures for the case study areas and New Zealand as a whole is included in Section 5.2.3.

Rail network infrastructure is not funded from the NLTP because it has been determined that it is road users that contribute to the NLTF, and therefore they should receive the direct benefits (Ministry of Transport, 2009). Instead it is funded directly by the crown and managed by KiwiRail. Passenger rail services are funded under the passenger services activity class of the NLTP and by regional and local funding sources. The rail and sea freight activity class, which is for projects that encourage movement of freight by rail or coastal shipping, is being phased out during the period of the current NLTP (2009-2012) (NZTA, 2009). Figure 16 shows how the land transport funding system operates in New Zealand.

**Figure 16 Land Transport Funding in New Zealand (adapted from NZTA, 2009, p.17 and Ministry of Transport *et al*, 2008, p.50)**



#### 5.2.3.2 Nationwide responses to the peak oil issue

The current Central government's views on the subject of peak oil indicate a lack of concern about any potential problems it may cause (Joyce, 2010). They have been criticised for an emphasis placed on funding for roading in the current GPS and NLTP and reduced funding for public transport, in particular in Auckland (Dearnaley, 2009a). The current NLTP produced by the NZTA outlines transport funding in New Zealand for the period 2009-2012. \$8.7 billion in funding is allocated for land transport. Approximately 75% of the \$8.7 billion is being allocated to roading construction, maintenance and renewals, 10% to public transport and 1% to walking and cycling projects (New Zealand Transport Agency, 2009). There are several changes in the funding allocations from the previous GPS, developed under the Labour Government, to the current GPS, developed under the current National Government. The most notable changes are the approximate 50% increase in funding for new and improved State Highways and the

significant reduction in funding for public transport infrastructure. These changes are shown in Table 5 in Section 5.3.2.

The Sustainable Energy Forum (2009) sent a letter to the Transport Minister Stephen Joyce expressing concerns about peak oil and its possible impacts for New Zealand, given the current GPS and the priority assigned to road funding at the expense of funding for alternative modes. The Minister's (2010) response was:

*"The government considers that road users will not sacrifice personal mobility, even in light of higher oil prices. While alternative transport options such as public transport are expected to play an important role, particularly in urban areas, these options cannot fully cater for personal mobility in all places in New Zealand.*

*This indicates that private road transport will continue to play an important role but we will need new fuels and better technologies. While higher oil prices will accelerate the uptake of these, the government is also facilitating their uptake. Light electric vehicles are now exempt from road user charges...There are also two incentives regarding biofuels...*

*...With regard to investments and infrastructure, the Government Policy Statement outlines how investment in public transport will continue to increase. In addition to the \$899 million allocated to public transport over the next three years, there is also significant direct Crown investment going into public transport...*

*In closing, while it is important to invest in public transport, it is also important to realise that there are significant economic costs associated with increasing investment levels to accelerate modal shift beyond what the market is able to realistically absorb. The reality is that, given our population density and history of the development of our transport system, private vehicles will continue to be the method by which most people will travel within the foreseeable future, and our investments need to reflect that reality." (p.1).*

Mr Joyce has expressed less concern about peak oil compared with the transport minister under the preceding Labour-led Central government (Hodgson, 2004).

An NZTA study (Lee *et al*, 2009) surveyed transport staff across New Zealand at the local government level to determine how they plan to manage demand for transport in the future. Fuel price rises were used as an example of a driver for a change in travel demand, both in terms of mode and total trips. The findings of the NZTA study concluded that:

- *“Most councils (75%) are not planning on the basis of fuel price rises;*
- *In terms of how well placed local authorities are to adapt to significant and unexpected changes in travel demand, councils are generally not well placed, because they are generally not planning for such an eventuality; and*
- *Should [significant and unexpected changes in travel demand] occur, then the preferred response would be to increase bus frequencies and expand bus networks. This would not work in peri-urban or rural areas. This solution may only really work in relatively dense urban environments where roads are laid out so they can be serviced by buses. Current policies and rules in district plans do not assist; they do not promote denser development at accessible or central locations and car parking standards and engineering standards are on the whole unresponsive” (p.35).*

The study also found that planners were less likely to use fuel price change data or vehicle kilometres travelled data in transport policy formulation. Whilst the study did not look at the possibility of sustained long term reductions in the availability of fossil fuels, the findings can be used to complement this research as it provides important information about attitudes towards possible future fuel price increases amongst transport policy makers at the local government level in New Zealand.

#### **5.2.4 Regional transport policy**

Transport policy at the regional level is made by the regional councils. Regional councils are required under the RMA to develop a RPS. A RPS contains objectives, policies and methods which set the direction for the management of the region’s natural and physical resources and provides the basis for development of Regional and District Plans. Most RPSs will have a section relating to transport, and also one relating to energy.



Regional councils are also required to prepare a RLTS with a 30 year planning horizon, and it is a statutory document under the LTMA (Auckland Regional Transport Committee, 2009, p.11). The RLTS is intended to set the strategic direction for transport in the region. The RLTS must, amongst other matters (adapted from ARC, 2009, p.6):

- Contribute to overall aim of LTMA;
- Contribute to the five LTMA/NZTS objectives;
- Be consistent with any NLTS;
- Be consistent with national policy statement, regional policy statement or plan under the RMA;
- Take into account the relevant GPS; and
- Take into account any National Energy Efficiency and Conservation Strategy.

The Regional Transport Committee (RTC) is charged with developing the RLTS. The RTC is comprised of representatives from a wide range of organisations, including the regional council, local councils and NZTA, as well as representatives from a wide range of community groups that collectively provide one representative for each of the following areas: economic development, access and mobility, safety and security, public health, environmental sustainability and cultural interests among others.

#### ***5.2.5 Local transport policy***

Local transport policy is made by local councils. Local councils are required under the RMA to prepare a District Plan, which is a legal document setting out the council's objectives, policies and methods for managing local natural and physical resources, including the transport network. The District Plan must give effect to the RPS (RMA, 1991, Section 75).

Local councils are also required under the LGA to produce a LTCCP which is produced every three years and outlines the council's plans in the next ten year period. Annual plans may be developed each year to detail the council's actions and budget for the forthcoming year. Although not required to do so, most councils will also develop a non-statutory transport strategy or transport plan specific to their city or region. Local councils normally take into account the

relevant regional and national policies and plans in the development of their local transport strategy.

The elected officials usually develop transport policy with assistance and advice from council transport planners and engineers. In some cases, councils will engage external consultants to assist in the development of transport policy. Many councils also set up standing committees to assist with certain aspects of governance such as transport planning (Haas et al, 2004, p.20). Other groups within council will also have an influence on transport policy, such as the group in charge of roading infrastructure.

#### ***5.2.6 Key actors involved in transport policy formulation***

Key stakeholders are formally invited to participate in the policy and planning process. These key stakeholders usually include the RTF, AA, local iwi, local walking and cycling groups as well as key industry and business representatives. The key stakeholders formally invited to the consultation process vary depending on the plan or strategy being developed. Key stakeholders also exist in the public sector, in the form of neighbouring councils, the regional council and central government departments such as NZTA, the Police, Ministry of Health and Ministry of Education.

The planning process requires a public consultation to be carried out. District Plans, LTCCPs, RPSs, RLTPs and RLTSs, and other planning documents are submitted in draft form for public consultation before being formally adopted. External consultants can be part of the transport policy making process, as groups will often engage consultants to prepare submissions, or councils will engage consultants to assist either with the consultation process, or with the development of the policy or planning document itself. The consultation process has often been criticised for slowing the policy making process, in particular when transport projects are required to carry out public consultation: “the existing transport and land use planning environment provides extensive opportunities for public participation. Public participation can provide a direct barrier to swift action where the public are afforded opportunities to appeal determinations and decisions. In those circumstances proposals can quickly become bogged down and in some instances never be implemented at all” (Donovan *et al* 2008, p.88).

Local businesses, local residents associations and ratepayers associations, lobby/interest groups and business/industry groups can also influence transport policy making. Often they will approach the local community boards that have elected officials who represent the localised community interests and report back to council regularly. Elected officials are also members on these community boards. They provide a forum for local businesses and the general public to have their say on matters that affect the community, such as transport. Some actors will use the media to advance their cause and gain publicity, through local radio, newspapers, the internet or TV (Bush, 1995).

As well as the formal methods of influence (consultation, community boards) the nature of local government in New Zealand allows for more informal methods of influence to occur. Bush (1995) describes the informal method of influence, stating that many individuals and/or groups use the “personal factor” or the “word in the ear” (p.277) as an effective way of influencing local policy makers and that “local government is dominantly non-partisan, personal and immediate” (p.277). The nature of this style of influence means that networks of business people or ‘old-boys’ clubs enable an individual or a group to make direct contact with a policy maker and make their issue heard. Bush (1995) states:

*“Policy is bound to be made by some process of another, even though much is actually the product of the exercise of administrative discretion – countless lower-level decisions made by officers, consultants and contractors in the course of implementing the local body’s business. Broadly, however, policy stems from the attitudes and behaviour of formal participants, principally the councillors and the senior executive officers, modified by the environmental setting in which they act and interact” (p.226).*

Party politics is not a strong feature of local government in New Zealand therefore few groups will align themselves with political parties purely to influence local government policy (Bush, 1995).

### **5.3 Case study areas – Location factors**

Table 3 provides background information about each of the three case study areas. These factors are considered to be influential in transport policy decision making, because they impact on the

transport and activity systems. In the case of city 3, statistics for Auckland Region as a whole have been used (comprising the four organisations used in the case study plus three others). For city 1, statistics are for the district as a whole. Statistics for New Zealand as a whole have been included as a comparison.

**Table 3 Influential Factors**

	<b>City 1 (District statistics)</b>	<b>City 2</b>	<b>City 3 (Regional statistics)</b>	<b>New Zealand</b>
Population <sup>15</sup>	<21,000	<500,000	>1,000,000	4,027,947
Population density (people/km <sup>2</sup> ) <sup>16</sup>	3.0	549.2	989.1	14.2
Average weekly income <sup>17</sup>	\$589	\$658	\$687	\$667
Unemployment Rate <sup>18</sup>	2.7%	2.6%	4.6%	4.1%
National economic situation: See Section 5.2.2.				
National Government: led by National Party – centre right. See Section 5.2.1.				
Major employment sector <sup>19</sup>	Agriculture, forestry and fishing (38%)	Property and business services (34%)	Property and business services (37%)	Manufacturing (13%), Retail trade (12%), Property and business services (13%)
Access to Motor Vehicle <sup>20</sup>				
No access	8%	9%	7%	8%
One	38%	38%	33%	36%
Two or more	51%	51%	55%	52%
Main means of travel to work <sup>21</sup>				
Stay home	25%	16%	17%	18%
Drove/passenger in car, truck or van	58%	64%	67%	63%
Public transport	0%	4%	6%	4%
Other	11%	12%	6%	9%

<sup>15</sup> Estimate at June 2007. Source: Statistics New Zealand Website

<sup>16</sup> 2001 Census, Source: Statistics New Zealand Website

<sup>17</sup> Regional data for June 2007 Quarter. Source: Statistics New Zealand Website

<sup>18</sup> Regional data for March 2008 Quarter. Source: Statistics New Zealand Website

<sup>19</sup> 2007 data. Source: Statistics New Zealand Website

<sup>20</sup> 2006 Census. Source: Statistics New Zealand Website. Results do not include data for “Not elsewhere included” which includes ‘response unidentifiable’, and ‘not stated’. Results for “two or more” are the “two” and “three or more” categories combined.

<sup>21</sup> 2006 Census, Source: Statistics New Zealand Website.. All figures are for the employed census usually resident population count aged 15 years and over. Results do not include data for “Not elsewhere included” which includes ‘response unidentifiable’, and ‘not stated’. “Public transport” is “public bus” and “train” combined. “Other is “motor cycle”, “power cycle”, “bicycle”, “walked or jogged” and “other” combined. “Stay home” is “worked at home” and “did not go to work today” combined.

### ***5.3.1 Transport and activity system characteristics***

#### ***5.3.1.1 City 1***

City 1 has a single major urban area that makes up approximately 60% of the population for the district. The urban area acts as a service centre for the wider rural population. The population density is low and widely spread, with low density housing. As there is no public transport, apart from inter-regional bus services that pass through the district, there is a high dependence on the private vehicle for mobility.

There are numerous heavy vehicles on the road as a result of farming, in particular dairying (City 1 Land Transport Strategy). 90% of the roads in the district are classed as rural, and are low volume, with 60% of roads being unsealed (City 1 LTCCP). The district is bisected by several inter-regional State Highways. Like many smaller urban centres in rural settings in New Zealand, a State Highway passes directly through the centre of town and through traffic is a major source of income for local businesses, including shops and accommodation providers.

The population of the district is expected to decline through to 2031 (Statistics NZ Website). This has been contested by the council who had a report commissioned which found that the district's population may in fact increase (City 1 Council Website).

#### ***5.3.1.2 City 2***

City 2 is a predominately urban area with low-medium level density housing with several low-density subdivisions on the perimeter of the city. The city is characterised by a single central business district with several smaller outlying 'hubs' which are principally centred around major shopping malls. Many people commute into the city from the surrounding districts and this trend is increasing. Between 1996 and 2006, the number of people in a neighbouring district who gave a workplace address in City 2 almost doubled (Statistics NZ Website).

Congestion issues are predominately located on major arterials at the morning and evening peak traffic times, although increases in traffic volumes are resulting in congestion outside the peak on some routes. The city is bisected by several State Highways. The city has a mainly bus-based public transport system. Bus patronage is increasing in the city. The city has 58km of on-road cycle lanes and 73km of off road cycle paths (City 2 Cycling Strategy).

The population of city 2 is expected to grow below the national average through to 2031 (Statistics NZ Website).

#### *5.3.1.3 City 3*

City 3 has a main central business district with several smaller business/shopping areas located at the centre of each of the cities that makes up Auckland city as a whole. Because the city is made up of several smaller cities joined together, traffic flows in several different directions, not just purely in and out of the CBD, at the peak time each day. The city is spread over a wide area with access to the north of the city via a single bridge over the harbour. Like any major city in the world, city 3 suffers from major congestion issues at times, in particular at the harbour bridge with people commuting to the CBD from the North Shore. Congestion is described in the current draft RLTS as the “central challenge that has faced Auckland’s transport system since the first RLTS was created in 1993... caused by population growth and decades of underinvestment in public transport networks” (ARC, 2009, p.25).

Statistics regarding commuting in City 3 indicate the number of people who travel into the city from outlying areas for work:

- “Auckland metropolis commuting zones extend well beyond territorial authority boundaries; and
- Almost 9 out of every 10 employed people in the Auckland region work within the Auckland metropolis” (Statistics NZ Website).

City 3 is bisected by several State Highways, including State Highway 1. The city has a public transport system that is comprised of a bus, train and ferry system. In 2008/9 79.5% of trips were by bus, 13% were by train and 7.5% were by ferry. Like city 2, public transport patronage is growing in the region, with 7.7% increase from the previous year (ARC website). There are 77km of cycle ways in the four territorial authorities in the case study area of city 3.

The population of city 3 is expected to grow by 41% through to 2031, well above the national average (Statistics NZ Website).

### 5.3.2 Transport budget

Table 4 provides data, in millions of dollars, for each of the three case study areas in terms of the proposed expenditure outlined in their respective RLTPs for various activity classes in the 2009-2012 planning period. A subtotal for roading related activity classes and for other classes has been included for comparison.

**Table 4 RLTP Proposed Expenditure 2009-12 (\$M)<sup>22</sup>**

Activity class	City 1 (District Wide)	% of total	City 2	% of total	City 3 (Auckland Region)	% of total
Maintenance & operation of local roads	11	34%	69	26%	271	14%
Renewal of local roads	14	43%	58	22%	357	19%
New & improved infrastructure for local roads	5	15%	52	19%	727	38%
<b>Roading Sub-Total</b>	<b>30</b>	<b>92%</b>	<b>179</b>	<b>67%</b>	<b>1355</b>	<b>72%</b>
Public transport infrastructure	0	0%	70	26%	359	19%
Walking & cycling facilities	2	6%	11	4%	92	5%
Demand management & community programmes	0.5	2%	5	2%	43	2%
Transport planning	0.2	1%	3	1%	44	2%
<b>Other Sub-Total</b>	<b>2.7</b>	<b>8%</b>	<b>89</b>	<b>33%</b>	<b>538</b>	<b>28%</b>
<b>TOTAL</b>	<b>32.7</b>	<b>100%</b>	<b>268</b>	<b>100%</b>	<b>1893</b>	<b>100%</b>

In city 3 the current RLTP (2009/10-2011/12) shows an increase in funding for new and improved State Highway projects and public transport service improvements, but due to a decrease in the local share of funding, investment outlined in the RLTP is dependent on funding available under the current GPS. The current GPS has a focus on transport projects that improve national economic growth and productivity. The current GPS proposes:

*“A large increase in funding for new and improved State Highways, this reflects the Government’s philosophy to invest heavily in this area and contrasts markedly with*

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<sup>22</sup> Source: RLTPs for each region. Figures rounded to the nearest \$million. Does not include three State Highway activity classes (maintenance, renewals and new infrastructure) which are 100% funded by NZTA. City 1 and 2 does not include public transport services and operations, which are covered by the regional council. Public transport services and operations for City 3 has been deleted for ease of comparison.



*the 2008 GPS allocation which proposed to reduce funding on State Highways...funding allocated to public transport infrastructure has reduced in the 2009 GPS when compared to current levels and the 2008 GPS...[and] the funding allocated to demand management and walking/cycling facilities in the 2009 GPS has reduced when compared to both the 2008 GPS and current levels.” (ARTA, 2009a, p.25).*

The difference in funding allocated to each activity class from the previous GPS to the current GPS is shown in Table 5 (adapted from Campaign for Better Transport, 2010).

**Table 5 GPS Funding Changes**

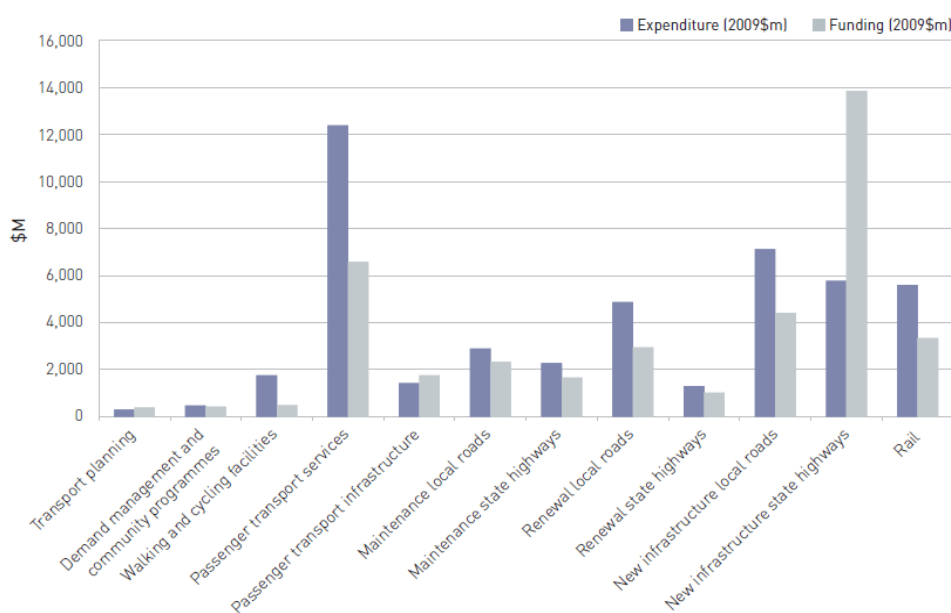
Activity Class	Range	Old (\$M) 09/10-11/12	New (\$M) 09/10-11/12	Change (\$M)	Change (%)
Transport Planning	L	\$90	\$96	\$6	7%
	H	\$135	\$114	-\$21	-16%
Sector Training and Research	L	\$21	\$15	-\$6	-29%
	H	\$30	\$21	-\$9	-30%
Demand Management and Community Programmes	L	\$150	\$120	-\$30	-20%
	H	\$225	\$165	-\$60	-27%
Public Transport Services	L	\$630	\$585	-\$45	-7%
	H	\$760	\$675	-\$85	-11%
Public Transport Infrastructure	L	\$290	\$60	-\$230	-79%
	H	\$550	\$300	-\$250	-45%
Walking and Cycling	L	\$45	\$30	-\$15	-33%
	H	\$90	\$75	-\$15	-17%
New and Improved State Highways	L	\$1600	\$2475	\$875	55%
	H	\$2200	\$3450	\$1250	57%
Renewal of State Highways	L	\$645	\$580	-\$65	-10%
	H	\$705	\$700	-\$5	-1%
Maintenance and Operation of State Highways	L	\$915	\$830	-\$85	-9%
	H	\$985	\$1025	\$40	4%
New and Improved Local Roads	L	\$450	\$450	\$0	0%
	H	\$750	\$750	\$0	0%
Renewal of Local Roads	L	\$705	\$630	-\$75	-11%
	H	\$735	\$750	\$15	2%
Maintenance and Operation of Local Roads	L	\$780	\$630	-\$150	-19%
	H	\$810	\$825	\$15	2%
Rail and Sea Freight	L	\$3	\$0	-\$3	-100%
	H	\$9	\$4	-\$5	-56%
Domestic Sea Freight Development	L	\$18	\$0	-\$18	-100%
	H	\$36	\$4	-\$32	-89%
Road Policing	L	\$915	\$885	-\$30	-3%
	H	\$955	\$914	-\$41	-4%
Management of the Funding Allocation System	L	\$189	\$93	-\$96	-51%
	H	\$207	\$112	-\$95	-46%
TOTALS	L	\$7446	\$7479	\$33	0%
	H	\$9182	\$9884	\$702	8%

The RLTS, the Auckland Transport Plan (ATP) and the RLTP all highlight the need for a robust public transport network in Auckland. Yet, it appears that a shortage in local funding due to “tough economic times and the need to minimise local rates increases...is an important factor holding back investment in the regional arterial road network and public transport services and infrastructure investment which are dependent on achieving around 50% local funding share” (ARTA, 2009a, p.iii). This is compounded by the GPS allocating more funding to new and improved State Highways. The RLTS highlights this issue:

*“The National Land Transport Programme (NLTP) allocates 53 per cent of the transport budget over the next three years to State Highway infrastructure and only 19 per cent to public transport. If a similar allocation were to be made over the 30-year life of the strategy, a significant shortfall in the funds required for Auckland region's priority projects could result... this strategy recognises the need to work with the Government for a change in funding arrangements to ensure funds are available to implement the strategy” (Auckland Regional Transport Committee, 2010, p.10).*

This issue is illustrated in Figure 17, showing the funding estimated for Auckland transport over the life of the RLTS if funding allocations similar to the existing NLTP are made over the 30 year period.

**Figure 17 Funding alignment by activity area for the 30 year RLTS (ARTC, 2010, p.66)**



As well as the public transport activity class, the existing GPS also has reduced funding for the local roads activity class compared to the previous version. City 1's LTCCP states that land transport costs contribute to more than half of the Council's total budget and that most of this budget is taken up with maintaining the existing asset – the local roads (City 1 LTCCP). In city 2 public transport and road safety projects have also been impacted by the funding changes in the latest GPS. With reduced funding for certain activity classes under the GPS, the Councils are then required to make up a bigger shortfall to fund any works or defer the works to a later date. The shortfall then needs to be made up through loans or through raising ratepayers' rates.

## 5.4 Case Study Areas – Transport Policy Documents

The following sections review the relevant transport policy and planning documents for each of the case study areas.

### 5.4.1 City 1

#### 5.4.1.1 Regional council

The current RPS was developed in 1998 and recognises that the demand for non-renewable energy such as fossil fuels is growing in the region and that dependence on such energy sources is unsustainable. It also states that the increasing use of non-renewable energy in the transport sector is an issue. The objectives and policies relating to transport and energy use in the RPS are summarised in Table 6 (adapted from City 1 RPS).

**Table 6 City 1 RPS**

<b>Objectives</b>	<b>Policies</b>
To sustainably produce and use energy; To encourage use of renewable resources to produce energy.	Encourage energy efficient transport modes, encourage energy efficient technology, educate the public about energy efficiency.
Promote sustainable management of infrastructure; avoid, remedy or mitigate negative impacts of infrastructure on natural and physical resources.	Encouraging a reduction in the use of non-renewable resources while promoting the use of renewable resources in the construction, development and use of infrastructure; Promote fuel efficient modes of transport.

The regional council produced the RLTS, which, in keeping with its obligations to be aligned with the NZTS and the NZEECS, recognises that the transport sector is a major energy user and that there is a need to ensure that sustainable transport practices are adhered to. The potential for a shortage in the supply of fossil fuels, or significant price increases are not identified as future challenges. Meeting obligations for a reduction in emissions under the Kyoto Protocol is identified as a challenge.

Peak oil is mentioned in the regional council's LTCCP – it comments that the regional council has representation in national groups that consider such issues. It also outlines energy conservation and sustainable use of energy resources as desired outcomes of the document.

#### *5.4.1.2 Local council*

City 1's District Plan recognises that energy use in transportation relies on fossil fuels, that they are a finite resource, and that reliance on fossil fuels needs to be reduced. It highlights that fossil fuel price rises and shortages could cause problems for the transport sector in the district and recognises that the level of the problem will be driven by how many new oil discoveries are made and any advancements in technology and alternative fuels. The Plan states that the council can be supportive of efforts to develop public transport but that it "is not in a position to take the lead on this matter" (City 1 District Plan). The objectives and policies relating to transport and energy use in the District Plan are summarised in Table 7 (adapted from City 1 District Plan):

**Table 7 City 1 District Plan**

<b>Objectives</b>	<b>Policies</b>
The conservation and efficient use of energy.	Promote compact urban form and location of services to reduce car use.
To promote the efficient use of the district's existing and future transportation resource and of fossil fuel usage associated with transportation.	Promote efficient use of fuel resources by policy of consolidated urban areas; provide for home occupations within residential areas to reduce travel time and costs to work.

The council produced a Land Transport Strategy and a Walking and Cycling Strategy. The potential for a shortage in the supply of fossil fuels, or significant price increases are not identified as future challenges. The strategies include actions to introduce measures such as travel demand management, as well as public transport trials and improvements to walking and

cycling infrastructure, in keeping with the strategic direction of the NZTS and its five key objectives.

## 5.4.2 City 2

### 5.4.2.1 Regional council

City 2's regional council has several documents and reports relating specifically to peak oil. The RPS was developed in 1998 and a review began in 2007, which is currently ongoing. The review highlights the need to better integrate land use, transport and energy related policies, rather than separating them. The review also recognizes the region's continuing growing demand for non-renewable fossil fuels, in particular the growing demand from the transport sector, including a trend of increasing vehicle ownership and use. It recognises that efforts to introduce or promote bio-fuels have been ineffective in reducing the trend of increasing use of fossil fuels. The objectives and policies in the RPS have been summarized in Table 8 (adapted from City 2 RPS).

**Table 8 City 2 RPS**

<b>Objectives</b>	<b>Policies</b>
Enable urban development and the physical expansion of settlements and the use and provision of network utilities to occur while avoiding, remedying or mitigating adverse effects on the environment, including in particular effects on energy use.	Promote settlement and transport patterns and built environments that will result in increasingly effective and efficient use of resources, particularly energy.
Enable a safe, efficient and cost-effective transport system to meet present and future regional, inter-regional and national needs for transport.	Encourage settlement patterns that will make efficient use of the regional transport network.
Reduce dependence on non-sustainable energy sources.	Promote the use of energy from renewable sources consistent with sustainable management of natural and physical resources, including the promotion of the substitution of fossil fuels with renewable sources; Promote energy conservation and efficient energy use.
Enable a safe, efficient and cost-effective transport system to meet regional, inter-regional and national needs for transport.	Promote transport modes which have low adverse environmental effects; Promote changes in movement patterns, travel habits and the location of activities, which achieve a safe, efficient and cost effective use of the transport infrastructure and reduce the demand for transport.

Several other regional council documents highlight the need to reduce dependence on fossil fuels. The RLTS highlights concerns about future energy supplies and recognizes the existing reliance on fossil fuels. It recognizes that increased spending is needed on sustainable transport modes such as walking, cycling and public transport. The RLTS is currently being updated.

In 2009 a report was produced for the regional council that highlighted the need for businesses and organisations to develop risk management strategies around fuel supplies as well as the need for more information to be developed around fuel shortage emergency procedures.

The regional council has recognised the peak oil issue and produced a report that outlines the issues facing the region in a scenario of reduced availability of fossil fuels. The report concludes:

*“There is a need to plan ahead for the energy shortages resulting from the predicted plateau of oil production. If the new projections are correct we do not have 20 years to achieve a smooth transition to low energy economy. A formal council position is recommended on peak oil to ensure it is factored into the Annual Plan process and the reviews of the LTCCP and the Regional Land Transport Strategy. This formal acknowledgement is needed to help manage the significant risk from energy shortages.”(Report by external consultants for City 2 regional council).*

Despite this recommendation, the RLTS has only two paragraphs that talk about future energy use and the concerns about peak oil (City 2 RLTS). The strategy does, however, go on to advocate public transport, walking and cycling, demand management and travel behaviour change programmes, in order to meet one of the key objectives: environmental sustainability.

The regional LTCCP sets out key issues for transport in the region through to 2019 – efficient movement of people and freight (highlighting that the economy is dependent on the transport system), traffic congestion and road safety. Reliance on fossil fuels is not mentioned, however promoting sustainable transport systems such as walking, cycling, car pooling and public transport are part of a community education process.

The regional council, in partnership with the local council that is city 2, and other local councils, has also developed a growth strategy. The strategy aims to integrate all aspects of future planning, including land use and transport planning, water and urban design. The strategy also

recognises that transport relies heavily on fossil fuels and that issues with supply could result in uncertainties in the cost and supply of fossil fuels (City 2 Growth Strategy).

#### 5.4.2.2 Local council

The City Plan recognises that the transport sectors' reliance on fossil fuels and the demand for private vehicle use is unsustainable. It describes trends showing increased fuel and vehicle use. The objectives and policies relating to transport and energy use are summarised in Table 9 (adapted from City 2 City Plan).

**Table 9 City 2 City Plan**

<b>Objectives</b>	<b>Policies</b>
The efficient use of energy, in both supply and consumption, whilst promoting the development of alternative renewable energy sources.	<ul style="list-style-type: none"> <li>To promote increased public awareness of the need for energy efficiency;</li> <li>To encourage the development and use of renewable energy sources;</li> <li>To promote energy efficiency through urban consolidation; and</li> <li>To encourage energy efficiency in transportation.</li> </ul>
A safe, efficient and sustainable transport system.	<ul style="list-style-type: none"> <li>To promote integration of transport and land use planning;</li> <li>To promote integration of the planning, management, and operation of all elements of the transport system;</li> <li>To make efficient use of the transport system, particularly its infrastructure;</li> <li>To encourage change in the transport system towards sustainability; and</li> <li>To develop a long term integrated strategy for transport.</li> </ul>

The local council for city 2 has several different strategies that are focussed on transport. These documents do not highlight a concern about possible future fossil fuel shortages and the potential impact on the transport system.

At the time of writing, the local council is developing a Transport Plan specific to the city, due for completion in February 2011. The aim of the Transport Plan is to provide a document that links all the current strategies as well as the RLTS. The Transport Plan will have a 30 year planning term to align with the RLTS. Peak oil is being considered in the Transport Plan as one of the challenges for the future (City 2 Transport Planner, personal communication, March 3, 2010).

The local council's Energy Strategy recognises the city's reliance on fossil fuels and that this is a finite resource. It outlines a number of strategic initiatives to meet the long term vision of the city being powered totally by renewable resources by 2050.

### **5.4.3 City 3**

City 3 is New Zealand's largest city and is divided into seven separate local councils, overseen by one regional authority, the ARC. For the purposes of this research only four local councils have been used in the case study, and have been named Local council A, B, C and D respectively. At the time of writing Auckland is going through a major local government restructuring process. From November 2010 the existing seven local councils and the ARC will be merged to form the Auckland Council. The Auckland Transport Agency will be formed as part of this restructuring which will oversee all transport operations in Auckland.

#### *5.4.3.1 Auckland Regional Council*

The ARC is "responsible for setting the strategic direction for all transport development within the Auckland region and to provide funding...[with NZTA]...for public transport and sustainable transport initiatives, such as walking and cycling" (ARC website).

The ARC is also responsible for developing the RPS. The RPS recognises the increase in vehicle trips, the dominance of the private vehicle, the problems associated with low density urban sprawl, and the need for the transport system to be more sustainable. It recognises the links between transport and urban form and the need to consider both in conjunction with one-another. It recognises the dependence on non-renewable energy resources as being a significant issue. In 2008 a review of the existing RPS (1999) began, and is currently ongoing. Review documents highlight the need for closely integrated land use and transport planning and the need for a good public transport system as the city's population grows. The review specifically mentions peak oil and the reliance of the region, in particular the transport sector, on fossil fuels. It highlights concerns about rising energy costs and how it will impact the region, in particular the impacts on vulnerable people.

A summary of the objectives and policies relating to transport and energy use are shown in Table 10 (adapted from ARC, 1999).



**Table 10 City 3 RPS**

Objectives	Policies
<p>To avoid, remedy, or mitigate the adverse effects of transport on the environment, in particular to reduce the need for the transport system to use non-renewable fuels.</p>	<p>Land use and transport planning will be integrated in a way which reduces the need for vehicle travel.</p> <p>Development of the transport system will be guided in a way which reduces the need to use non-renewable fuels.</p> <p>The public transport system will be managed to better enable existing and potential users to get to work, services, shops, educational, social and recreational facilities.</p> <p>Transport links which promote the efficient movement of people, goods and services throughout the Region will be identified in the Auckland RLTS and will be required to be protected in district plans.</p> <p>The efficiency of congested transport corridors will be increased by encouraging increases in person carrying capacity (i.e., by supporting public transport, car pooling and high occupancy vehicles) and freight carrying capacity (i.e., by supporting consolidation of loads and rail freight) rather than vehicle capacity.</p> <p>Central government will be requested to ensure that funding is available to enable the development of a safe, effective, affordable transport system.</p>
<p>The sustainable use of energy resources (excluding minerals), and the efficient use and development of energy resources.</p>	<p>More efficient use shall be made of available energy resources by: promoting a reduction in the wasteful use of energy; promoting the application of energy efficiency in the design and operation of transport vehicles.</p> <p>Renewable energy sources shall be encouraged by promoting alternatives to the use of non-renewable fossil fuels.</p> <p>An urban form, supported by transportation systems, which improves efficiency and conservation in energy use, shall be promoted.</p>

The Auckland RLTS is developed by the Auckland Regional Transport Committee (ARTC) and “sets the direction for the region's transport system for the next 30 years. The strategy identifies the actions, policies and funding needed” (ARTC, 2010, p.13).

The RLTS was recently renewed and as part of the process research was carried out in a number of areas to assist in the development of the new strategy. Donovan *et al* (2009) carried out research into transport fuels which found:

*“It is considered that oil prices will in general trends upwards and perhaps more importantly exhibit increasing volatility. Although higher prices are expected to drive efficiencies of their own accord, the associated volatility mean that prices alone are a poor proxy for good policy. It is suggested that an increased focus on regional energy security grounded in reduced dependence on oil based transport fuels will be an increasingly important determinant of Auckland’s future economic development.” (p.3)*

The RLTS (ARTC, 2010) lists seven key points that were taken into consideration in its development, one of them being: “an important determinant of Auckland’s future economic development is reduced dependence on oil based transport fuels and an increase in public transport, active mode infrastructure and services” (p.13). This indicates that the possibility of future fuel supplies being reduced is a scenario being discussed and considered by the ARTC.

The Royal Commission on Auckland Governance, set up in 2007 by the government, produced a report (Salmon *et al*, 2009) which aimed “to investigate, and make recommendations on, local and regional government arrangements for the Auckland region in the future”. The Commission highlighted the fact that Auckland has a high percentage of car users and a poor public transport service by international standards. The report found that:

*“It is essential that planning for infrastructure takes a long-term focus. This means taking into account global changes such as climate change and peak oil – might the Auckland of the future be less car-dependent, produce more weightless exports, and have a greater number of workers operating from home? Infrastructure designed around this scenario would mean less spending on roading but more on public transport and provision for fast broadband”(p.72)*

The RLTS appears to adhere to the advice of the Royal Commission as it lists six main risks to achieving the vision and objectives of the Strategy, one of which is described as “mitigating future energy availability and price volatility” (ARTC, 2010, p.121). The following statement highlights the level of understanding and concern about future fossil fuel supplies and over-investment in roading infrastructure in the event of significant fossil fuel shortages:

*“This strategy assumes that energy prices will over time, to around \$3.71 per litre in 2040 (in \$2006 dollars). More difficult to predict are potential fluctuating*

*constraints in energy supply, and volatility in energy prices. Sensitivity testing for the development of the preferred strategic transport option, detailed in Chapter 4, considered a high transport energy price of \$6.00 per litre. At that price, by 2040, it is expected that car trips would decline by nine per cent and PT trips would increase by 33 per cent compared with the assumed price of \$3.71 per litre.<sup>23</sup> This strategy aims to develop a transport network that is focused on managing demand and providing access to public transport, thereby providing a transport network that is resilient to shortages or price volatility in transport energy...*

*...Increases in fuel prices, as shown in the recent oil price spike, depress travel demand by private vehicle. However, in the event of high oil prices or limited availability, there is a risk that by adding more roads for current high traffic volumes may lead to roads becoming stranded or under utilised long term public investments. This strategy aims to reduce the impact of rising or volatile fuel prices on the economy by providing transport choices suitable to the needs of Aucklanders.” (ARTC, 2009, p.121).*

The ARC is also responsible for preparing a LTCCP. The LTCCP’s section on transport highlights concerns about the reduction in funding for public transport from central government, along the same arguments as in the RTP, as mentioned in Section 5.2.2 above. The LTCCP does not specifically mention concerns about fossil fuel price or supply, except to say that fuel price will affect the ability to fund public transport services.

The ARC, in conjunction with its seven territorial authorities, has also developed a Regional Growth Strategy (ARC, 1999a). This strategy highlights the need to create an efficient transport system and an intensification of living density to support walking, cycling and public transport.

#### *5.4.3.2 Auckland Regional Transport Authority*

City 3 is unique in New Zealand in that it has a separate organisation responsible for transport in the Auckland region, ARTA, which is controlled by the ARC. The aim of ARTA is “to plan, fund and develop the Auckland regional land transport system in a way that contributes to an

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<sup>23</sup> “Trip reduction savings arising from fuel price increases are modeled and therefore uncertain”

integrated, safe, responsive and sustainable land transport system for the Auckland region” (ARTA, 2009a). ARTA “undertakes detailed transport planning, is the conduit for all funding (including for local roads and public transport), and manages contracts for rail, bus and ferry services” (ARC website).

ARTA develops the ATP. The ATP outlines “priorities and the phasing of projects [and] sets out a coordinated programme for the delivery of an integrated, efficient transport system” through to 2019 (ARTA, 2009b). The 2009 ATP comments on the links between transport and fuel use and has a section titled *Peak Oil* which describes both the optimistic and pessimistic predictions for the future oil supply and price. The ATP has another section titled *Impacts of Energy Price Increases on Auckland* which highlights the need to invest in public transport infrastructure and the need to increase travel demand management and traffic management measures. Like the RLTS, there is a significant focus in the ATP on the desire to improve the public transport network and concerns are raised about the reduced funding for public transport in Auckland.

#### 5.4.3.3 Local council A

The City Plan highlights the growing use of fossil fuels in transport and highlights the need to use non-renewable energy sources efficiently. It has a number of objectives and policies that aim to reduce reliance on fossil fuels and promote a sustainable transport system. These are summarised in Table 11 (adapted from City 3/Local council A City Plan).

**Table 11 City 3/Local council A City Plan**

<b>Objectives</b>	<b>Policies</b>
To enable a transport system that avoids, remedies or mitigates the adverse effects of transport activity on the natural and physical environment and protects the amenity value of open spaces and streets, while maintaining the health and safety and the economic, social and cultural well-being of the people and community.	By reducing the need for travel by private motor vehicle within the city; to encourage the most efficient and safe use of transportation infrastructure within the city; to maintain a balance between changes in activities and the transportation system from the sub-regional through to the local level, so that there is a reasonable match between the trip generating capacity of the pattern of activities and trip carrying capacity of the transportation system; to increase the person carrying capacity of congested corridors and to provide viable alternatives to the private motorcar; to encourage the use of fuel-efficient and less polluting modes of travel, particularly passenger transport, cycling and walking; to support studies of the likely effects and feasibility of economic instruments as techniques for managing travel demand on congested corridors and discouraging inefficient modes of travel.
To mitigate the adverse effects of transport and promote more efficient use of transport fuels by supporting a satisfactory alternative to the use of the private motorcar through fostering an effective passenger transport system	<p>To provide on-street passenger transport facilities which are attractive and convenient for users, including:</p> <ul style="list-style-type: none"> <li>• bus stops, seats and shelters;</li> <li>• facilities for bus users, buses and taxis at commercial centres;</li> <li>• measures to enable priority use of roadways by buses and other priority vehicles to bypass traffic congestion in peak and off-peak periods, including reserved lanes, priority and exclusive turning movements and traffic signal pre-emption, where appropriate.</li> </ul> <p>To provide infrastructure to support passenger ferry services as appropriate; to liaise with and support the Regional Council and passenger transport operators to ensure the provision of effective and appropriate passenger transport services within the city and to neighbouring centres to meet the needs of existing and potential users, including those dependent on passenger transport; to assist and support the Regional Council to improve cross-harbour passenger transport services and facilities, through the implementation of a Priority Lane along the Motorway corridor and improved passenger ferry services; and to consider land use issues and to evolve an urban form more supportive of the provision of effective passenger transport services.</p>
To provide for cyclists and pedestrians in a safe and convenient manner by establishing these as viable alternatives to the car.	To provide for cycling and walking in a safe and convenient manner through the comprehensive provision of cycle ways and walkways in structure, neighbourhood unit and subdivision plan areas and by providing cycle ways in established areas.

Local council A has a Transport Strategy. The Strategy recognises that fossil fuels are a finite resource and identifies ways in which the territorial authority is working towards minimising fossil fuel use, including implementing public transport, walking and cycling projects. In its City Plan the local council also recognises the need to provide a sustainable transport system and ensure land use planning is integrated with transport planning in order to minimise travel demand. Concerns about future availability of fuels is not specifically mentioned in the City Plan, other than in relation to future capacity needs in the roading network: “other factors such as fuel prices, carbon emissions and global warming may affect future demand for transport, but their effects are uncertain at present” (City 3/ Local council A City Plan).

#### *5.4.3.4 Local council B*

The City Plan recognises that there are global concerns about the use of non-renewable fossil fuels in transportation and the need to promote efficient transport systems, including public transport, and reduce demand for private vehicle use and longer trip distances. A summary of the objectives and policies relating to transport and energy use are shown in Table 12 (adapted from City 3/ Local council B City Plan).

**Table 12 City 3/ Local council B City Plan**

<b>Objectives</b>	<b>Policies</b>
To manage the use and development of the City's transportation resources in a way that promotes the protection and enhancement of the City's environment.	By encouraging the efficient use of the existing roading infrastructure; by supporting and promoting a transportation system designed and managed to encourage the efficient use of energy; by recognising and providing for the interdependence between transportation and the efficiency of other activities; by supporting the creation of an efficient public transport network which provides an integrated system, with appropriate levels of convenience and service; by taking national and regional energy policies into account in policy development and decision making; by minimising the adverse local environmental effects of proposed new roads and other additions to the City's transportation network; and by adopting planning techniques to discourage traffic in areas where it would have significant adverse environmental effects.
To ensure that people can move easily around the Central Area.	By providing for safe, attractive, efficient and identifiable linkages, networks and environments for vehicles, including bicycles and pedestrians; and by integrating pedestrian walkways with the passenger transport network.
To provide for the development of improved passenger transport to, from and within the Central Area.	By improving passenger transport facilities; by providing for an integrated passenger transport facility that incorporates alternative transport modes; by giving priority to passenger transport and service traffic, where appropriate; by promoting passenger transport as an alternative means of commuter travel; and by encouraging passenger transport use through managing the provision of ancillary and non-ancillary commuter parking as a means of contributing to the attractiveness of the Central Area as a place to work, conduct business, live and visit.
To reduce traffic congestion, improve traffic flow and manage the parking supply in the Central Area.	By ensuring the parking policy complements efforts aimed at improving the City's passenger transport system while at the same time ensuring the Central Area can continue to function as the central business district for the City and Region and remains attractive for people to work, live in and visit.

Local council B does not have a specific transport strategy document, but has a series of separate strategies that look at specific areas of the transport system. Within each of these strategies is a commitment to sustainable transport modes such as walking, cycling and public transport. The

Central Area Access Strategy aims to increase the mode share of walking, cycling and public transport and place a cap on the number of vehicles that enter the CBD area during the peak hours.

Local council B's LTCCP acknowledges the issue of future fuel supply in transport planning: "Our transport planning also has to take account of other factors. These include the supply and funding of transport services, reliability of fuel sources and fluctuating oil prices" (City 3/ Local council B LTCCP).

#### *5.4.3.5 Local council C*

The City Plan recognises that the transport system is a high user of non-renewable fossil fuels and that the trend is increasing, with increased private vehicle use and population growth. It also recognises the need to integrate land use and transport planning to ensure a sustainable transport system can be implemented, in particular the public transport system. A summary of the objectives and policies relating to transport and energy use are shown in Table 13 (adapted from City 3/ Local council C City Plan).



**Table 13 City 3/ Local council C City Plan**

<b>Objectives</b>	<b>Policies</b>
To maximise energy efficiency and accessibility within the transportation network and encourage the use of energy efficient modes of transport.	The transportation network should be managed in such a way that: transport generated carbon dioxide and noxious gas emissions and the consumption of non-renewable fuels is reduced; ensures a pattern of development and supporting infrastructure which permits the City to be efficiently and effectively served by passenger transport services; caters for the movement of people and goods; traffic-generating activities in sensitive environments are discouraged where these would have significant adverse effects. Development of new or existing urban areas should give regard to: the ability to effectively service new and existing urban areas with passenger transport; the provision of safe and convenient pedestrian and cyclist access to community facilities, places of work and shopping areas; facilitating improved cyclist and pedestrian linkages within neighbourhoods; and the provision of cycle ways in the construction or reconstruction of primary network roads.
To co-ordinate land use and transportation planning and decision making so as to achieve a transport system that provides for the safe, efficient and convenient movement of people and goods.	The continued development of the transportation network should: achieve acceptable levels of accessibility, mobility, safety and convenience for all sections of the community; provide convenient and safe road and cycle/footpath linkages to activity centres and local facilities; make provision for the likely future transport and development needs of the City; ensure transport effects, traffic generating characteristics and demand for various modes of transport are taken into account when providing for land use activities.

Local council C has a separate Transport Strategy. The Strategy makes reference to a trend of increased fuel consumption over the past two decades, as a result of longer trips and a less efficient transport system. The Strategy notes that “New Zealand’s transport systems are also environmentally unsustainable because of their dependence on non-renewable fuels” (City 3/ Local council C Transport Strategy), and that the use of alternative modes to the car, such as public transport, are declining in patronage. The Strategy commits to increasing walking and cycling and also to travel demand management measures to reduce the need to travel and reliance on private motor vehicles.

Local council C’s LTCCP, whilst not specifically mentioning concerns about future fuel supplies, does emphasise the need for a sustainable transport system. This is also reflected in an additional

long term planning document, which provides strategic direction from the community to the local council in the development of its LTCCP. A group that is investigating ways in which to plan for the future, which local council C is part of, highlights resource availability (energy in particular oil, food and water) as a “major driver of global change”.

Local council C’s policies and strategies do not highlight concerns about the possibility of a reduction in the supply of fossil fuels in the future, except to say that fossil fuels are “non-renewable”.

#### *5.4.3.6 Local council D*

The City Plan recognises the need to integrate land use and transport planning and the transportation problems associated with urban sprawl. It also recognises the need to reduce fossil fuel use; however the focus of the plan is more on reducing fossil fuel use in order to reduce emissions, rather than fossil fuels being a non-renewable resource. A summary of the objectives and policies relating to transport and energy use are shown in Table 14 (adapted from City 3/ Local council D City Plan).

**Table 14 City 3/ Local council D City Plan**

<b>Objectives</b>	<b>Policies</b>
To manage the effects of land use on the environment and, in particular, to maintain air quality, including contributing to the maintenance of the atmosphere at a local, national and global level.	Retail activities should be located in a way that minimises the adverse impacts of motor vehicles on air quality. Retail activities should be encouraged to locate in locations which will minimise vehicle trip length and numbers, promote passenger transport, support major town centres as key transport destination points, and reinforce those areas identified for population intensification. Any location of retail activity outside of town centres should not compromise the achievement of these aims.
	Intensive housing (such as Medium Density Housing or Apartments) and Mixed Use Developments should be encouraged in areas where it will help to reduce emissions from motor vehicles by reducing vehicle trip length and vehicle numbers and support public transport, in particular around main town centres, train stations and major roads.
	Apartments should be accommodated within identified areas in the main town centres of the City, and avoided outside these areas.
	Pedestrian and cycle access should be designed and constructed in a way that facilitates the use of cycling and walking as transport methods, as means of avoiding the effects of motor vehicle emissions on air. This includes constructing them so that they are safe and easy to use, and choosing a route that maximises links with local neighbourhoods, shops, schools, community facilities, local recreation areas and town centres.
	That a wide range of opportunities for Non-Residential Activities be provided within the urban area to help reduce the need for travel, and as a consequence reduce the discharge of contaminants from motor vehicles into the air.
	Roads should be designed and constructed in a way which minimises the adverse effects of motor vehicle emissions on air. This means reducing motor vehicle trip lengths and numbers, and alleviating congestion: <ul style="list-style-type: none"> <li>• through appropriate traffic control;</li> <li>• by creating a roading pattern which maximises connections within and between local neighbourhoods, shops, schools, community facilities, recreation areas and town centres, taking into account natural topographic features; and</li> <li>• by designing and constructing roads in a way which facilitates the use of alternative modes of transport that are less polluting than the private motor vehicle, such as passenger transport, cycling and walking.</li> </ul>

Local council D has a separate Transport Strategy. Concerns about fossil fuel use are highlighted, saying the “rising price of petrol is changing the way we live” (City 3/ Local council

D Transport Strategy). The Transport Strategy's strategic direction is "to reduce congestion in parts of the network and to encourage people to walk, cycle, use passenger transport and car pool" (City 3/ Local council D Transport Strategy).

An addendum to the strategy was produced which describes one of the key challenges over the next 50 years as "oil price increases and potential shortages in supply – in the next 10 years oil prices are expected to be volatile, with petrol and diesel prices potentially stabilising at around \$3 per litre. Beyond this, oil prices are expected to plateau but remain unstable" (City 3/ Local council D Transport Strategy). The addendum used data from a number of reports to set its strategic direction, including Donovan *et al* (2008).

Like the ARC, the local council D makes note of the need for Central government funding to be directed towards sustainable transport solutions:

*"A 10 point action plan [found in the ... LTCCP 2009-2019] to contribute to the targets of the New Zealand Transport Strategy provides for a number of additional projects which focus on sustainable outcomes. This action plan is consistent with the travel demand management approach taken in the proposed draft Auckland Regional Land Transport Strategy 2010-2040. This action plan could be considered if the Government Policy Statement changes to allocate more national funding towards sustainable transport initiatives"* (City 3/ Local council D Transport Strategy).

The Strategy is aligned with the territorial authority's 10 year plan (2009-2019) and the strategic direction outlined within for transport, aiming to develop a "sustainable multi-modal transport system that is integrated with land use" (City 3/ Local council D LTCCP).

#### **5.4.4 Existing Policy Documents: Level of Planning for Peak Oil**

Following the analysis of all the existing policy documents relating to energy use in transport carried out above, each city has been given a score of 1 to 5 (with 5 being a high level and 1 being a low level) to indicate their current level of planning for peak oil. The scores are combined for regional and local level policy documents, and the scores are combined for all local councils within city 3. The scoring is shown in Table 15.

**Table 15 Level of Planning for Peak Oil**

<b>Indicator – Content of Policy Documents</b>	<b>City 1</b>	<b>City 2</b>	<b>City 3</b>
Policy documents specifically acknowledge peak oil may be a challenge	2	4	4
Contains policies that result in transport systems that could mitigate the effects of fuel price rises or fuel shortages (e.g. walking, cycling, and public transport)	1	3	4
Contains policies that result in travel demand management tools being implemented (parking price and availability, road pricing, incentives to use public transport etc)	1	3	3
Contains policies that integrate land use planning and transport planning	3	4	4
<b>TOTAL Score</b>	<b>7 Med/Low</b>	<b>14 Med/High</b>	<b>15 Med/High</b>

## **5.5 Survey Results Collation**

The following sections detail the interview and online survey results for the case study areas. The interview results are presented first, followed by the online survey results. A discussion of the results is presented in Section 6.

### **5.5.1 Interview Results**

Interviews were conducted with 46 persons over a two week period in February 2010. Interviews were requested by email and interviewees were sent an information sheet prior to the interview. Examples of these can be found in Appendix 3 and 4 respectively. The duration of the interviews was between 15 and 35 minutes, depending on the amount of information provided by the interviewee. All three case studies used the same question prompts in interviews in order to ensure consistency, apart from those which are related to a specific projects or situation (For example discussions about public transport were not a focus in city 1 where there is no public transport service).

The results from the interviews were collated into broad statements and matched to the five main criteria. A list of broad statements that represented the views of several people interviewed was developed after listening to the recordings of the interviews. The interviews were then analysed again and the number of times each response fit into a broad statement was counted. The results were then sorted using the four sorting methods described in Section 4.4.2.

It must be noted that difficulty exists in attempting to quantify results from interviews using open ended questions. The broad statements, and counting of comments that fit within these broad statements, is used as a means of developing an understanding of the general views of the interviewees. The number and percentages of respondents that expressed a view under each of the broad statements does not necessarily take into account those respondents who may hold this view but did not express the view in the interview process.

In order to sort by the level of concern about peak oil, interviewees were categorised depending on their responses. The same three categories described in Section 4.3.2.2 for the online surveys were used. Interviewees who clearly stated “peak oil will *not* be a problem” were placed into Category 1: *No concern about peak oil*. Interviewees who expressed some concerns about peak oil, but who expressly stated that they thought the market and alternative fuels and new technologies would mitigate any issues, were placed into Category 2: *Minor concerns about peak oil*. Interviewees who expressed major concerns about peak oil and associated problems and who did not express a view that the market or any alternative fuel or new technology would mitigate the issue were placed into Category 3: *Major concerns about peak oil*. The number of respondents in each category is shown in Table 16.

**Table 16 Interviewees by Level of Concern about Peak Oil**

<b>Organisation</b>	<b>Category 1</b>	<b>Category 2</b>	<b>Category 3</b>	<b>TOTAL</b>
City 1	0	5	1	6
City 2	2	3	6	11
City 3	5	9	15	29
TOTAL	7	17	22	46
Councillors	5	11	9	25
Technical Staff	2	6	13	21

The results of the interviews are shown in the sections below, broken into each of the five main criteria, apart from location factors which are not shown (further information about location factors is detailed in Section 5.3 above). It must be noted that 63% of all respondents were from city 3, therefore results not sorted by city are likely to reflect the views of those from city 3.

### 5.5.1.1 Personal Factors

A breakdown of interviewees by each case study city, role and organisation is shown in Table 17. The majority of interviewees were local council staff from city 3. There was an even split between elected officials and technical staff.

**Table 17 Interviewees**

Organisation	Total number of interviewees	Elected Officials	Technical Staff	Regional Council	Local Council
City 1	6	4	2	0	6
City 2	11	6	5	3	8
City 3	29	15	14	5	24

### 5.5.1.2 Beliefs about Transport Policy

Table 18 shows the broad statements expressed in the interviews that fit into the criterion of *beliefs about transport policy*. The majority of interviewees consider that the Central government should provide more funding for public transport, walking and cycling.

**Table 18 Beliefs about Transport Policy: All Responses**

Criterion: Beliefs about Transport Policy	Total	
Central govt should provide more funding for public transport/walking/cycling	29	63%
Politicians are often short sighted and too focussed on localised issues to deal with big issues like peak oil	23	50%
Public transport supporter	21	46%
'Roads of national significance' policy is not a good policy stance	18	39%
Concerned about land use planning and urban sprawl and the effects on the transport system	18	39%
Some parts of 'roads of national significance' policy are good and necessary	13	28%
Sustainable transport should be prioritised regardless of whether peak oil is true because of issues like congestion	13	28%
There are issues with some sustainable policies which come up against strong opposition: e.g. bus lanes vs. parking for residents and businesses	7	15%
Central govt should provide more funding for local roads	6	13%
'Roads of national significance' is a good policy stance	4	9%

Table 19 shows the broad statements expressed in the interviews that fit into the criterion of *beliefs about transport policy*, sorted by case study city. Interviewees in all three cities consider

that the Central government should provide more funding for public transport, walking and cycling.

**Table 19 Beliefs about Transport Policy: by city**

<b>Criterion: Beliefs about Transport Policy</b>	<b>City 1</b>		<b>City 2</b>		<b>City 3</b>	
Central govt should provide more funding for public transport/walking/cycling	4	67%	7	64%	18	62%
Politicians are often short sighted and too focussed on localised issues to deal with big issues like peak oil	2	33%	4	36%	17	59%
Public transport supporter	0	0%	4	36%	17	59%
'Roads of national significance' policy is not a good policy stance	2	33%	2	18%	14	48%
Concerned about land use planning and urban sprawl and the effects on the transport system	0	0%	2	18%	16	55%
Some parts of 'roads of national significance' policy are good and necessary	0	0%	3	27%	10	34%
Sustainable transport should be prioritised regardless of whether peak oil is true because of issues like congestion	0	0%	4	36%	9	31%
There are issues with some sustainable policies which come up against strong opposition: e.g. bus lanes vs. parking for residents and businesses	0	0%	3	27%	4	14%
Central govt should provide more funding for local roads	3	50%	1	9%	2	7%
'Roads of national significance' is a good policy stance	0	0%	2	18%	2	7%

Table 20 shows the broad statements expressed in the interviews that fit into the criterion *beliefs about transport policy*, sorted by role. Elected officials were more likely to express their support for public transport.

**Table 20 Beliefs about Transport Policy: by role**

<b>Criterion: Beliefs about Transport Policy</b>	<b>Elected Officials</b>		<b>Technical Staff</b>	
Central govt should provide more funding for public transport/walking/cycling	17	68%	13	62%
Politicians are often short sighted and too focussed on localised issues to deal with big issues like peak oil	12	48%	12	57%
Public transport supporter	16	64%	6	29%
'Roads of national significance' policy is not a good policy stance	12	48%	6	29%
Concerned about land use planning and urban sprawl and the effects on the transport system	9	36%	9	43%
Some parts of 'Roads of national significance' policy are good and necessary	5	20%	9	43%
Sustainable transport should be prioritised regardless of whether peak oil is true because of issues like congestion	5	20%	9	43%
There are issues with some sustainable policies which come up against strong opposition: e.g. bus lanes vs. parking for residents and businesses	5	20%	3	14%
Central govt should provide more funding for local roads	6	24%	0	0%
'Roads of national significance' is a good policy stance	4	16%	0	0%



Table 21 shows the broad statements expressed in the interviews that fit into the criterion *beliefs about transport policy*, sorted by level of concern about peak oil category. Those in category 1 were more likely to express support for the current Central government policy of ‘roads of national significance’.

**Table 21 Beliefs about Transport Policy: by level of concern about peak oil**

<b>Criterion: Beliefs about Transport Policy</b>	<b>Category 1 No concern</b>		<b>Category 2 Minor concern</b>		<b>Category 3 Major concern</b>	
Central govt should provide more funding for public transport/walking/cycling	3	43%	12	71%	15	68%
Politicians are often short sighted and too focussed on localised issues to deal with big issues like peak oil	2	29%	8	47%	14	64%
Public transport supporter	4	57%	6	35%	12	55%
‘Roads of national significance’ policy is not a good policy stance	1	14%	4	24%	13	59%
Concerned about land use planning and urban sprawl and the effects on the transport system	1	14%	4	24%	13	59%
Some parts of ‘roads of national significance’ policy are good and necessary	1	14%	7	41%	6	27%
Sustainable transport should be prioritised regardless of whether peak oil is true because of issues like congestion	2	29%	7	41%	5	23%
There are issues with some sustainable policies which come up against strong opposition: e.g. bus lanes vs. parking for residents and businesses	0	0%	3	18%	5	23%
Central govt should provide more funding for local roads	2	29%	4	24%	0	0%
‘Roads of national significance’ is a good policy stance	3	43%	1	6%	0	0%

### 5.5.1.3 Influences on Transport Policy Makers

Table 22 shows the broad statements expressed in the interviews that fit into the criterion *influences on transport policy makers*. Central government was frequently mentioned as being influential in transport policy making.

**Table 22 Influences on Transport Policy Makers: all responses**

<b>Criterion: Influences on Transport Policy Makers</b>	<b>Total</b>	
Central government is a key influence in transport policy because of the funding structure	22	48%
The signals from central government do not encourage planning for peak oil	16	35%
The Government Transport Minister is not concerned about peak oil	8	17%
The road lobby groups are influential	7	15%

Table 23 shows the broad statements expressed in the interviews that fit into the criterion *influences on transport policy makers*, sorted by city. Those in city 1 were more likely to state that the road lobby groups are influential.

**Table 23 Influences on Transport Policy Makers: by city**

<b>Criterion: Influences on Transport Policy Makers</b>	<b>City 1</b>		<b>City 2</b>		<b>City 3</b>	
Central government is a key influence in transport policy because of the funding structure	3	50%	4	36%	15	52%
The signals from central government do not encourage planning for peak oil	2	33%	4	36%	10	34%
The Government Transport Minister is not concerned about peak oil	0	0%	2	18%	6	21%
The road lobby groups are influential	2	33%	1	9%	4	14%

Table 24 shows the broad statements expressed in the interviews that fit into the criterion *influences on transport policy makers*, sorted by role.

**Table 24 Influences on Transport Policy Makers: by role**

<b>Criterion: Influences on Transport Policy Makers</b>	<b>Elected Officials</b>		<b>Technical Staff</b>	
Central government is a key influence in transport policy because of the funding structure	11	44%	11	52%
The signals from central government do not encourage planning for peak oil	6	24%	10	48%
The Government Transport Minister is not concerned about peak oil	4	16%	5	24%
The road lobby groups are influential	5	20%	2	10%

Table 25 shows the broad statements expressed in the interviews that fit into the criterion *influences on transport policy makers*, sorted by level of concern about peak oil category. Those in category 2 and 3 were more likely to express a view that central government are influential.

**Table 25 Influences on Transport Policy Makers: by level of concern about peak oil**

<b>Criterion: Influences on Transport Policy Makers</b>	<b>Category 1 No concern</b>		<b>Category 2 Minor concern</b>		<b>Category 3 Major concern</b>	
Central government is a key influence in transport policy because of the funding structure	1	14%	9	53%	12	55%
The signals from central government do not encourage planning for peak oil	0	0%	2	12%	14	64%
The Government Transport Minister is not concerned about peak oil	0	0%	1	6%	8	36%
The road lobby groups are influential	0	0%	2	12%	5	23%

#### 5.5.1.4 Knowledge of and Attitude towards Peak Oil

Table 26 shows the broad statements expressed in the interviews that fit into the criterion *knowledge of, and attitude towards, peak oil*. Half of all interviewees stated that they thought technology or another energy source will mitigate any peak oil problems.

**Table 26 Knowledge of, and Attitude towards Peak Oil: All responses**

<b>Criterion: Knowledge of, and attitude towards, peak oil</b>	<b>Total</b>	
Technology or another energy source will mitigate any peak oil problems	23	50%
We live in a car dominated society which makes it hard to change travel behaviour	18	39%
Peak oil is hard to plan for because it is too far away and there are no tangible effects currently	14	30%
The council is too small to plan for peak oil, there are other more pressing issues	3	7%
The debate about the timing of peak oil provides little certainty for planners	10	22%
The market will respond to mitigate any problems	9	20%
It will need to take a crisis before we start planning for peak oil	8	17%
People will adjust to rising fuel prices and any shortages in supply	7	15%
Peak oil will not be a problem in the future	7	15%
Technology or alternative fuels will <i>not</i> be able to mitigate peak oil problems	4	9%
There is plenty of oil available for transport	2	4%
Elected official: thinks the majority of tech staff not concerned about peak oil	4	9%
Tech staff: thinks the majority of elected officials are not concerned about peak oil	13	28%
Elected official: thinks the majority of elected officials are not concerned about peak oil	8	17%

Table 27 shows the broad statements expressed in the interviews that fit into the criterion *knowledge of, and attitude towards, peak oil*, sorted by city. Those in city 1 were more likely to state that technology will mitigate any peak oil problems, that council is too small to plan for peak oil, that the market will respond to mitigate any problems, and that people will adapt to rising fuel prices and shortages in supply.

**Table 27 Knowledge of, and Attitude towards Peak Oil: by city**

<b>Criterion: Knowledge of, and attitude towards, peak oil</b>	<b>City1</b>		<b>City 2</b>		<b>City 3</b>	
Technology or another energy source will mitigate any peak oil problems	4	67%	4	36%	15	52%
We live in a car dominated society which makes it hard to change travel behaviour	2	33%	4	36%	12	41%
Peak oil is hard to plan for because it is too far away and there are no tangible effects currently	3	50%	3	27%	8	28%
The council is too small to plan for peak oil, there are other more pressing issues	3	50%	0	0%	0	0%
The debate about the timing of peak oil provides little certainty for planners	1	17%	3	27%	6	21%
The market will respond to mitigate any problems	3	50%	1	9%	5	17%
It will need to take a crisis before we start planning for peak oil	0	0%	1	9%	7	24%
People will adjust to rising fuel prices and any shortages in supply	3	50%	1	9%	3	10%
Peak oil will not be a problem in the future	0	0%	2	18%	5	17%
Technology or alternative fuels will <i>not</i> be able to mitigate peak oil problems	1	17%	1	9%	2	7%
There is plenty of oil available for transport	0	0%	1	9%	1	3%
Elected official: thinks the majority of tech staff not concerned about peak oil	1	17%	2	18%	1	3%
Tech staff: thinks the majority of elected officials are not concerned about peak oil	1	17%	4	36%	8	28%
Elected official: thinks the majority of elected officials are not concerned about peak oil	1	17%	2	18%	5	17%

Table 28 shows the broad statements expressed in the interviews that fit into the criterion *knowledge of, and attitude towards, peak oil*, sorted by role. Elected officials were more likely to express a view that technology or another energy source will mitigate any peak oil problems and that we live in a car dominated society which makes it hard to change behaviour. 62% of technical staff consider that elected officials have no concern for peak oil.

**Table 28 Knowledge of, and Attitude towards Peak Oil: by role**

<b>Criterion: Knowledge of, and attitude towards, peak oil</b>	<b>Elected Officials</b>		<b>Technical Staff</b>	
Technology or another energy source will mitigate any peak oil problems	16	64%	8	38%
We live in a car dominated society which makes it hard to change travel behaviour	13	52%	6	29%
Peak oil is hard to plan for because it is too far away and there are no tangible effects currently	6	24%	9	43%
The council is too small to plan for peak oil, there are other more pressing issues	1	4%	2	10%
The debate about the timing of peak oil provides little certainty for planners	6	24%	5	24%
The market will respond to mitigate any problems	7	28%	3	14%
It will need to take a crisis before we start planning for peak oil	3	12%	5	24%
People will adjust to rising fuel prices and any shortages in supply	7	28%	0	0%
Peak oil will not be a problem in the future	5	20%	2	10%
Technology or alternative fuels will <i>not</i> be able to mitigate peak oil problems	0	0%	4	19%
There is plenty of oil available for transport	1	4%	1	5%
Elected official: thinks the majority of tech staff not concerned about peak oil	4	16%	0	0%
Tech staff: thinks the majority of elected officials are not concerned about peak oil	0	0%	13	62%
Elected official: thinks the majority of elected officials are not concerned about peak oil	9	36%	0	0%

Table 29 shows the broad statements expressed in the interviews that fit into the criterion *knowledge of, and attitude towards, peak oil*, sorted by level of concern about peak oil category. The majority of respondents in category 1 and 2 consider that technology or another energy source will mitigate any peak oil problems.

**Table 29 Knowledge of, and Attitude towards Peak Oil: by level of concern about peak oil**

Criterion: Knowledge of, and attitude towards, peak oil	Category 1 No concern		Category 2 Minor concern		Category 3 Major concern	
Technology or another energy source will mitigate any peak oil problems	7	100%	16	94%	1	5%
We live in a car dominated society which makes it hard to change travel behaviour	3	43%	8	47%	8	36%
Peak oil is hard to plan for because it is too far away and there are no tangible effects currently	0	0%	5	29%	10	45%
The council is too small to plan for peak oil, there are other more pressing issues	0	0%	2	12%	1	5%
The debate about the timing of peak oil provides little certainty for planners	2	29%	6	35%	3	14%
The market will respond to mitigate any problems	3	43%	7	41%	0	0%
It will need to take a crisis before we start planning for peak oil	0	0%	2	12%	6	27%
People will adjust to rising fuel prices and any shortages in supply	1	14%	6	35%	0	0%
Peak oil will not be a problem in the future	7	100%	0	0%	0	0%
Technology or alternative fuels will <i>not</i> be able to mitigate peak oil problems	0	0%	0	0%	4	18%
There is plenty of oil available for transport	2	29%	0	0%	0	0%
Elected official: thinks the majority of tech staff not concerned about peak oil	0	0%	3	18%	1	5%
Tech staff: thinks the majority of elected officials are not concerned about peak oil	1	14%	1	6%	11	50%
Elected official: thinks the majority of elected officials are not concerned about peak oil	0	0%	3	18%	6	27%

### 5.5.2 Online Survey Results

Invitations to complete the online survey were emailed to all the interviewees as well as some people who were initially approached to carry out an interview but were unable to participate. The survey was conducted using a web-based survey system<sup>24</sup> and a link to the survey was emailed to interviewees immediately following their interview and to other participants as soon as agreement to participate was given. Participants were given two weeks to complete the survey. A copy of the online survey questions can be found in Appendix .

<sup>24</sup> The online survey company *SurveyMonkey* ([www.surveymonkey.com](http://www.surveymonkey.com)) was used to design and carry out the survey.

A total of 61 people were sent the survey link by email. 55 people (90%) started the survey and 46 people (75%) completed it. A breakdown of those who completed the survey for each case study area is shown in Table 30.

**Table 30 Online Survey Respondents**

Organisation	Number completed survey	Councillors	Technical Staff
City 1	5	4	1
City 2	10	5	5
City 3	31	17	14

The results from the survey were downloaded from the survey website and collated into each of the five criteria and sub-criteria, then sorted into four groups. In order to present the results across all three case study cities combined, the average response was calculated for each question. Answers to the question “*Which organisation do you represent?*” were used to sort the results by city. Answers to the question “*What is your role?*” were used to sort the results by policy maker type. Answers to the question “*Do you personally believe that peak oil could create problems for the transport system in your city in the future?*” were used to sort the results by level of concern about peak oil.

The results for each of the five criteria and sortings are shown in the sections below. Each section represents each of the five main criteria and then each section is split into the sub-criteria (underlined and in bold italics), as listed in Figure 12 in Section 4.3. Under each sub-criteria heading the results for the four sortings are presented in table or graph format.

Similarly to the interview results, location factors are not included as they have been described in Section 5.3, and due to the large percentage of respondents from city 3, the results for the cities combined may reflect the views of respondents from this city. Only 1 technical staff member from city 1 completed the survey, which also may produce misleading results when analysing the results from city 1. Further limitations of the results data are described in Section 6.8.

#### *5.5.2.1 Personal Factors*

The personal factors obtained from the survey are presented in Table 31.

**Table 31 Online Survey: personal factors by city**

	City 1		City 2		City 3	
Age						
20-30	0%	0	10%	1	0%	0
31-40	20%	1	20%	2	19%	6
41-50	20%	1	20%	2	32%	10
51-60	0%	0	50%	5	19%	6
61+	60%	3	0%	0	29%	9
Organisation						
Local	100%	5	80%	8	87%	27
Regional	0%	0	20%	2	13%	4
Role						
Councillor	80%	4	50%	5	55%	17
Technical Staff	20%	1	50%	5	45%	14

The personal factor results, sorted by policy maker role are presented in Table 32. Regional council counts are shown in brackets.

**Table 32 Online Survey: personal factors by policy maker role**

	Elected Officials		Technical Staff	
Age				
20-30	0%	0	5%	1
31-40	8%	2	35%	7
41-50	19%	5	40%	8
51-60	31%	8	15%	3
61+	42%	11	5%	1
City (Regional Council)				
City 1	15%	4 (0)	5%	1 (0)
City 2	19%	5 (0)	25%	5 (2)
City 3	65%	17 (1)	70%	14 (2)

The personal factor results, sorted by level of concern about peak oil are presented in Table 33. Regional council counts are shown in brackets.



**Table 33 Online Survey: personal factors by level of concern about peak oil**

	Category 1 No concern		Category 2 Minor concern		Category 3 Major concern	
Age						
20-30	0%	0	0%	0	5%	1
31-40	0%	0	17%	3	30%	6
41-50	0%	0	33%	6	30%	6
51-60	17%	1	22%	4	30%	6
61+	83%	5	28%	5	5%	1
City (Regional Council)						
City 1	0%	0 (0)	22%	4 (0)	5%	1 (0)
City 2	17%	1 (0)	17%	3(0)	25%	5 (2)
City 3	83%	5 (0)	61%	11 (1)	70%	14 (3)
Role						
Councillor	100%	6	61%	11	35%	7
Technical Staff	0%	0	39%	7	65%	13

The results for personal factors show that older people were more likely to have little or no concern for peak oil, as were elected officials. 100% of those in category 1 were over 51 or older, whereas 65% of those in category 3 were younger than 51. Likewise, 100% of those in category 1 were elected officials, whereas elected officials only made up 35% of those in category 3. The number of people from each role that participated in the survey was relatively even, with 54% elected officials and 46% technical staff.

#### *5.5.2.2 Beliefs about Transport Policy*

##### **Future challenges**

Respondents were asked to rank a list of possible future challenges on a scale of 1-10. Counts were taken for the number of people who gave each item a ranking of one or two (biggest challenge) and the number of people who gave each item a ranking of 9 or 10 (smallest challenge). 22% of people gave peak oil a ranking of 1 or 2, and 22% gave it a ranking of 9 or 10. The biggest challenge was cited as *funding and affordability* (67% gave it a ranking of 1 or

2) and the second biggest challenge was cited as *managing land use and transport integration* (41% gave it a ranking of 1 or 2). The results for all respondents combined for their biggest and smallest challenges are presented in Figure 18.

The key for the graphs, for each of the future challenges is as follows:

a) *Congestion/Road capacity/Space to meet demands*

b) *Facilitating economic growth*

c) *Mobility and accessibility for an aging population*

d) *Climate change and environmental impacts*

e) *Peak oil - reduced availability of fossil fuels*

f) *Funding and affordability*

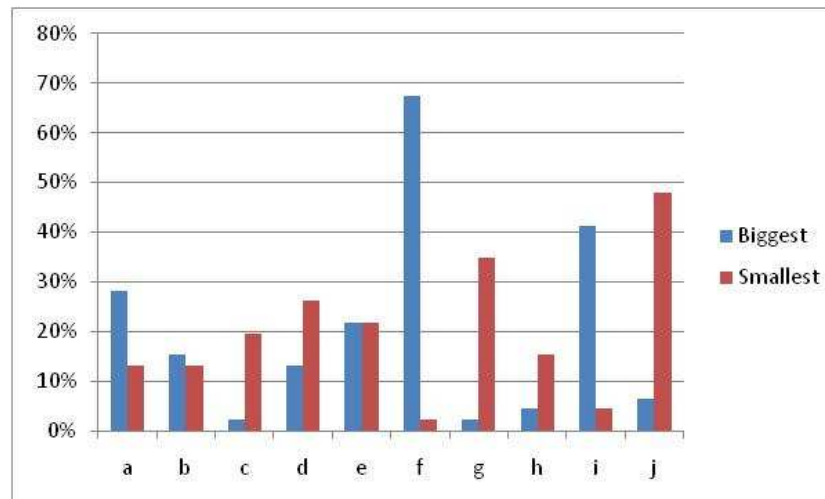
g) *Public health*

h) *Road safety*

i) *Managing land use and transport integration*

j) *3-year central government electoral cycle*

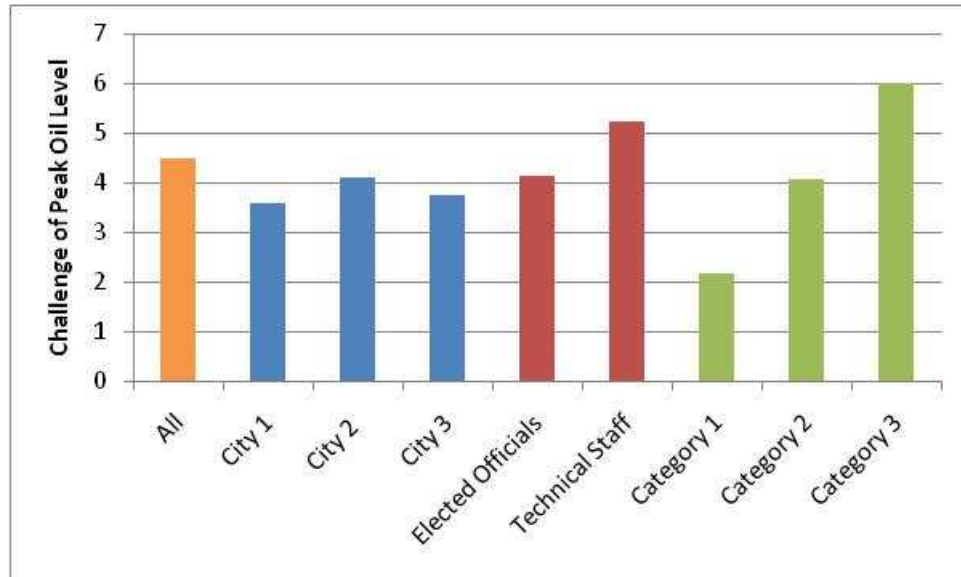
**Figure 18 Future Challenges**



An average ranking for the challenge of (e) *peak oil* was calculated for each group. These results are presented in Figure 19. The higher the number, the bigger the challenge peak oil is

considered to be. Of the three sortings, those in city 2, technical staff and those in category 3 were more likely to consider peak oil to be a challenge in the next 30 years.

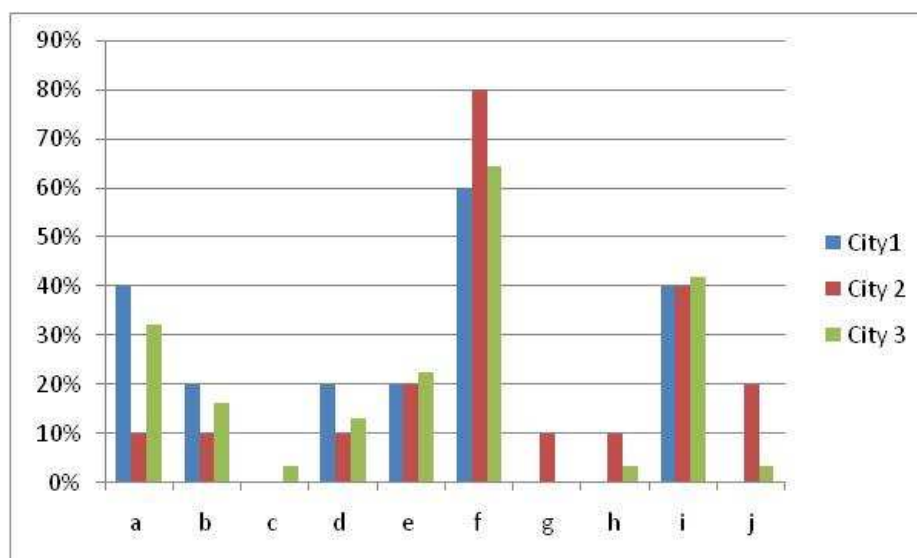
**Figure 19 Future Challenges – Average for Peak Oil**



### Results Sorted By City

City 2 was more likely to consider (f) *funding and affordability* and (j) *the three year election cycle* to be a challenge and less likely to consider (a) *congestion/road capacity/space to meet demands* to be a challenge, when compared to the other cities.

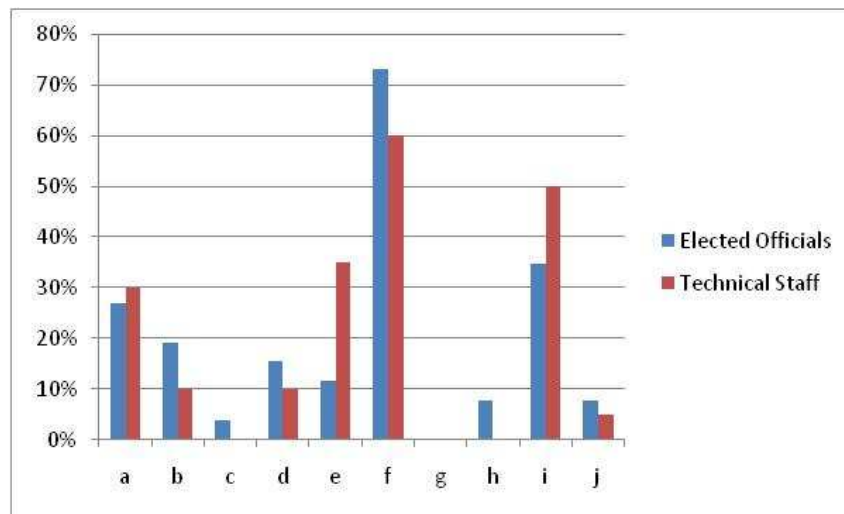
**Figure 20 Future Challenges – By City**



## Results Sorted by Policy Maker Role

Technical staff were more likely to consider (e) *peak oil* and (i) *managing land use and transport integration* to be challenges, compared to elected officials, whereas elected officials were more likely to consider (f) *funding and affordability* to be a challenge.

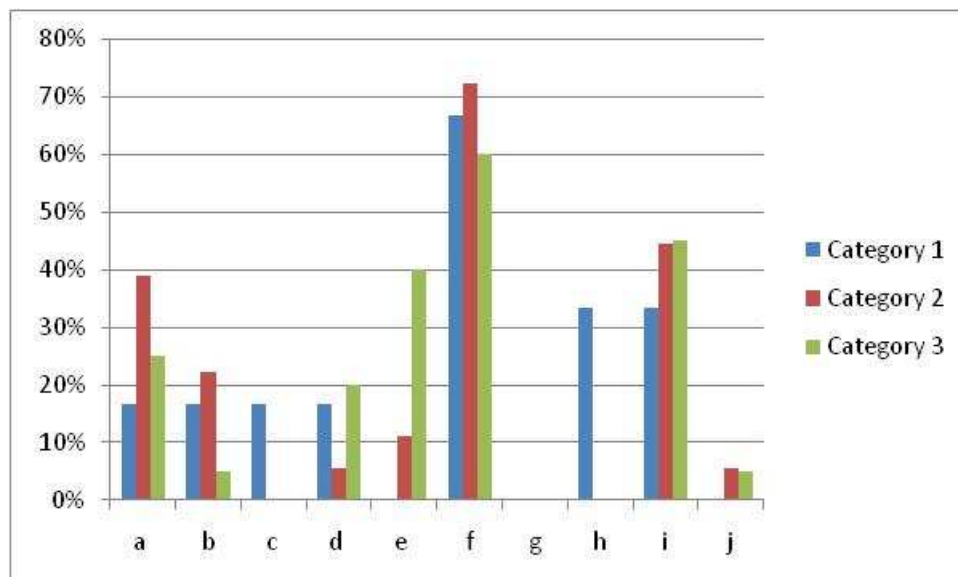
Figure 21 Future Challenges - By Policy Maker Role



## Results Sorted by Level of Concern about Peak Oil

Those in category 1 were more likely to consider (h) *road safety* to be a challenge, and those in category 3 were more likely to consider (e) *peak oil* to be a challenge. Those in category 2 were more concerned about (a) *congestion/road space/capacity to meet demands* than people in the other two categories.

Figure 22 Future Challenges – By Level of Concern about Peak Oil



### **Key objectives in transport policy making**

In order to understand what transport policy makers consider to be the key objectives in transport policy respondents were asked to carry out a pair-wise comparison of the five NZTS objectives: *economic development, public health, access/mobility, environmental sustainability and safety*, and rank them on a scale of -8 to 8. For example respondents were asked “*Is economic development more or less important than safety*”. Respondents could then give a score, for example 8 to indicate that economic development is extremely *more* important than safety, or -8 to indicate that economic development is extremely *less* important than safety.

The key to the tables and graphs is as follows:

- *eco dev: economic development*
- *acc/mob: access/mobility*
- *enviro: environmental sustainability*
- *ph: public health*

The analysis of the pair-wise comparison involved the following steps (Mindtools, 2010):

1. Using the results from the survey a matrix was created for each respondent that showed the relative importance of each objective rated against the others. The upper right half of the matrix (yellow cells in Table 34) was completed for each of the questions in the survey. E.g. a score of more importance (e.g. 6) is indicated by 6, a score of less importance (e.g. -6) is indicated by 1/6 or 0.17.
2. To fill the lower left half of the matrix (green cells in Table 34) the reciprocal values of the upper right half were used. If  $x_{ab}$  represents a figure in row *a* column *b* of the upper right half of the matrix, then the lower left half is filled using this formula:  $x_{ab} = 1 / x_{ba}$

**Table 34 Pairwise Matrix**

	A	B	C	D	E	F
1		Eco dev	Safety	Acc/Mob	Enviro	PH
2	Eco dev	1.00	0.00	2.00	6.00	0.50
3	Safety	0.00	1.00	2.00	4.00	0.00
4	Acc/Mob	0.50	0.50	1.00	4.00	0.00
5	Enviro	0.17	0.25	0.25	1.00	0.17
6	PH	2.00	0.00	0.00	6.00	1.00
7	Total	<b>3.67</b>	<b>1.75</b>	<b>5.25</b>	<b>21.00</b>	<b>1.67</b>

3. The totals for each column were calculated (row 7).
4. The overall weighting for each objective was calculated and a priority vector (PV) obtained for each objective. First the score given for each cell was divided by the total for the column (e.g. in Table 34 above, cell B3 was divided by cell B7 to give the value in cell B3 in Table 35 below). The PV for each objective was calculated by calculating the average of the row (e.g. the average of values in row 2 gave a PV of 0.25 for economic development, as shown in Table 35). The priority vector indicated the weighting each person gave to each of the objectives.

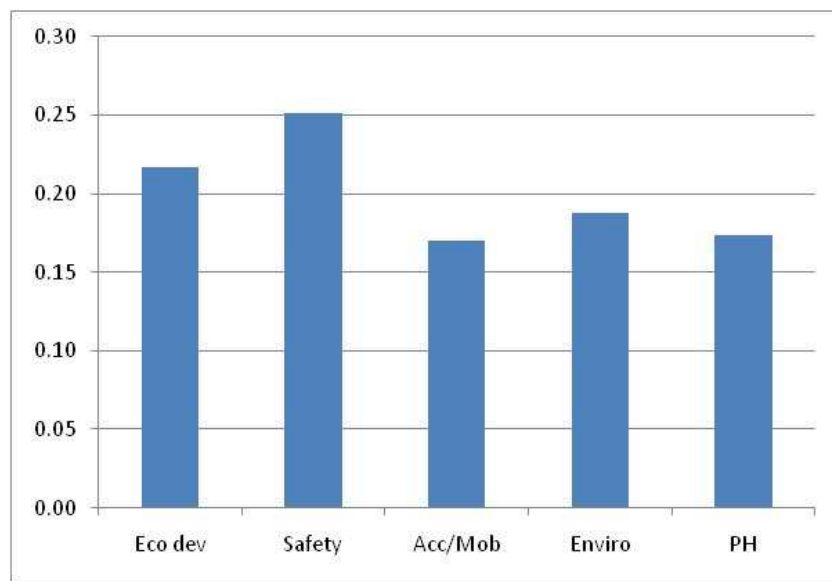
**Table 35 Priority Vector Calculation**

	A	B	C	D	E	F	G
1		Eco dev	Safety	Acc/Mob	Enviro	PH	<b>PV</b>
2	Eco dev	0.27	0.00	0.38	0.29	0.30	<b>0.25</b>
3	Safety	0.00	0.57	0.38	0.19	0.00	<b>0.23</b>
4	Acc/Mob	0.14	0.29	0.19	0.19	0.00	<b>0.16</b>
5	Enviro	0.05	0.14	0.05	0.05	0.10	<b>0.08</b>
6	PH	0.55	0.00	0.00	0.29	0.60	<b>0.29</b>

For the individual example shown in Table 35, the priority vectors indicate that this person placed the highest importance on *public health* and the lowest importance on *environmental sustainability*.

The results showing the priority vectors for each objective averaged across all the respondents are presented in Figure 23. The most important objective was *safety*, with *economic development* being the next most important objective.

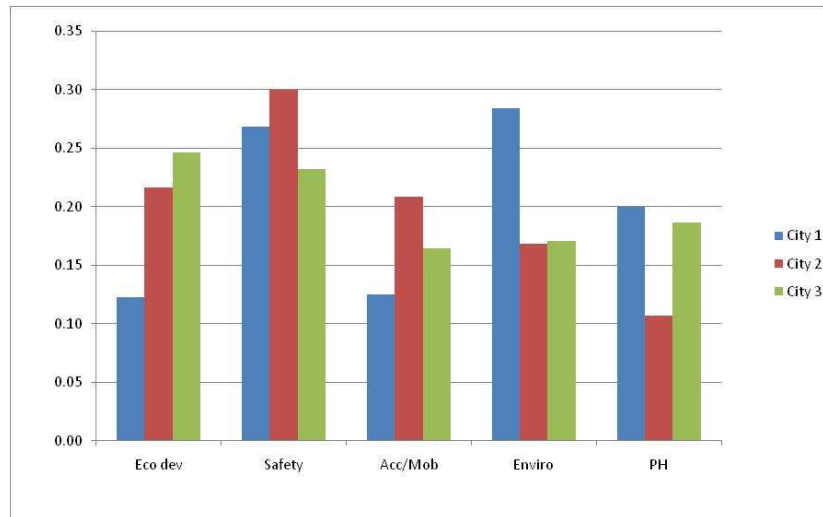
**Figure 23 Priority Vectors for Key Transport Objectives**



## Results Sorted By City

Results sorted by city show that *economic development* was generally more important than *environmental sustainability* in city 2 and 3, and that *environmental sustainability* was considerably more important in city 1.

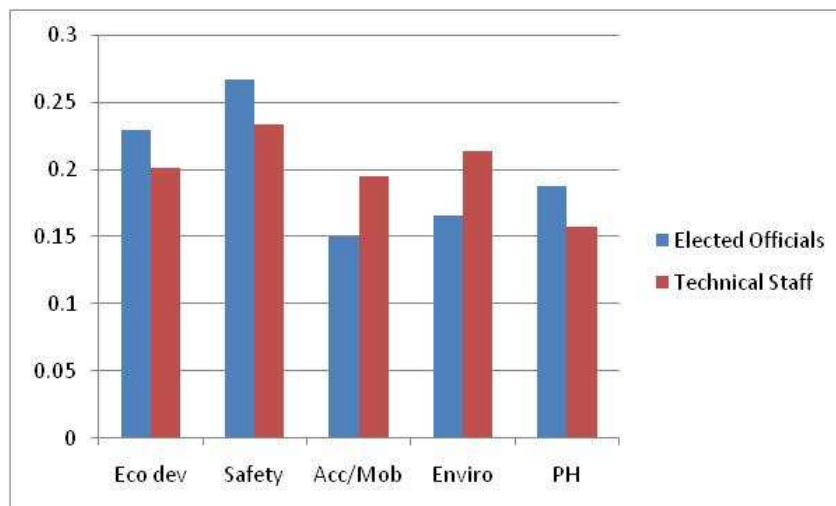
**Figure 24 Priority Vectors for Key Transport Objectives – By City**



## Results Sorted by Policy Maker Role

Elected officials generally place more importance on *economic development*, *safety* and *public health* compared to technical staff and technical staff generally place more importance on *access and mobility* and *environmental sustainability*.

**Figure 25 Priority Vectors for Key Transport Objectives – By Policy Making Role**

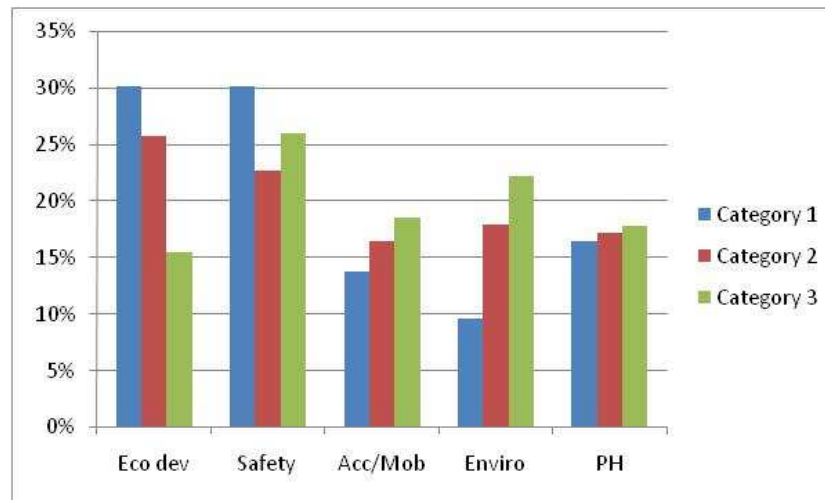




## Results Sorted by Level of Concern about Peak Oil

*Economic development* is more important for those in category 1 and 2, whereas *environmental sustainability* is more important for those in category 3.

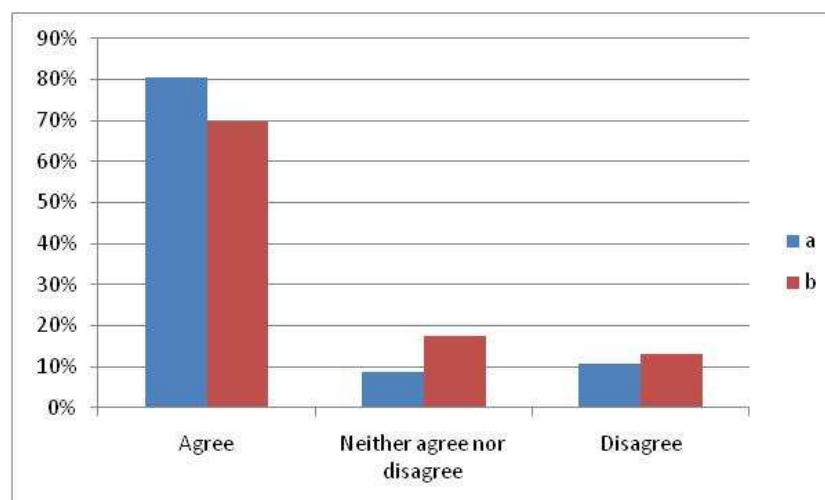
**Figure 26 Priority Vectors for Key Transport Objectives – By Level of Concern about Peak Oil**



## Role of economic growth in transport policy

Respondents were asked whether they agreed with certain statements about transport policy and economic growth. The majority of respondents agreed that: (a) *Economic growth can be achieved with a sustainable transport system that reduces dependence on fossil fuels and protects the environment*; and (b) *The current Central Government's transport policy of increased funding for 'roads of national significance' promotes short term economic growth at the expense of long term sustainability objectives*.

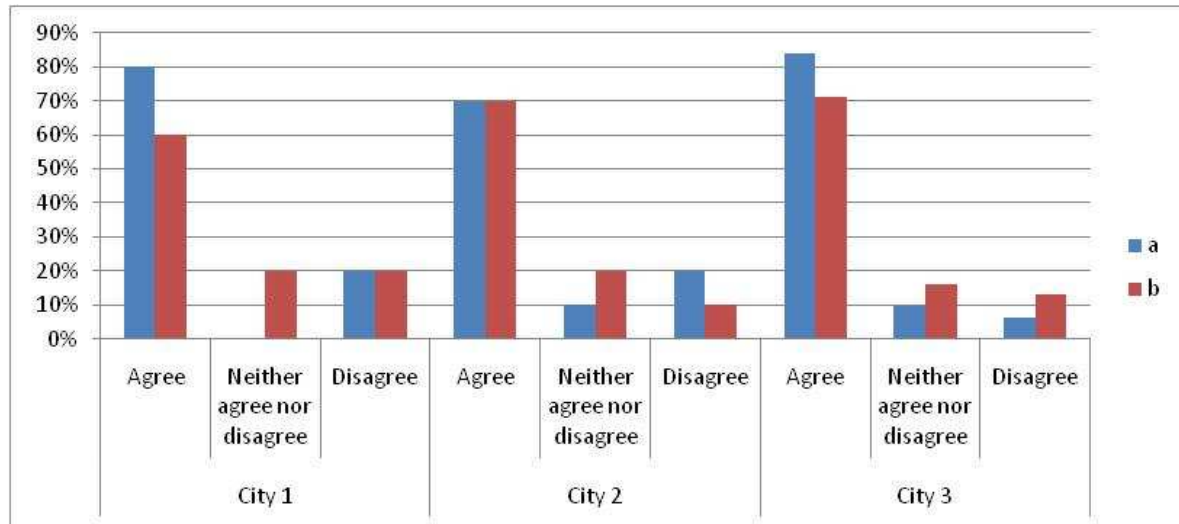
**Figure 27 Economic Growth**



## Results Sorted By City

The results did not vary greatly by city, with the majority of respondents agreeing with the two statements.

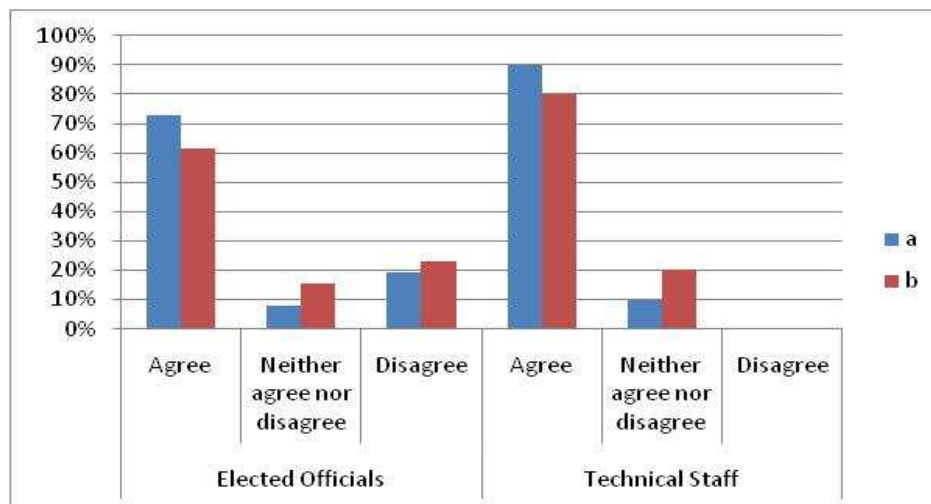
Figure 28 Economic Growth – By City



## Results Sorted by Policy Maker Role

Elected officials were more likely to disagree with the two statements about economic growth.

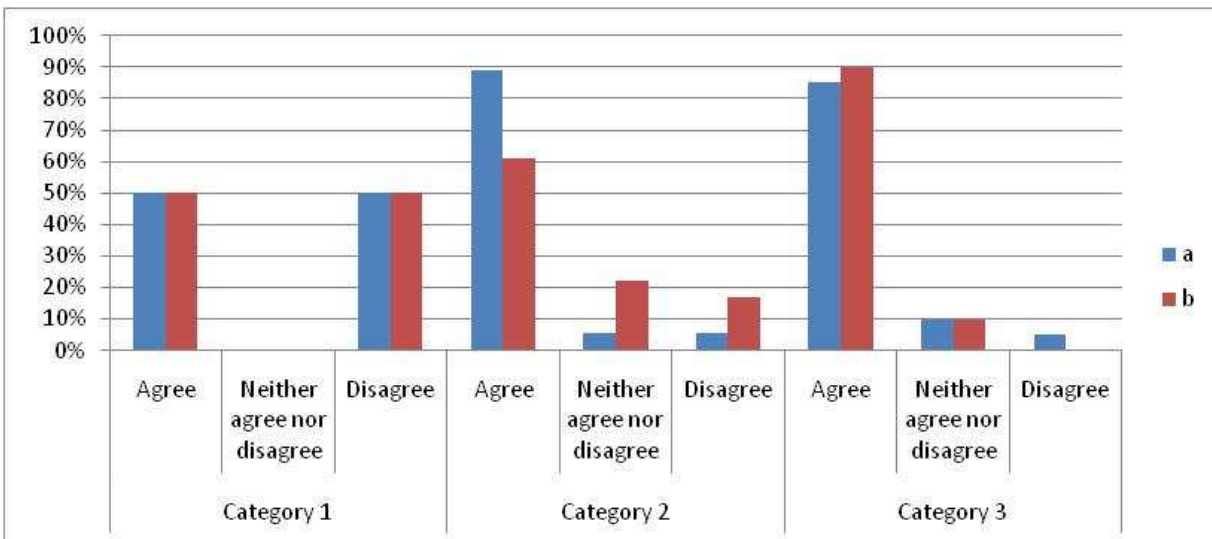
Figure 29 Economic Growth – By Policy Making Role



## Results Sorted by Level of Concern about Peak Oil

The results were split for category 1, with half agreeing and half disagreeing with the statements. Those in category 2 and 3 were more likely to agree with the statements, in particular those in category 3.

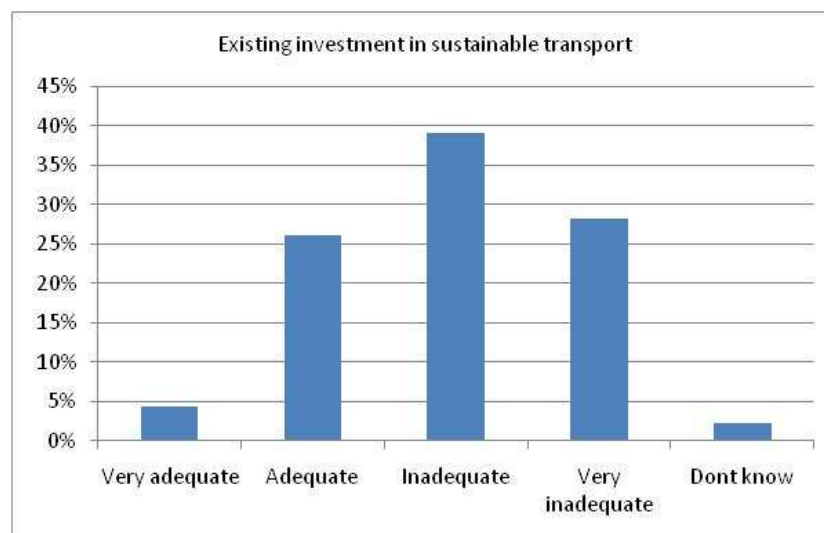
**Figure 30 Economic Growth – By Level of Concern about Peak Oil**



## Existing investment in sustainable transport

67% of respondents considered the amount of investment in sustainable transport to be either *inadequate* or *very inadequate*.

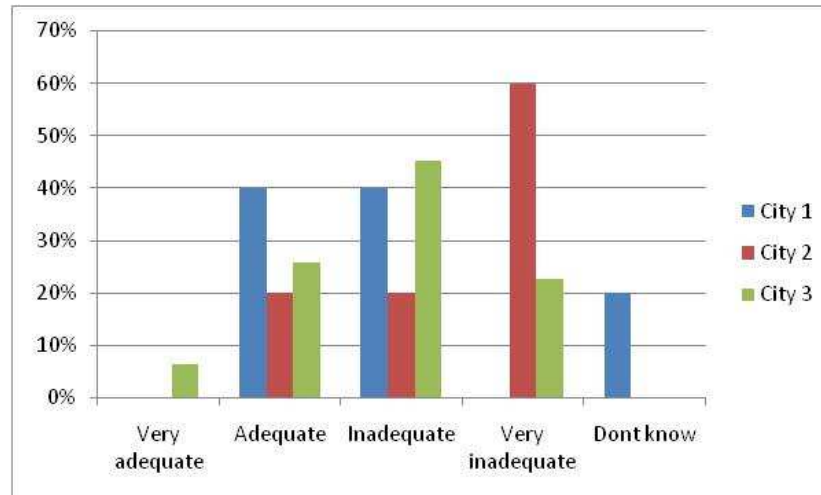
**Figure 31 Existing Investment in Sustainable Transport**



## Results Sorted By City

Those in city 1 were split between *adequate* and *inadequate*. Those in city 2 consider the existing investment in sustainable transport to be far less *adequate* than in the other cities.

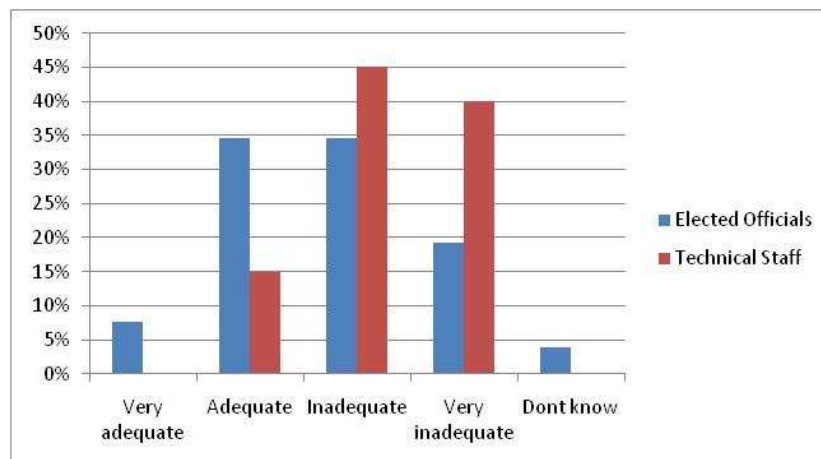
Figure 32 Existing Investment in Sustainable Transport – By City



## Results Sorted by Policy Maker Role

Elected officials were more likely to consider the amount of investment in sustainable transport to be *adequate* when compared to technical staff.

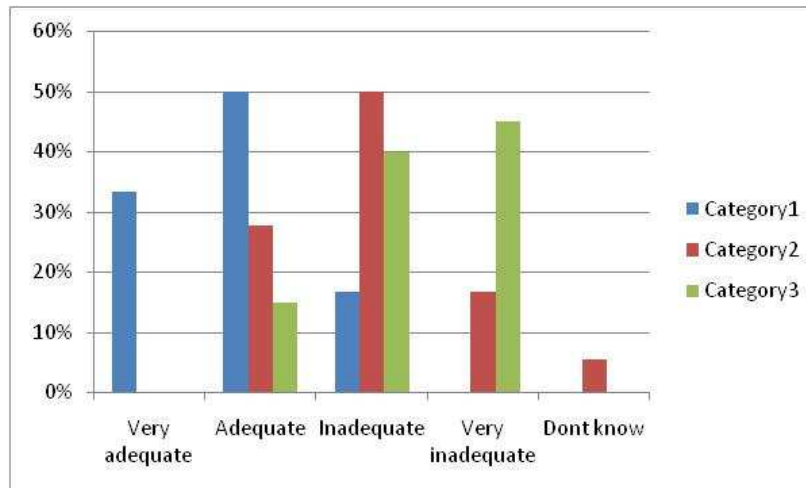
Figure 33 Existing Investment in Sustainable Transport – By Policy Making Role



## Results Sorted by Level of Concern about Peak Oil

The level of concern about peak oil is correlated to the perceived degree of adequacy of investment in sustainable transport: those with a higher concern about peak oil are more likely to consider the amount of investment to be *inadequate*, whilst those with lesser concerns about peak oil are more likely to consider the amount of investment to be *adequate*.

Figure 34 Existing Investment in Sustainable Transport – By Level of Concern about Peak Oil



### Priorities for future investment

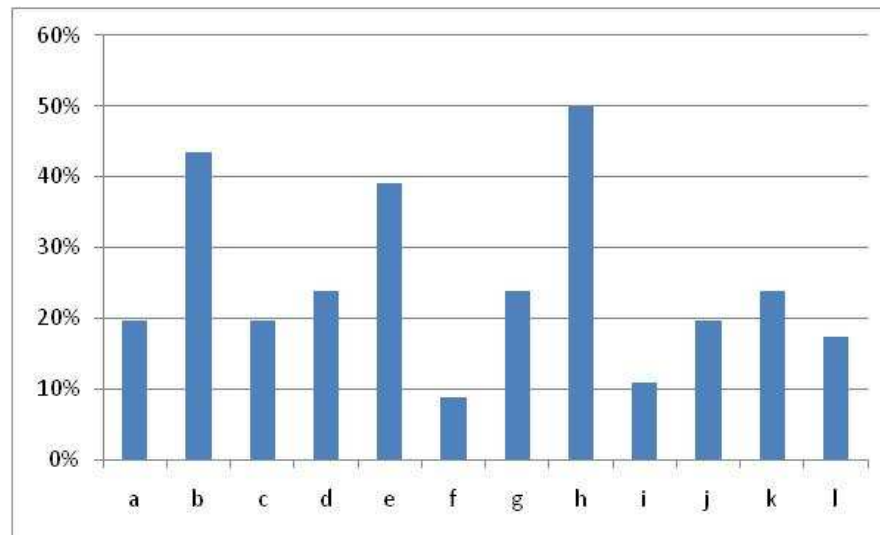
When asked to indicate three areas in which they would like investment to be prioritised, the three most popular answers were (h) *improving facilities for pedestrians and cyclists*, (b) *promoting travel demand management and travel behaviour change measures* and (e) *introducing or improving bus services*. These results are presented in Figure 35.

The key for the graphs, for each of the different areas for investment is as follows:

- a) *Reducing the cost of public transport*
- b) *Promoting travel demand management and travel behaviour change measures*
- c) *Road and pavement maintenance*
- d) *Improving road safety*
- e) *Introducing or improving bus services*
- f) *Building new roads in congested areas*
- g) *Introducing or improving train services*

- h) Improving facilities for pedestrians and cyclists*
- i) Improving personal safety and comfort on public transport*
- j) Public transport infrastructure (e.g. bus priority, real time info)*
- k) Building new roads for key freight/tourism/economic corridors*
- l) Improving amenity areas (e.g. CBD revitalisation)*

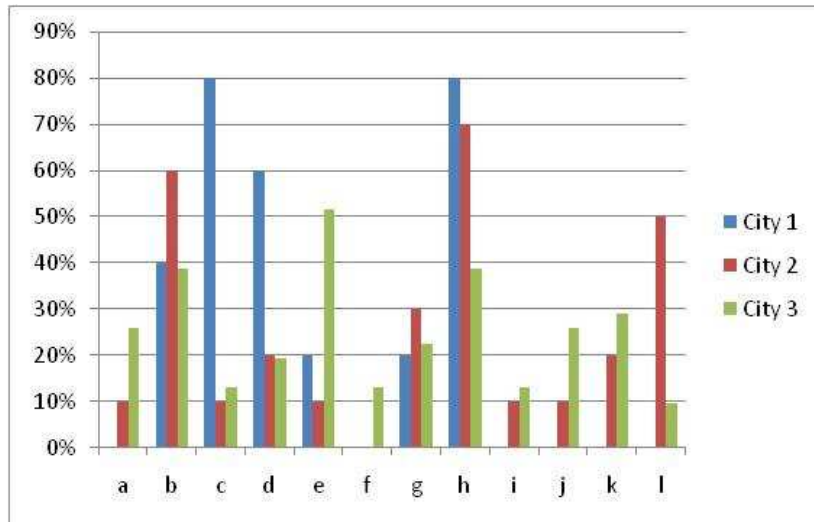
**Figure 35 Priorities for Investment**



### **Results Sorted By City**

In City 1 there was a clear desire for *(h) investment in improving facilities for pedestrians and cyclists*, *(c) road and pavement maintenance* and *(d) road safety*. In City 2 there was a clear desire for *(b) investment in promoting travel demand management and behaviour change measures*, *(h) improving facilities for pedestrians and cyclists* and *(l) improving amenity areas*. In City 3 there was a clear desire for investment in *(e) introducing or improving bus services* (*e*), followed by *(b) promoting travel demand management and behaviour change measures* and *(h) improving facilities for pedestrians and cyclists*.

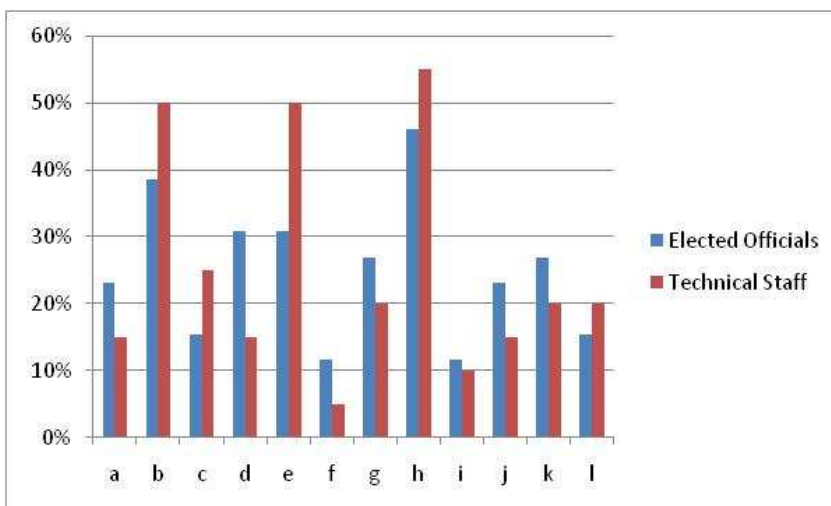
**Figure 36 Priorities for Investment – By City**



### Results Sorted by Policy Maker Role

Technical staff were far more likely to consider (e) *introducing or improving bus services* and (b) *promoting travel demand management and behaviour change measures* to be a priority compared to elected officials. Elected officials were more likely to consider (d) *improving road safety* to be a priority for investment.

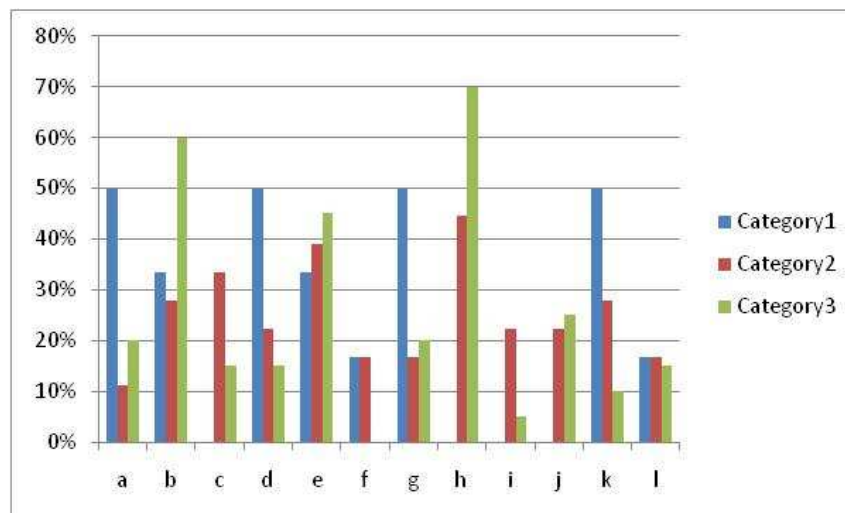
**Figure 37 Priorities for Investment – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

Those in category 1 were more likely to consider (a) *reducing the cost of public transport*, (d) *road safety* and (k) *building new roads for key freight/tourism/economic corridors* to be priorities. In category 3 they were more likely to consider (b) *promoting travel demand management and behaviour change measures* and (h) *improving facilities for pedestrians and cyclists* to be priorities.

**Figure 38 Priorities for Investment – By Level of Concern about Peak Oil**

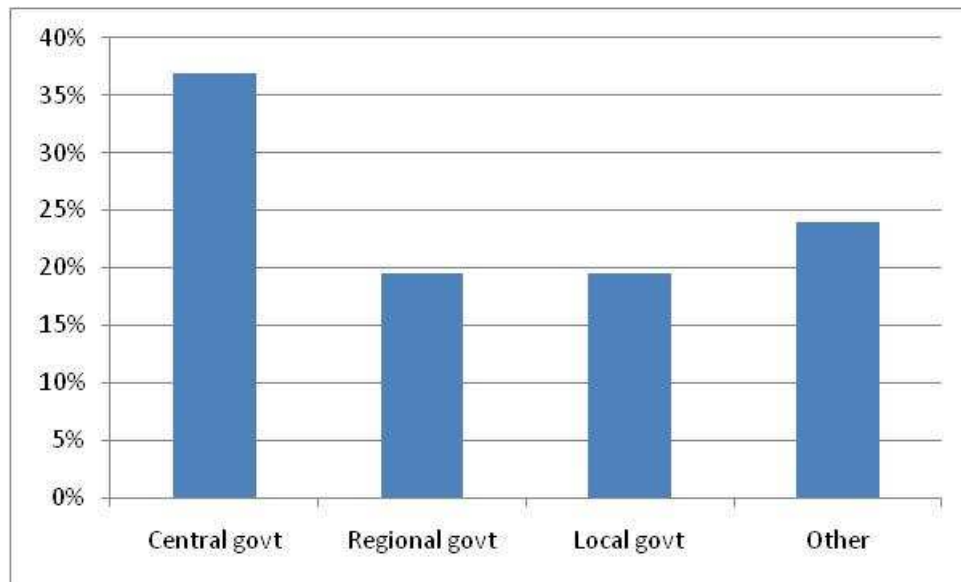


### Responsibility for investment

Respondents were asked who should be responsible for carrying out investment in the priority areas identified above. *Central government* was the most popular answer, however several indicated *other* and commented that it should be a combination of all levels of government, or central/regional, or central/local.



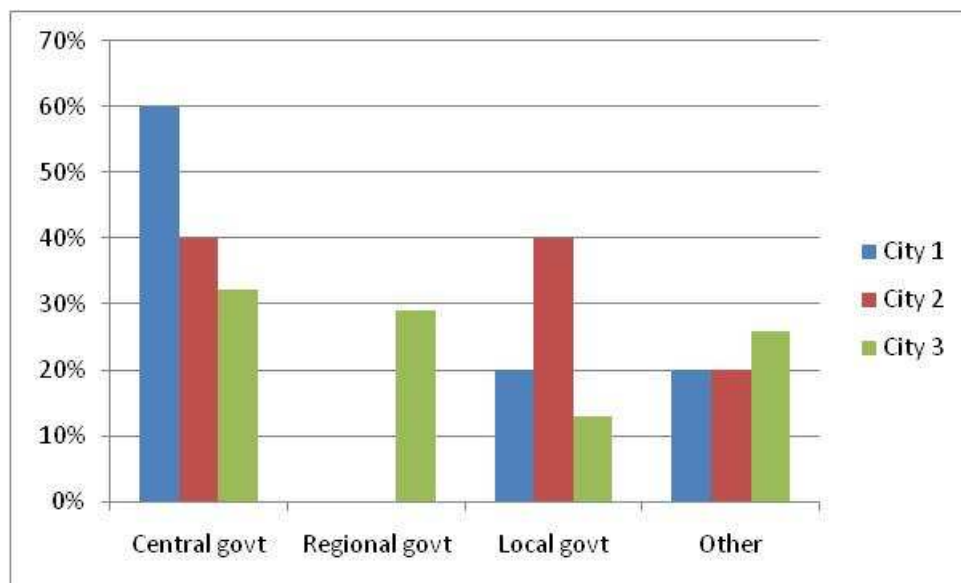
**Figure 39 Responsibility for Investment**



### Results Sorted By City

The results sorted by city show differences in opinion across each of the cities as to who has the responsibility. Respondents in city 1 and 2 do not think *regional government* has a responsibility, whereas nearly a third of those in city 3 do think *regional government* has a responsibility.

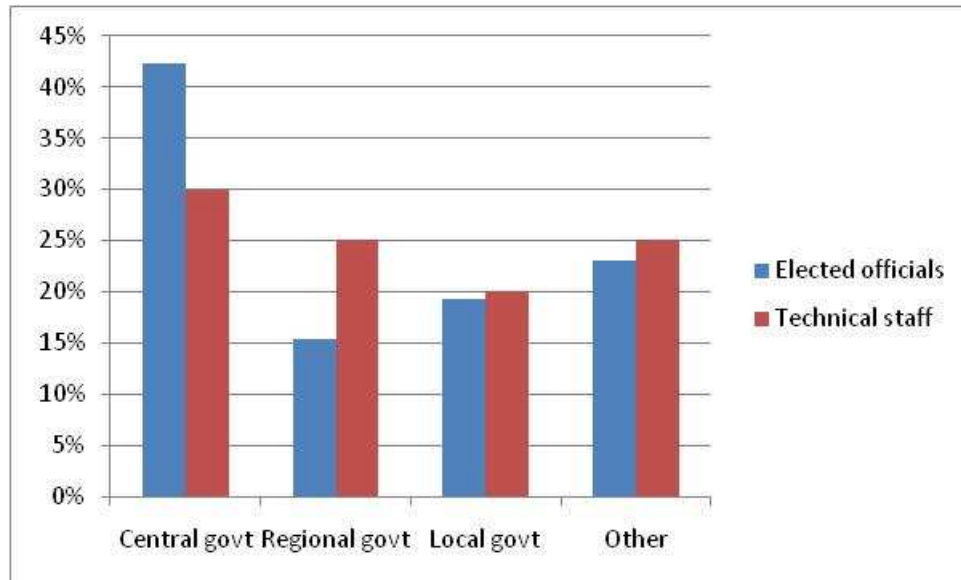
**Figure 40 Responsibility for Investment - By City**



## Results Sorted by Policy Maker Role

Elected officials were more likely to consider that investment is the responsibility of *Central government*.

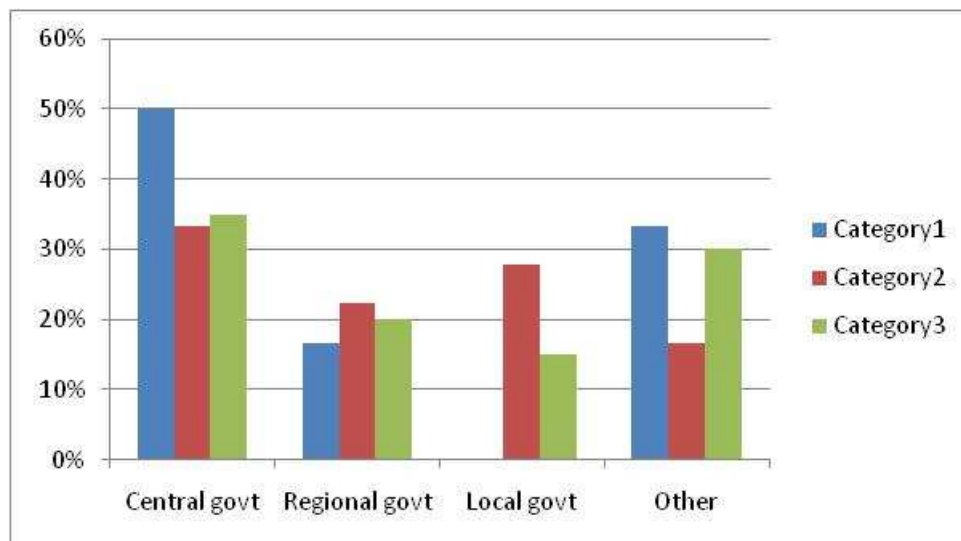
Figure 41 Responsibility for Investment - By Policy Making Role



## Results Sorted by Level of Concern about Peak Oil

Respondents in category 1 were more likely to consider that the responsibility lies with *central government*, or that there should be a combination of the groups (*other*).

Figure 42 Responsibility for Investment - By Level of Concern about Peak Oil



### **Perceived barriers to sustainable transport policy**

Respondents were asked to rank potential barriers on a scale from 1 to 5, with 1 being a significant barrier, 5 being no barrier. The barriers that scored 1 or 2 on the significance scale are represented in the results in this section. The three most significant barriers across all respondents were *(b) lack of funding available at local level*, *(c) lack of funding available from Central government* and *(e) lack of political support from Central government*. These results are represented in Figure 43.

The key for the graphs, for each of the different perceived barriers is as follows:

*a) Lack of public acceptance of policies*

*b) Lack of funding available at local level*

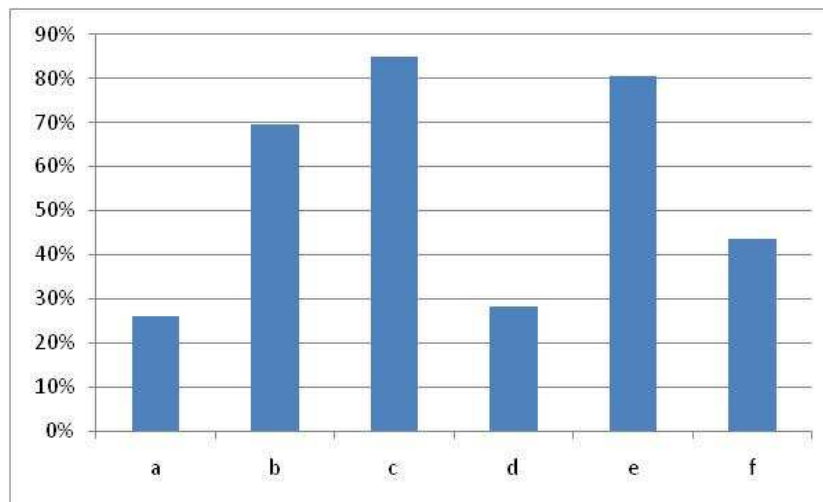
*c) Lack of funding available from Central government*

*d) Lack of political support from within your organisation*

*e) Lack of political support from Central government*

*f) Concerns from within your organisation about sustainable transport policy having a negative impact on local business/industry and the economy*

**Figure 43 Barriers to Sustainable Transport Policy**

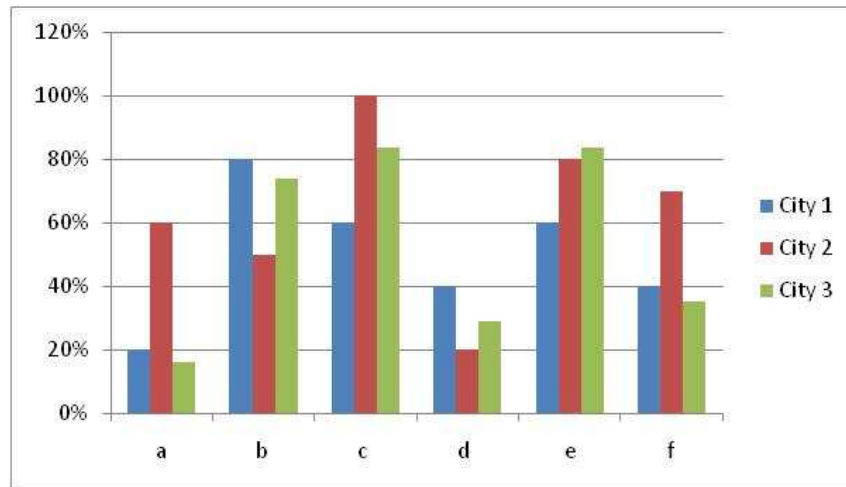


### **Results Sorted By City**

Across each city, *(c) lack of funding available from Central government* and *(e) lack of political support from Central government* were considered to be barriers. In cities 1 and 3 *(b) lack of*

*funding available at a local level* was also a concern. Those in city 2 indicated that (a) *lack of public acceptance of policies* and (f) *concerns from within the organisation about policies having a negative impact on local business and the economy* were also more likely to be barriers than in city 1 or 3.

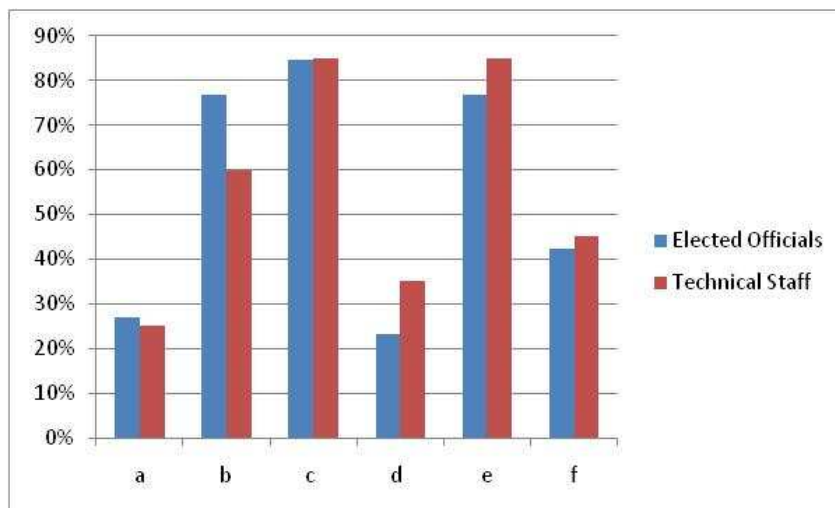
**Figure 44 Barriers to Sustainable Transport Policy – By City**



### Results Sorted by Policy Maker Role

The results were similar for each role, however elected officials were more likely to consider (b) *a lack of funding at the local level* to be a barrier; and technical staff were more likely to consider a (d) and (e) *lack of political support* to be a barrier.

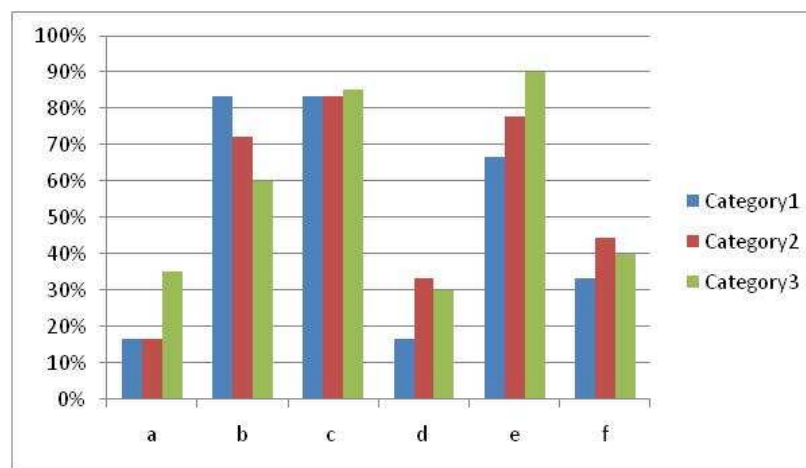
**Figure 45 Barriers to Sustainable Transport Policy – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

Across all the three categories the same barriers were identified as being significant: (c) *lack of funding available from Central government*, (e) *lack of political support from Central government* and (b) *lack of funding available at a local level*. Those in category 1 were more likely to consider (b) *lack of funding at a local level* to be a barrier and less likely to consider (e) *lack of political support from Central government* to be a barrier, when compared to category 2 and 3.

**Figure 46 Barriers to Sustainable Transport Policy – By Level of Concern about Peak Oil**



## Policy making style

Respondents were asked whether or not they agreed with certain statements about policy making. The statements were designed to determine the level of support for an incrementalist style of policy making amongst the policy makers, as described in Section 4.3.2.3.

The results show that 74% agreed with the statement (c) *Making small changes to existing policy, rather than introducing major new changes helps to ensure the political feasibility and acceptability of any proposed policy*; 68% agreed with the statement (b) *There are a wide range of stakeholders to satisfy, therefore compromises need to be made to ensure broad support for policies*; and 61% agreed with the statement (d) *The general public are usually reluctant to accept major changes to policy and tend to support minor policy changes that are more familiar and have the least uncertainty*.

The key for the graphs, showing each of the different statements expressing certain policy making styles is as follows:

a) *It is better to make small, incremental changes to existing policy rather than risk making mistakes with major changes to policy*

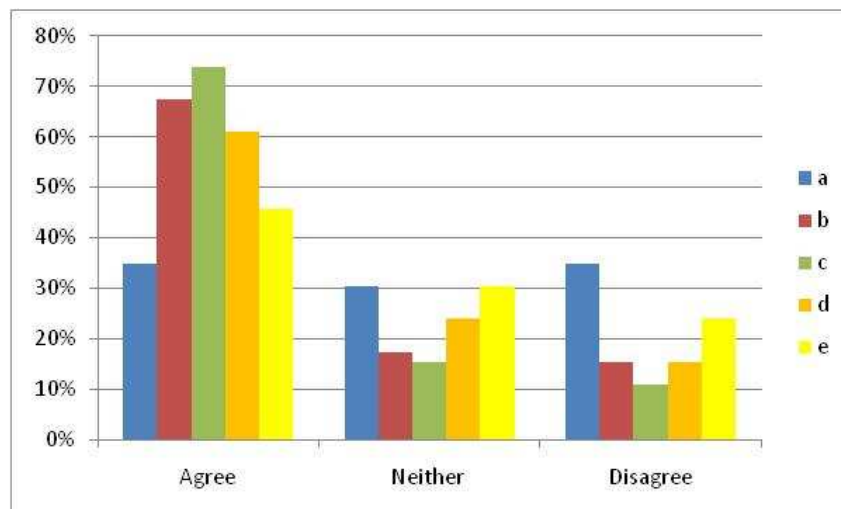
b) *There are a wide range of stakeholders to satisfy, therefore compromises need to be made to ensure broad support for policies*

c) *Making small changes to existing policy, rather than introducing major new changes helps to ensure the political feasibility and acceptability of any proposed policy*

d) *The general public are usually reluctant to accept major changes to policy and tend to support minor policy changes that are more familiar and have the least uncertainty*

e) *Major changes to policy should be made regardless of lack of public support, if such changes are necessary for the long term greater good of the public*

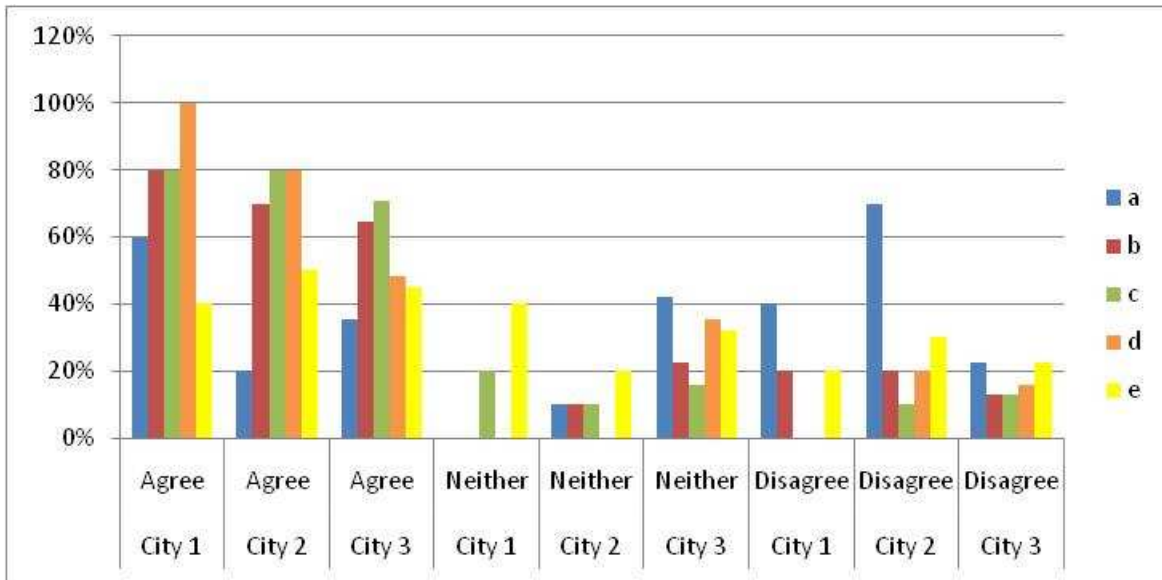
**Figure 47 Policy Making Style**



## Results Sorted By City

Those in city 2 were more likely to disagree with the statement (a) *It is better to make small, incremental changes to existing policy rather than risk making mistakes with major changes to policy* than the other cities.

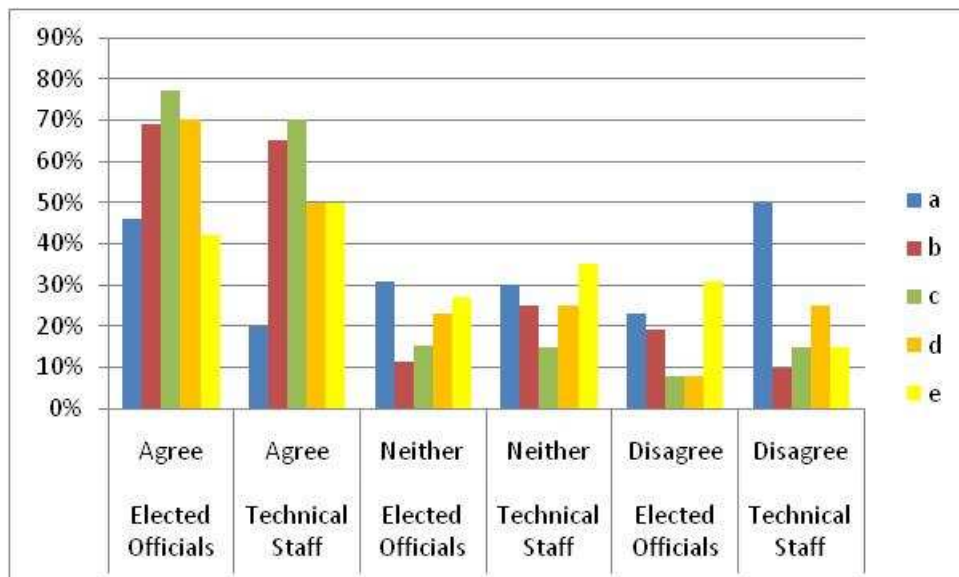
**Figure 48 Policy Making Style – By City**



### Results Sorted by Policy Maker Role

Technical staff were far more likely to disagree with the statement (a) *It is better to make small, incremental changes to existing policy rather than risk making mistakes with major changes to policy* than elected officials.

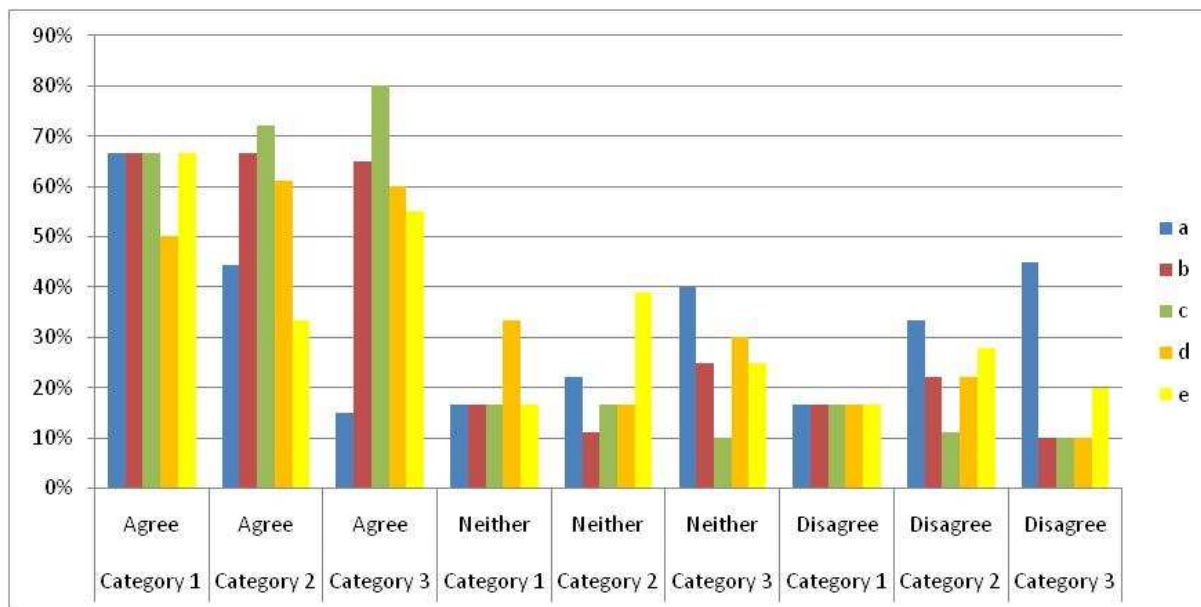
**Figure 49 Policy Making Style – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

Those in category 3 were more likely to disagree with the statement (a) *It is better to make small, incremental changes to existing policy rather than risk making mistakes with major changes to policy* than those in other categories. They were also more likely to agree with the statement (c) *Making small changes to existing policy, rather than introducing major new changes helps to ensure the political feasibility and acceptability of any proposed policy.*

**Figure 50 Policy Making Style – By Level of Concern about Peak Oil**



### 5.5.2.3 Influences on Transport Policy Content

#### Influential groups

Respondents were asked to rank a list of groups in terms of their level of influence on transport policy content on a scale of 1-9. Those groups that scored 1 or 2 were counted as being influential and are shown in the results in this section. (a) *Elected officials*, (b) *technical staff* and (g) *Central government* were the three most influential groups identified. (c) *Business/Industry*, (e) *the general public* and (h) *consultants* were also identified as being influential, but only by a minority. These results are presented in Figure 51.

The key for the graphs, for each of the influential groups is as follows:



a) *Elected officials (Councillors)*

b) *Council technical staff (transport planners/engineers)*

c) *Business/Industry*

d) *Environmental/Community groups*

e) *General public*

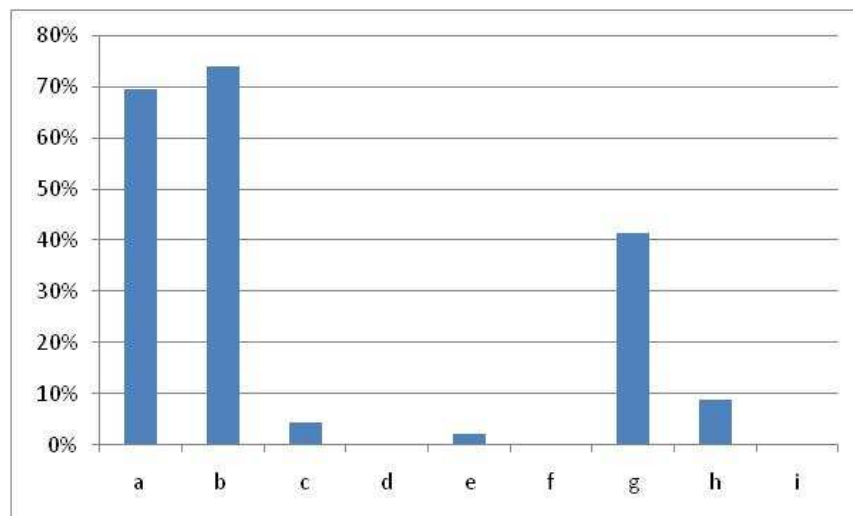
f) *Ratepayers/Residents Associations*

g) *Central government*

h) *Consultants*

i) *Academic researchers (e.g. University)*

**Figure 51 Influences on Transport Policy Content**

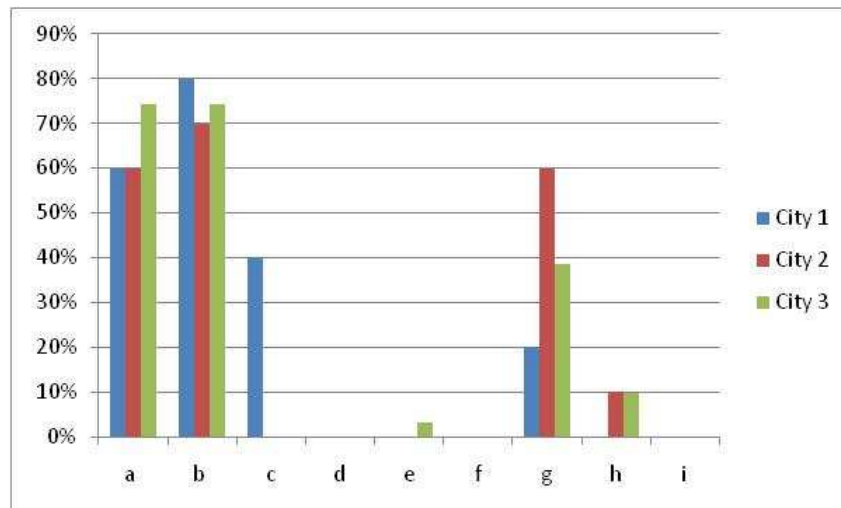


## Results Sorted By City

Across all three cities the majority considered *elected officials* and *council technical staff* to be most influential, followed by *Central government*.

In City 1 the (c) *business/industry* group was identified twice as having a score of “2” (second most influential group) and in cities 2 and 3 it was, on average, the 4th most influential group behind (a) *elected officials*, (b) *council technical staff* and (g) *Central government*. Those in city 2 considered (g) *Central government* to be more influential than those in the other cities.

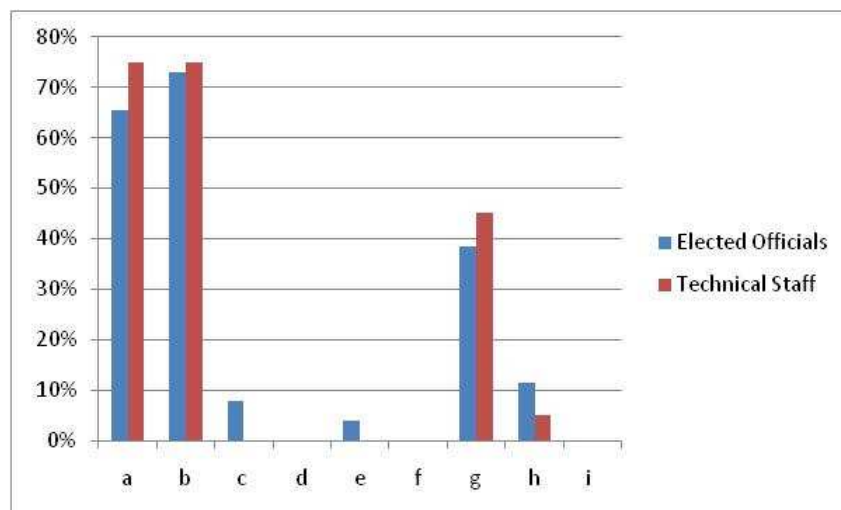
**Figure 52 Influences on Transport Policy Content – By City**



### Results Sorted by Policy Maker Role

Elected officials were more likely to consider (c) *business/industry* and the (e) *general public* to be influential, compared to technical staff. Elected officials and technical staff both considered their own colleagues to be influential.

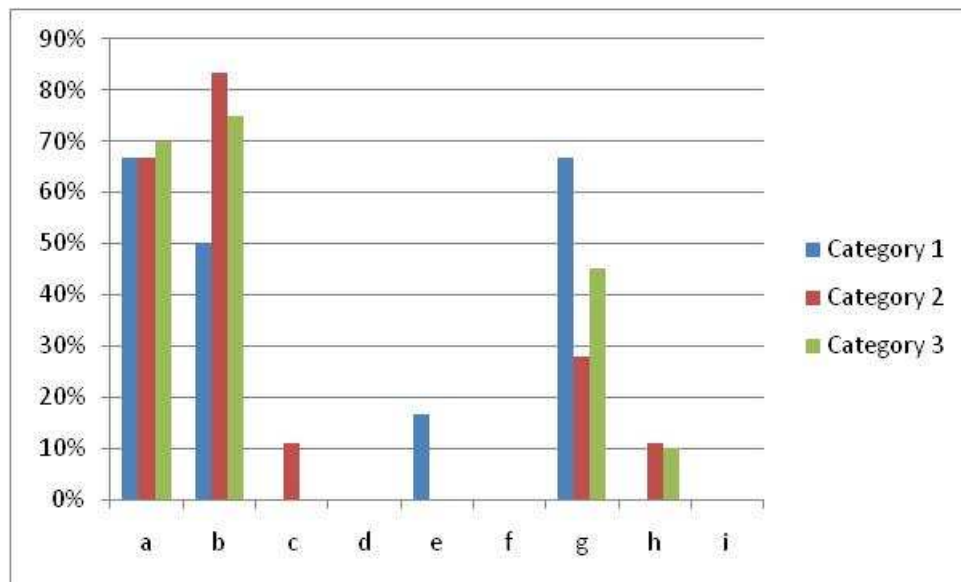
**Figure 53 Influences on Transport Policy Content – By Policy Making Role**



### Results Sorted by Level of Concern about Peak Oil

Those in category 1 were more likely to consider (g) *Central government* to be influential and less likely to consider (b) *technical staff* to be influential, compared to those in other categories.

**Figure 54 Influences on Transport Policy Content – By Level of Concern about Peak Oil**



### **How groups influence transport policy makers**

Respondents were asked to indicate how the top ranked groups, identified in the previous section, influenced transport policy decisions. Only the three most influential groups identified in the previous section have been included in the following section of results: elected officials, technical staff and Central government. Elected officials and Central government are more likely to influence transport policy decisions by *(h) controlling or influencing the funding for projects* whereas technical staff were more likely to influence transport policy decisions *(e) by providing technical advice to policy makers*. These were the two most popular methods of influence, with *(a) consultation*, *(b) and (c) meetings*, and *(d) via statutory powers* being the other, less likely methods.

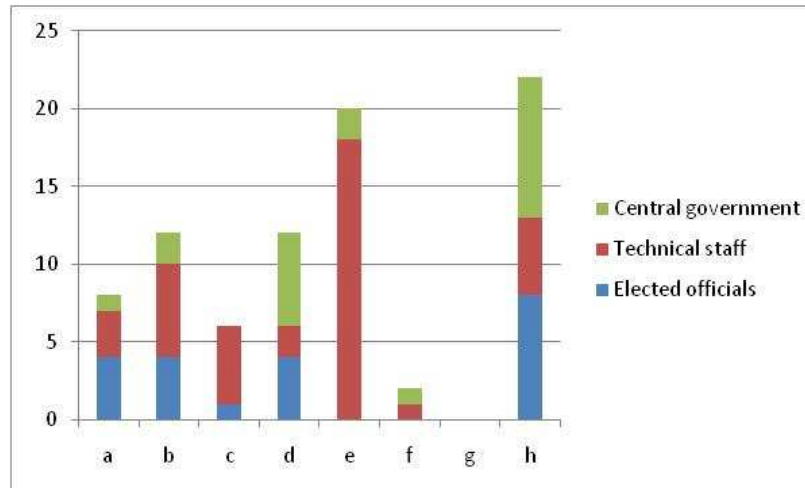
The key for the graphs, showing each of the methods of influence is as follows:

- a) Through the formal consultation process*
- b) Through formal meetings with policy makers*
- c) Through informal meetings with policy makers*
- d) Through statutory powers and/or requirements*
- e) By providing technical advice to policy makers*
- f) By lobbying policy makers to ensure their needs are met*

g) *By creating media interest in certain projects or issues*

h) *By controlling or influencing the funding for transport projects*

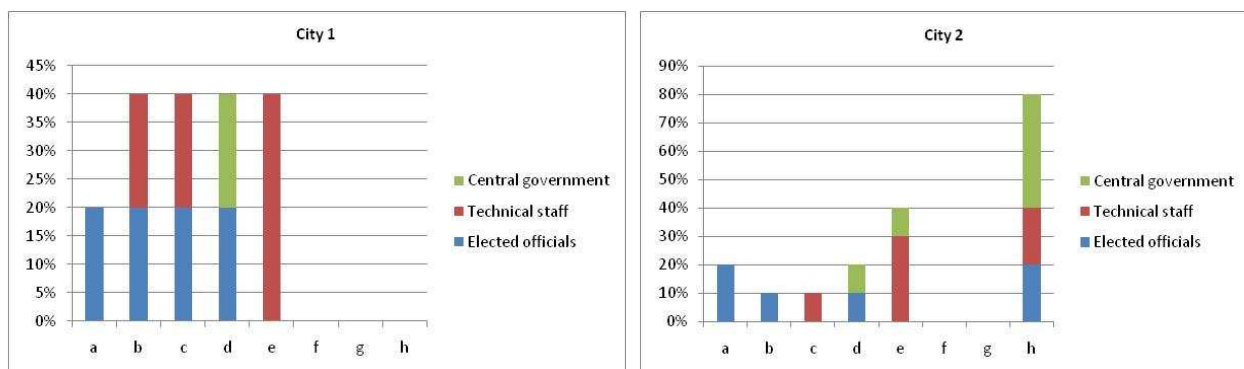
**Figure 55 Methods of Influencing Transport Policy Makers**

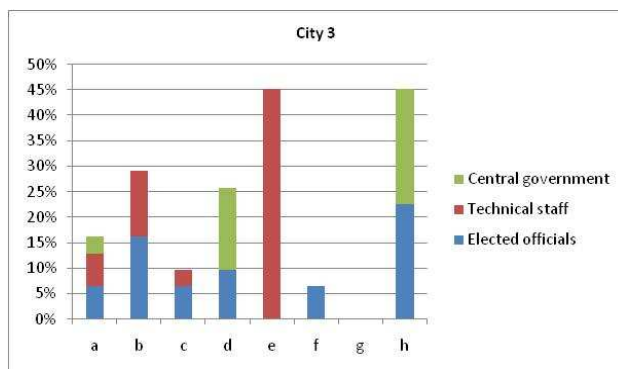


## Results Sorted By City

Respondents in City 2 and City 3 considered (g) *controlling or influencing the funding for transport projects* to be a predominant method of influence, in particular for elected officials and Central government. In City 1 this was not a popular method of influence. A popular method of influence in City 1 was (b) and (c) *formal and informal meetings* between elected officials, council technical staff and policy makers. In all three cities technical staff were influential by (e) *providing technical advice to policy makers*.

**Figure 56 Methods of Influencing Transport Policy Makers – By City**

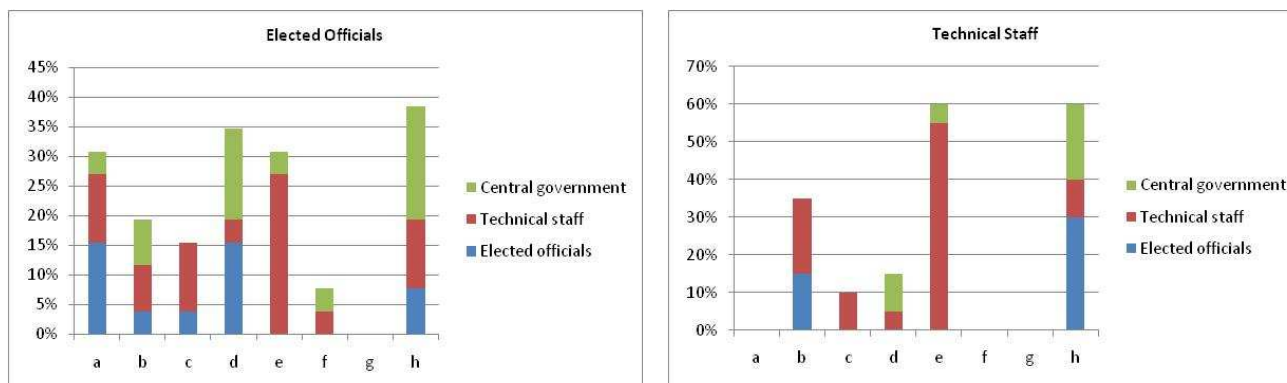




## Results Sorted by Policy Maker Role

Technical staff considered themselves to be influential by providing advice to policy makers. Compared to elected officials, they were far less likely to consider the (a) *consultation process*, (b) and (c) *meetings* and (d) *statutory powers* to be a regular method of influence. Technical staff also considered elected officials to be more likely to influence the decisions (h) *by controlling or influencing the funding for projects* than elected officials did themselves.

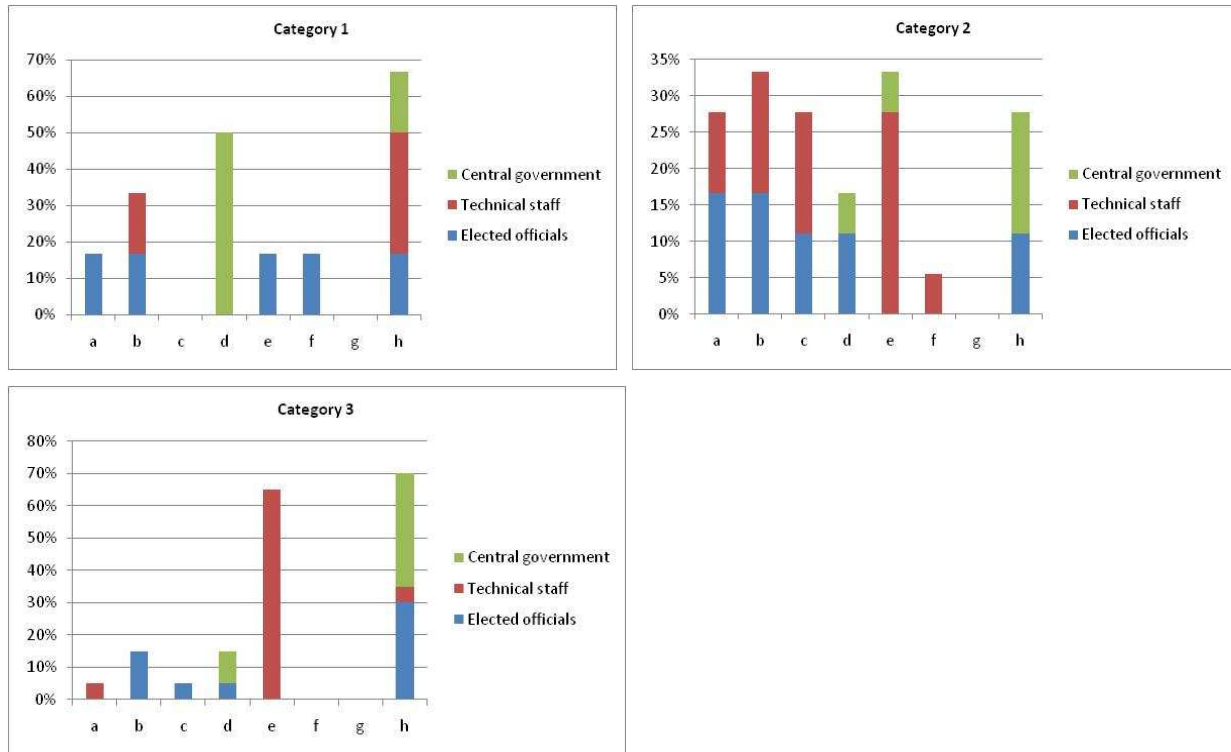
**Figure 57 Methods of Influencing Transport Policy Makers – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

Those in category 2 were more likely to consider the (a) *consultation process*, (b and c) *meetings* and (d) *statutory powers* to be a regular method of influence, compared to those in the other categories. Those in category 1 considered Central government were influential through their (d) *statutory powers*. Those in category 1 did not consider technical staff to be influential by (e) *providing advice to policy makers* (e), in comparison with those in the other categories; instead they were more likely to consider them to be influential by (h) *influencing funding for projects*.

**Figure 58 Methods of Influencing Transport Policy Makers – By Level of Concern about Peak Oil**



#### 5.5.2.4 Knowledge of, and Attitude Towards, Peak Oil

For the following sub-criteria several additional criteria were included in the survey to provide further information about transport policy makers' attitudes and actions towards peak oil. These additional criteria are listed below:

**Sub-criterion: Level of concern about peak oil**

**Sub-criterion: Level of priority placed on planning for peak oil**

Additional criterion: Why is planning for peak oil not a priority?

**Sub-criterion: Potential impacts of peak oil**

**Sub-criterion: Level of information about peak oil**

Additional criterion: Additional information needed about peak oil

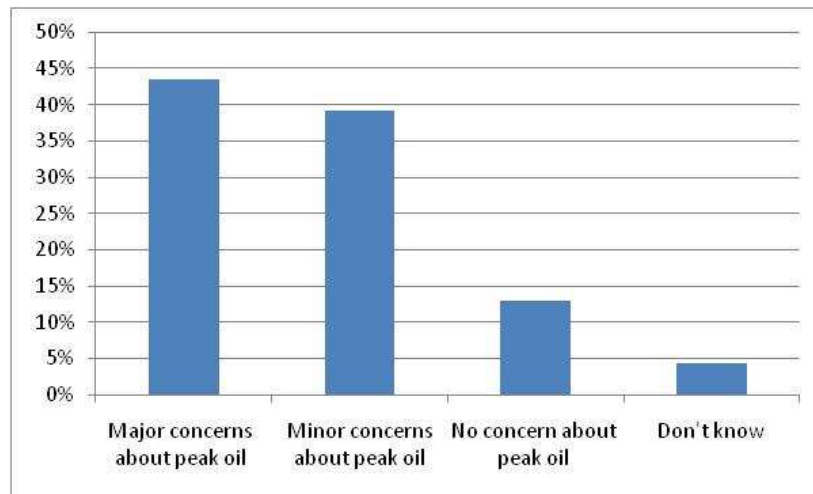
Additional criterion: Source of information about peak oil

Additional criterion: Knowledge of the peak oil subject

### Level of concern about peak oil

When asked about their level of concern about peak oil for their city in the future, the majority of respondents either had *major concerns* (43%) or *minor concerns* (39%). Only 13% had *no concern* and 4% *did not know*.

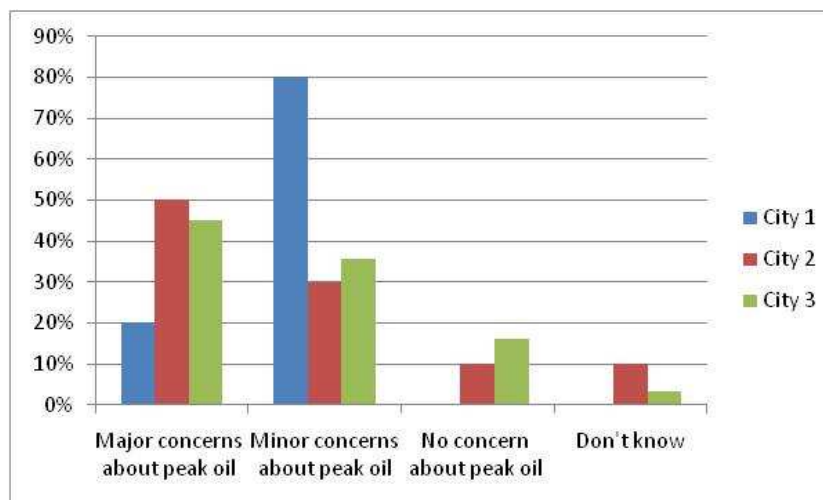
**Figure 59 Level of Concern about Peak Oil**



### **Results Sorted By City**

The results were spread fairly evenly for cities 2 and 3. The majority of respondents from city 1 have *minor concerns*.

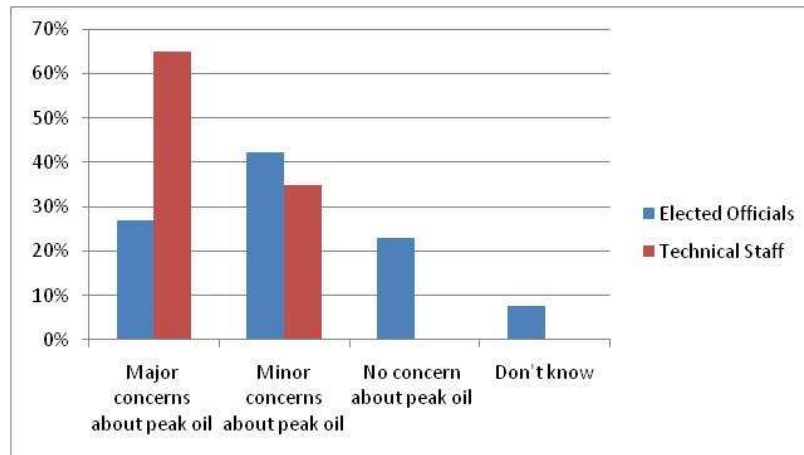
**Figure 60 Level of Concern about Peak Oil – By City**



## Results Sorted by Policy Maker Role

Technical staff were more likely to have *major concerns* about peak oil compared to elected officials.

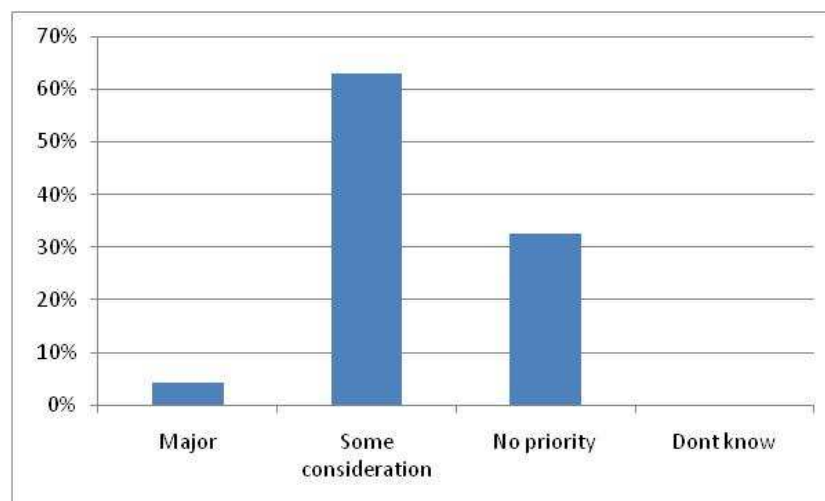
Figure 61 Level of Concern about Peak Oil – By Policy Making Role



## Level of priority placed on planning for peak oil

Respondents were asked to indicate what level of priority planning for peak oil was being given in their organisation. The majority (63%) said it is being given *some consideration* at present. Very few (2 people – 4%) said it was a *major priority*.

Figure 62 Level of Priority Placed on Planning for Peak Oil

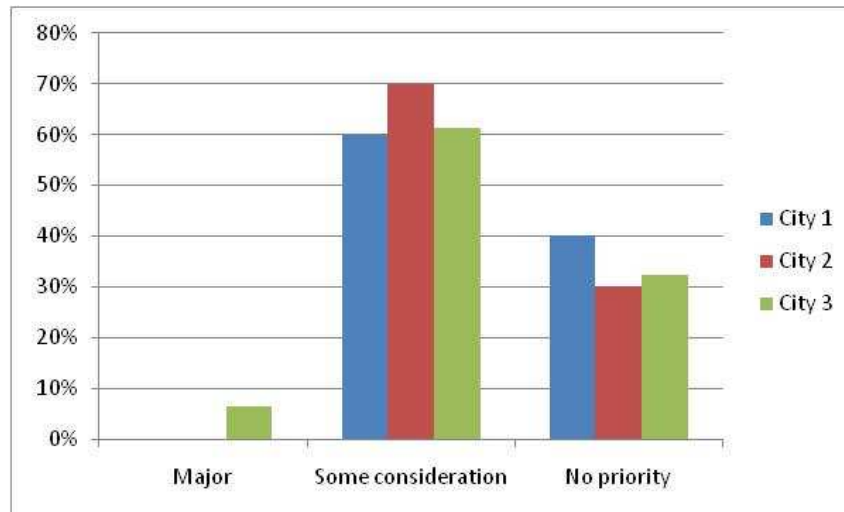




## Results Sorted By City

The results are similar across all three cities, with the 2 people who said peak oil planning was a *major priority* their organisation coming from city 3.

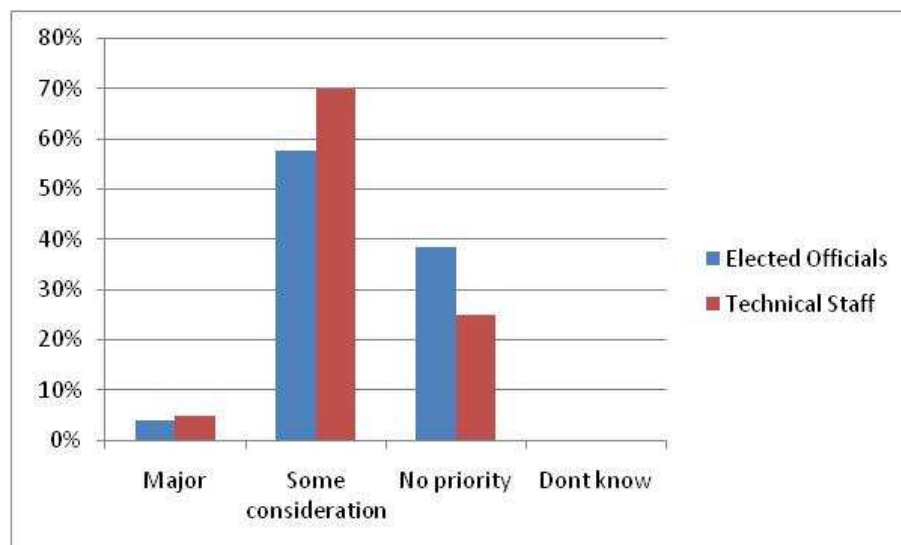
Figure 63 Level of Priority Placed on Planning for Peak Oil – By City



## Results Sorted by Policy Maker Role

Technical staff were more likely to consider that peak oil planning was being given *some consideration* and elected officials were more likely to consider that it was not being given any priority.

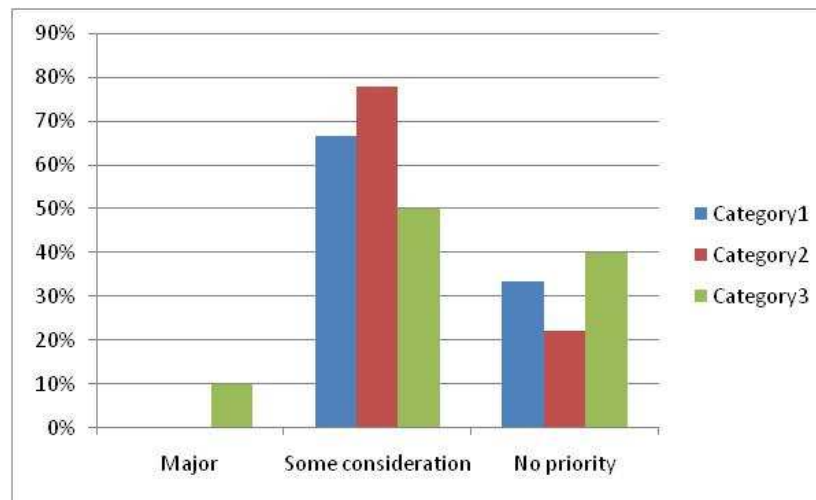
Figure 64 Level of Priority Placed on Planning for Peak Oil – By Policy Making Role



## Results Sorted by Level of Concern about Peak Oil

Those in category 2 were more likely to indicate that peak oil planning was being *given some consideration* at present. Those in category 3 were more likely to indicate it was being given *no priority*, however the two people who said it was a *major priority* were in category 3.

**Figure 65 Level of Priority Placed on Planning for Peak Oil – By Level of Concern about Peak Oil**



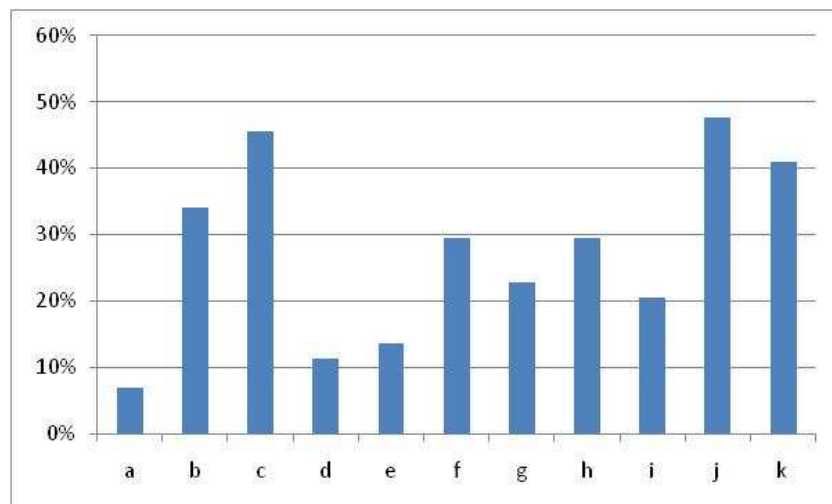
### Why is planning for peak oil not a priority?

As indicated in the previous section, respondents were asked whether or not planning for peak oil was a priority in their organisation. Those that indicated it was either given some consideration or no priority (44 people) were then asked for reasons why it was not a major priority, following the logical line of questioning described in Section 4.3.2.2. The most popular reasons were: (b) *because the science is inconclusive about the reality, timing and potential impacts of peak oil which makes it difficult to plan for*, (j) *because policy direction to plan for peak oil needs to be led from Central Government first*, (k) *because there is a lack of political will from within the organisation to plan for peak oil* and (c) *because alternative fuels and technologies such as bio-fuels or electric cars will replace the need for fossil fuels in transport*. Respondents were given an ‘other’ comment field, which was used to express a wide range of views, including several that indicated that the existing planning and development paradigm will be hard to change. These results are presented in Figure 66.

The key for the graphs, showing the reasons why planning for peak oil is not a priority in the organisation is as follows:

- a) *Because peak oil will not occur, there is plenty of cheap oil available in the world*
- b) *Because the science is inconclusive about the reality, timing and potential impacts of peak oil which makes it difficult to plan for*
- c) *Because alternative fuels and technologies such as bio-fuels or electric cars will replace the need for fossil fuels in transport*
- d) *Because there is plenty of time to plan in the future, peak oil will not occur for decades to come*
- e) *Because existing transport policies aimed at reducing greenhouse gas emissions will reduce the demand for fossil fuel consumption anyway*
- f) *Because transport policy aimed at significantly reducing fuel demand and consumption would be politically unacceptable*
- g) *Because transport policy aimed at significantly reducing fuel demand and consumption would be publicly unacceptable*
- h) *Because the transport budget is limited and peak oil planning is not a priority for funding*
- i) *Because policy aimed at significantly reducing fuel demand and consumption may be harmful to the economy*
- j) *Because policy direction to plan for peak oil needs to be led from Central Government first*
- k) *Because there is a lack of political will from within the organisation to plan for peak oil*

**Figure 66 Reasons for Not Prioritising Planning for Peak Oil**

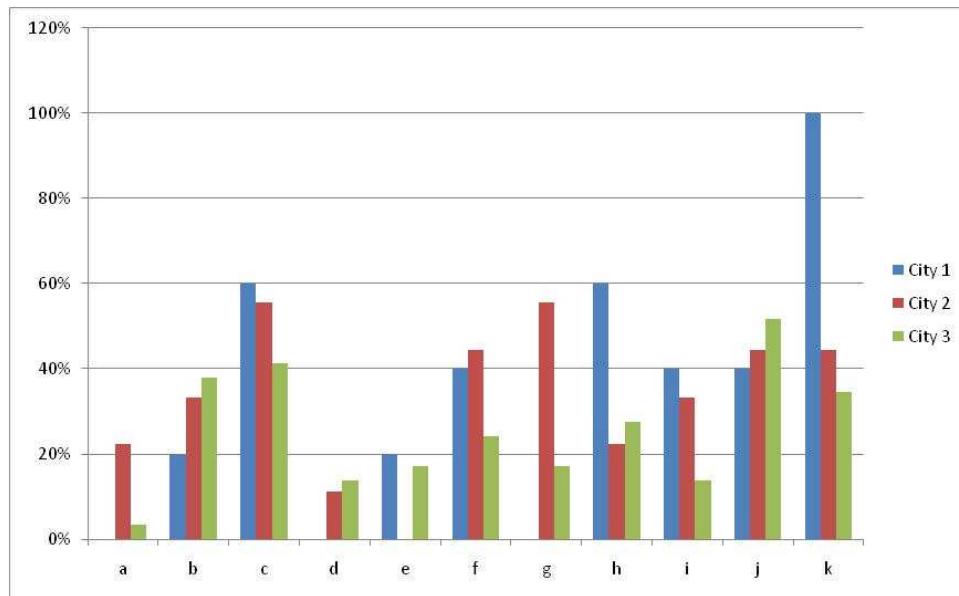


### Results Sorted By City

People in city 2 were more likely to consider policy that prioritised planning for peak oil to (g) *publicly unacceptable*. People in city 1 were far more likely to consider that there is a (k) *lack of*

political will from within the organisation and that the (h) transport budget is limited and peak oil planning is not a priority for funding. 20% of people in city 2 said planning for peak oil is not a priority (a) because peak oil will not occur, there is plenty of cheap oil available in the world.

**Figure 67 Reasons for Not Prioritising Planning for Peak Oil – By City**

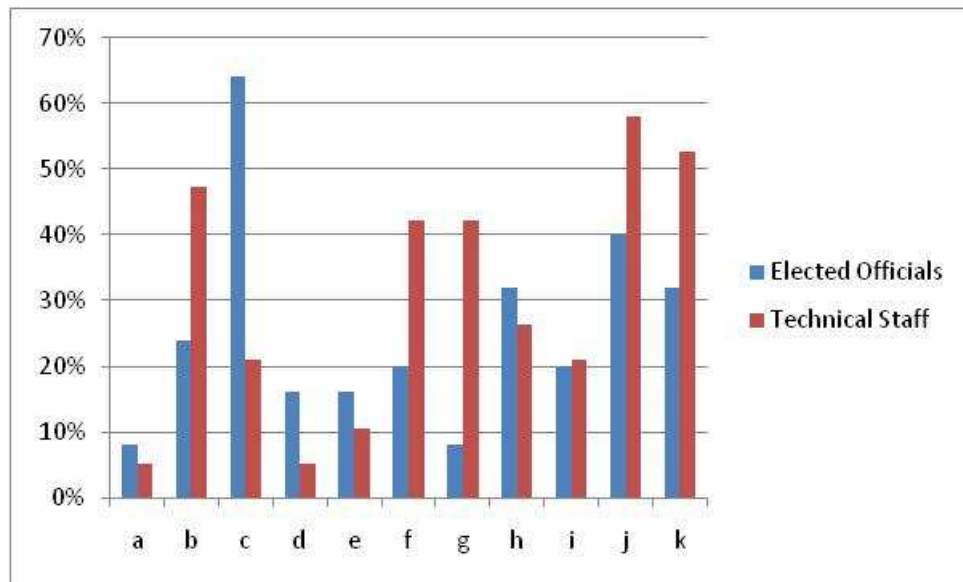


### Results Sorted by Policy Maker Role

Technical staff were far more likely than elected officials to give the following reasons for why planning for peak oil is not a priority: (b) because the science is inconclusive about the reality, timing and potential impacts of peak oil which makes it difficult to plan for, (f) because transport policy aimed at significantly reducing fuel demand and consumption would be politically unacceptable, (g) because transport policy aimed at significantly reducing fuel demand and consumption would be publicly unacceptable, (j) because policy direction to plan for peak oil needs to be led from Central Government first, and (k) because there is a lack of political will from within the organisation to plan for peak oil.

Elected officials were far more likely than technical staff to consider planning for peak oil is not a priority (c) because alternative fuels and technologies such as bio-fuels or electric cars will replace the need for fossil fuels in transport.

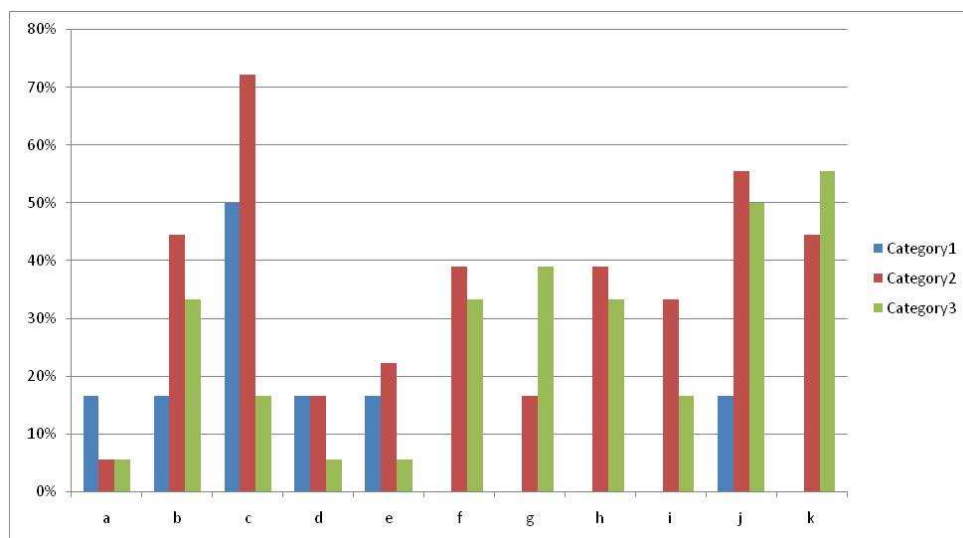
**Figure 68 Reasons for Not Prioritising Planning for Peak Oil – By Policy Making Role**



### Results Sorted by Level of Concern about Peak Oil

Those in category 1 and 2 were far more likely to consider planning for peak oil is not a priority (*c*) *because alternative fuels and technologies such as bio-fuels or electric cars will replace the need for fossil fuels in transport*. Those in category 1 were more likely to indicate that questions about the science behind peak oil were the reasons for not prioritising planning for peak oil, whereas those in category 2 and 3 considered it to be also due to other factors such as political and public acceptability issues.

**Figure 69 Reasons for Not Prioritising Planning for Peak Oil – By Level of Concern about Peak Oil**

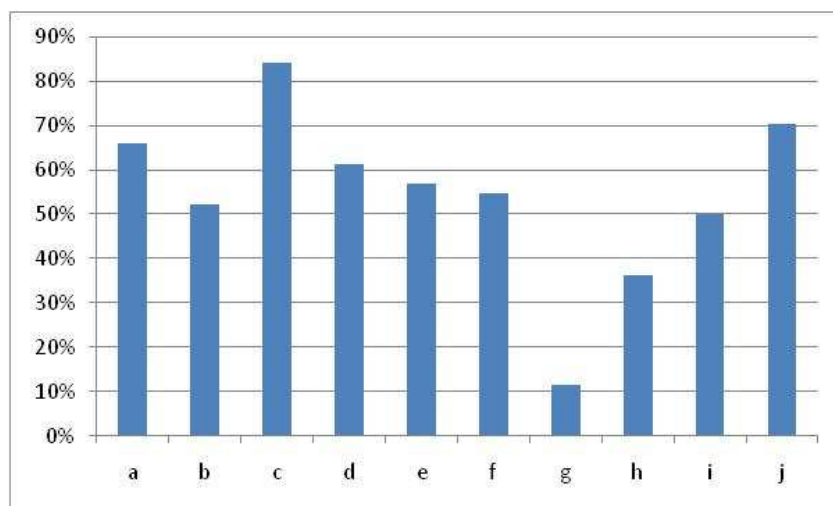


### **Potential impacts of peak oil**

There were a wide range of possible impacts of peak oil cited by people, with more than 50% considering them all possible; except for (g) *the industrial sector will collapse as it is too dependent on oil to continue to operate effectively* and (h) *multiple economic recessions*. These results are shown in Figure 70. The key to the graphs, showing the possible impacts of peak oil is as follows:

- a) *Increased food costs and disruption to food supplies due to fuel supply and costs*
- b) *Sudden fuel supply disruptions and price hikes, triggering periodic fuel supply emergencies*
- c) *Car use will decline and people will seek alternative transportation for their needs (e.g. public transport, cycling, telecommunications)*
- d) *People and businesses will need to relocate to be closer to each other and to transportation options; population will likely shift to city centres*
- e) *Transportation of freight will become more costly, likely leading to mode shifts from truck to rail and boat*
- f) *Maintenance of road infrastructure will be increasingly difficult because of loss of revenue (from fuel taxes) and reliance on asphalt*
- g) *The industrial sector will collapse as it is too dependent on oil to continue to operate effectively*
- h) *Multiple economic recessions*
- i) *Increasing conflicts over fuel resources*
- j) *Significant investment will be made in alternative fuels to mitigate any peak oil impacts*

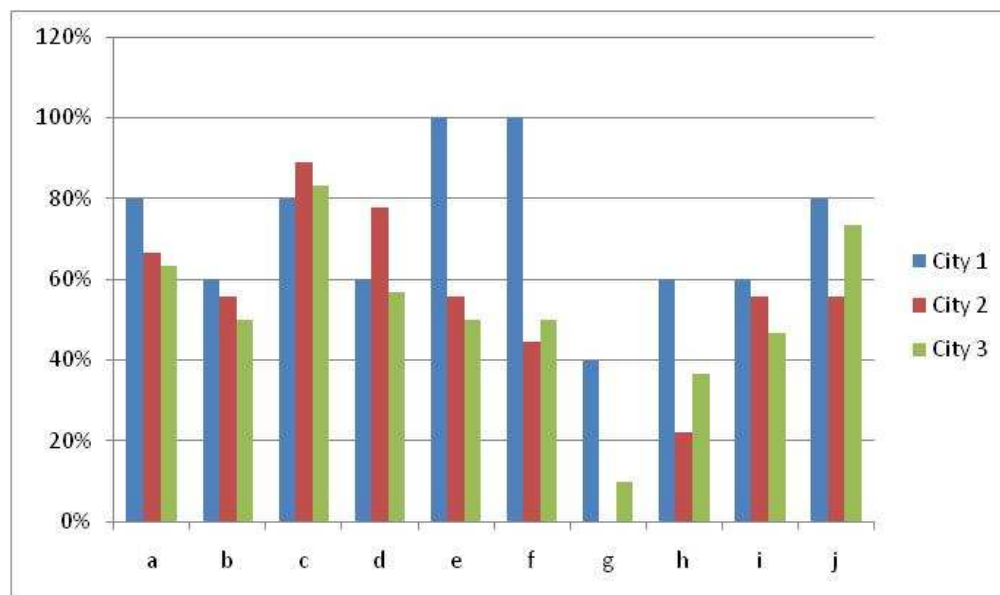
**Figure 70 Potential Impacts from Peak Oil**



## Results Sorted By City

The results were fairly similar across the three cities, apart from city 1 which was more likely to consider (e) *transportation of freight will become more costly, likely leading to mode shifts from truck to rail and boat*, (f) *maintenance of road infrastructure will be increasingly difficult because of loss of revenue (from fuel taxes) and reliance on asphalt*, (g) *the industrial sector will collapse as it is too dependent on oil to continue to operate effectively* and (h) *multiple economic recessions* to be possible impacts.

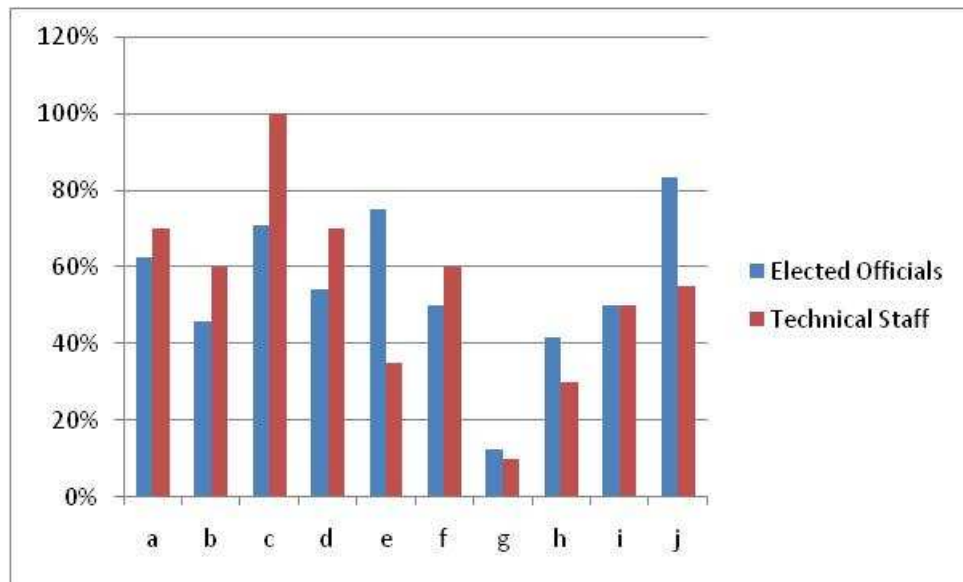
**Figure 71 Potential Impacts from Peak Oil – By City**



## Results Sorted by Policy Maker Role

Elected officials were more likely to consider (e) *transportation of freight will become more costly, likely leading to mode shifts from truck to rail and boat* and (j) *significant investment will be made in alternative fuels to mitigate any peak oil impacts* to be possible impacts. Technical staff were more likely to consider (c) *car use will decline and people will seek alternative transportation for their needs (e.g. public transport, cycling, telecommunications)* to be a possible impact.

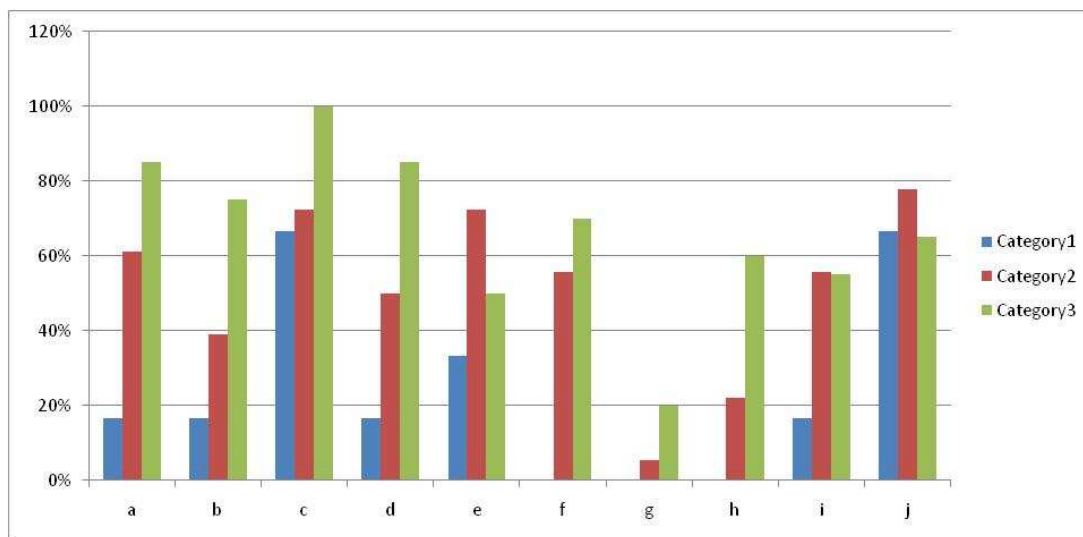
**Figure 72 Potential Impacts from Peak Oil – By Policy Making Role**



### Results Sorted by Level of Concern about Peak Oil

Across the board, those in category 3 were more likely to consider a wide range of possible impacts occurring. Those in category 1 were most likely to consider *(j) significant investment will be made in alternative fuels to mitigate any peak oil impacts* and *(c) car use will decline and people will seek alternative transportation for their needs (e.g. public transport, cycling, telecommunications)* to be possible impacts.

**Figure 73 Potential Impacts from Peak Oil – By Level of Concern about Peak Oil**

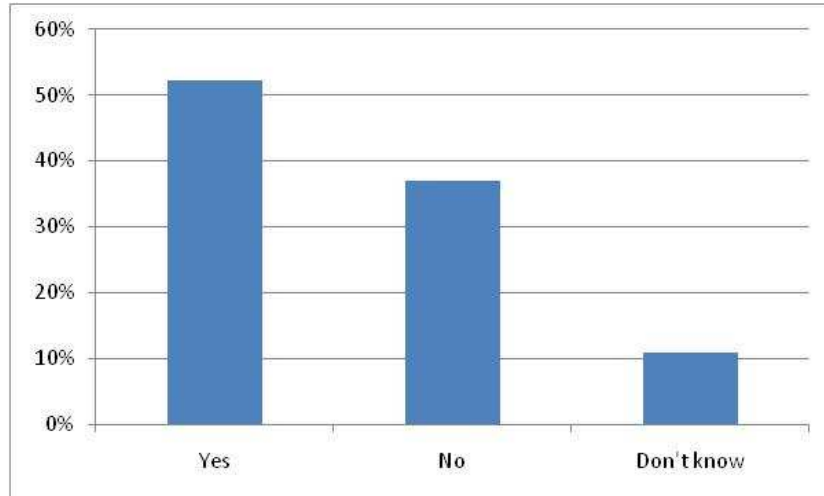




### **Level of information available**

Just over half (52%) of all respondents considered that they had adequate information about peak oil to make effective transport policy decisions.

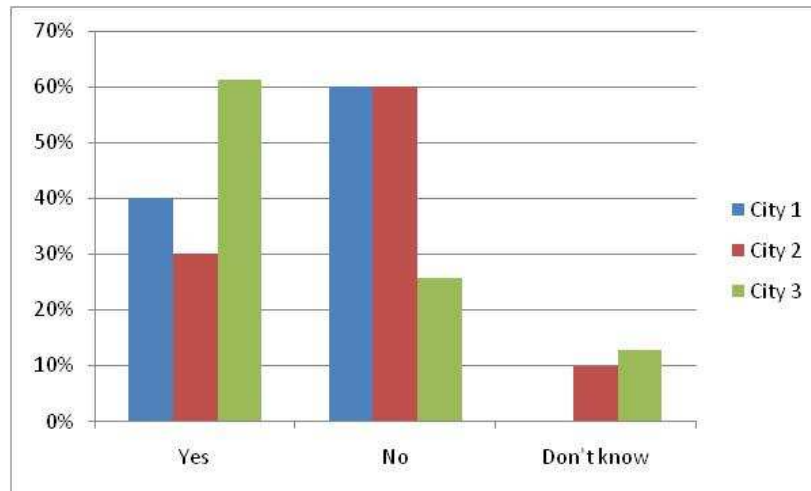
**Figure 74 Level of Information Available**



### **Results Sorted By City**

Respondents in city 1 and 2 were more likely to consider that they did not have adequate information about peak oil to plan effectively. 60% of those in city 3 said they had adequate information.

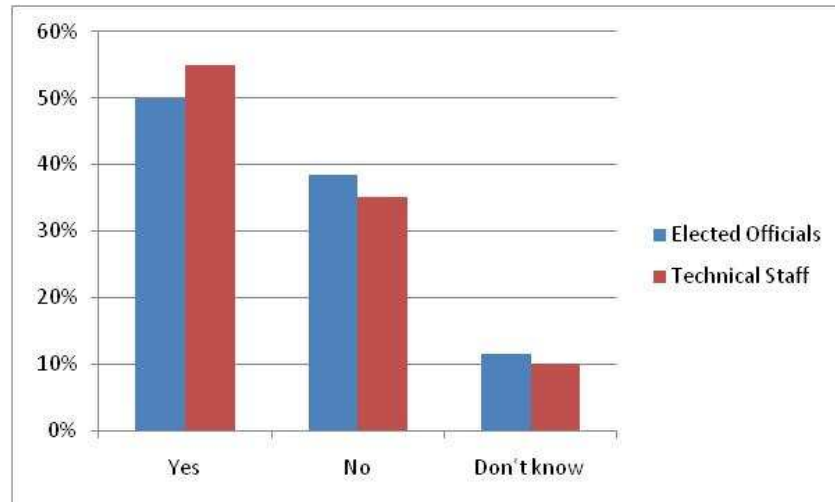
**Figure 75 Level of Information Available – By City**



## Results Sorted by Policy Maker Role

The results were relatively similar across the different policy maker roles.

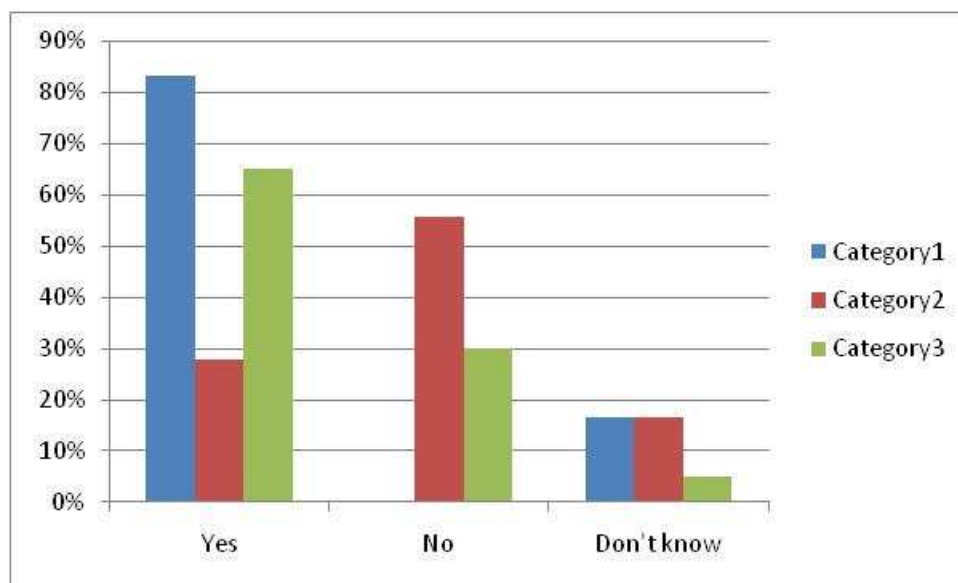
**Figure 76 Level of Information Available – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

Those in category 1 and 3 were more likely to consider that they did have adequate information to plan effectively for peak oil.

**Figure 77 Level of Information Available – By Level of Concern about Peak Oil**



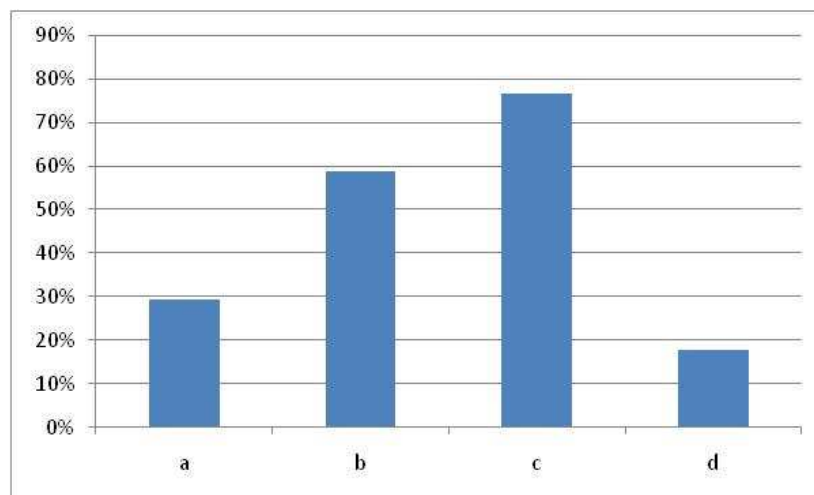
### Additional information needed about peak oil

Those who indicated that they did not have enough information to plan effectively for peak oil were asked what additional information they needed. The majority indicated they would like more information about (b) *the potential risks and impacts of a long term fuel supply shortage (on public, businesses etc)* and about (c) *how to prepare for and respond to the risks and impacts of a long term fuel supply shortage (e.g. potential policy options)*. The results are shown in Figure 78.

The key to the graphs, showing the additional information needed about peak oil is as follows:

- a) *Information about the possibility and likelihood of fuel supply shortages occurring (when it could occur, how big the shortage would be)*
- b) *Information about the potential risks and impacts of a long term fuel supply shortage (on public, businesses etc)*
- c) *Information about how to prepare for and respond to the risks and impacts of a long term fuel supply shortage (e.g. potential policy options)*
- d) *Other*

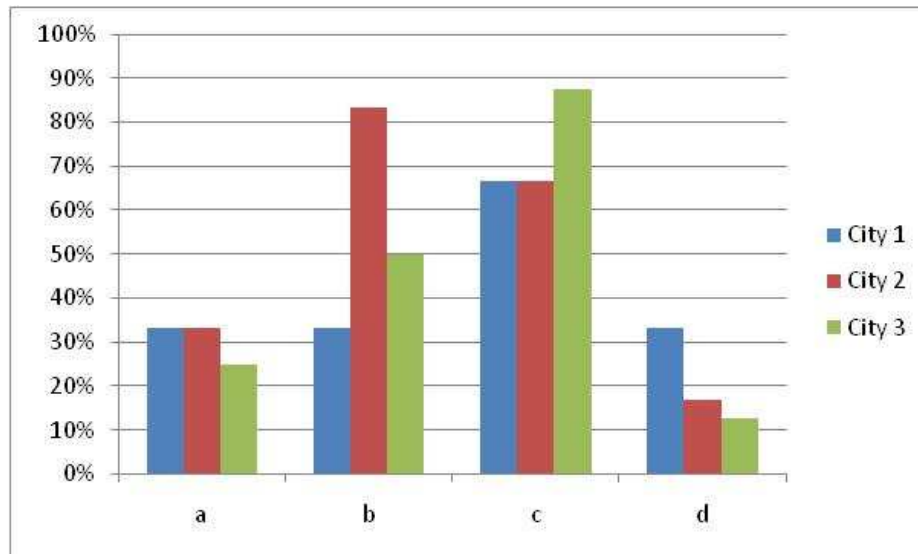
**Figure 78 Additional Information Needed about Peak Oil**



### **Results Sorted By City**

Those in city 2 were more likely to want information about (b) *the potential risks and impacts of a long term fuel supply shortage (on public, businesses etc)* and those in city 3 were more likely to want more information about (c) *how to prepare for and respond to the risks and impacts of a long term fuel supply shortage (e.g. potential policy options)* compared to the other cities.

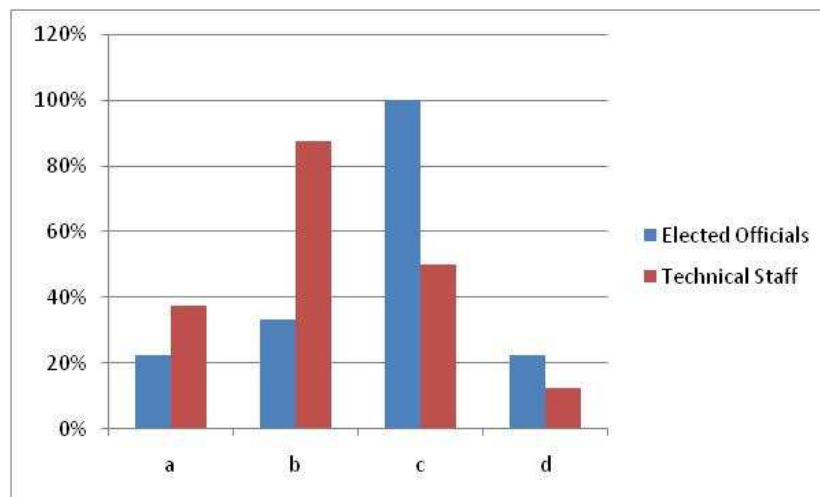
**Figure 79 Additional Information Needed about Peak Oil – By City**



### Results Sorted by Policy Maker Role

Technical staff were more likely to want information about (b) *the potential risks and impacts of a long term fuel supply shortage (on public, businesses etc)* and elected officials were more likely to want more information about (c) *how to prepare for and respond to the risks and impacts of a long term fuel supply shortage (e.g. potential policy options)*.

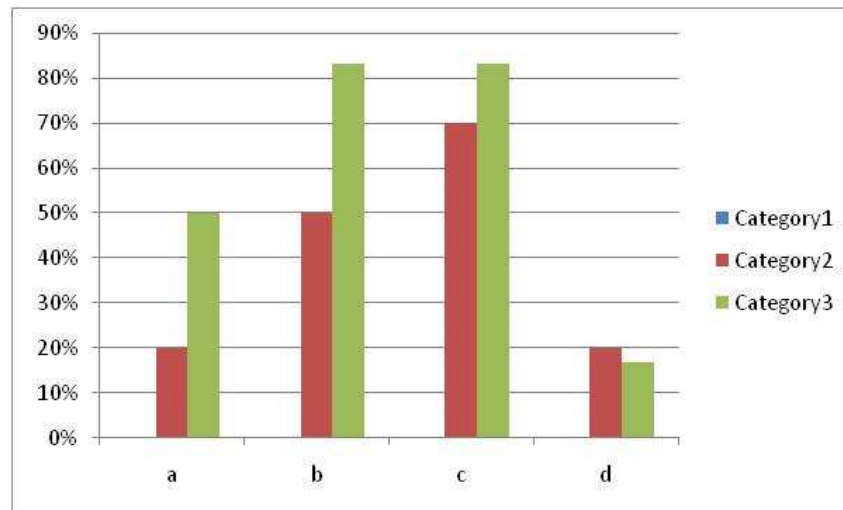
**Figure 80 Additional Information Needed about Peak Oil – By Policy Making Role**



## Results Sorted by Level of Concern about Peak Oil

No-one in category 3 considered they needed additional information about peak oil. Those in category 3 were more likely to need a wide variety of additional information compared to those in category 2.

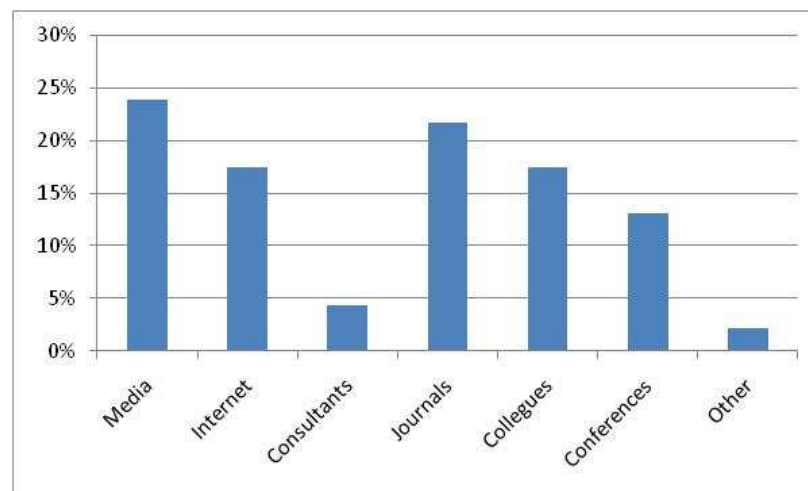
**Figure 81 Additional Information Needed about Peak Oil – By Level of Concern about Peak Oil**



## Source of information about peak oil

People obtain their information about peak oil from a wide range of sources.

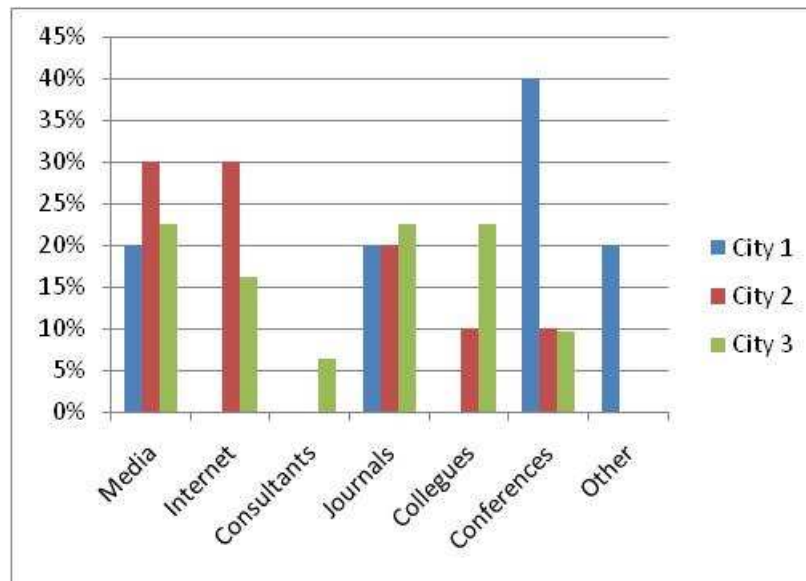
**Figure 82 Source of Information about Peak Oil**



## Results Sorted By City

The results did not vary greatly across the three cities, apart from people from city 1 being more likely to get their information from *conferences*, and not from the *internet* or *colleagues*.

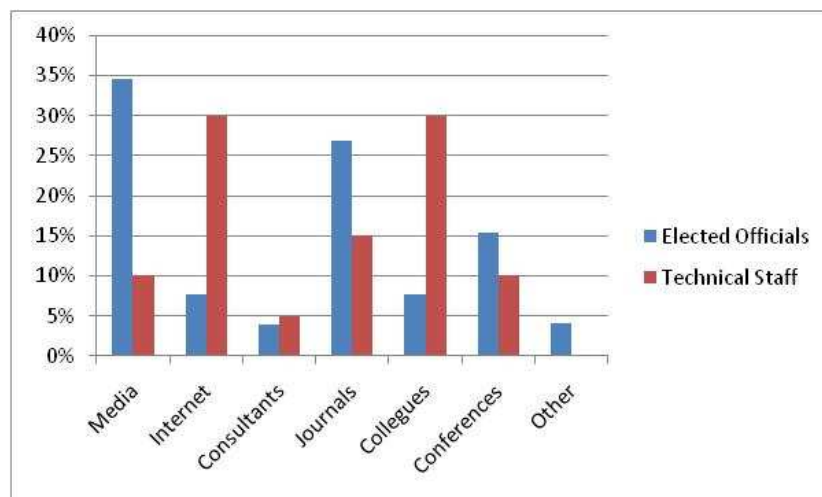
Figure 83 Source of Information about Peak Oil – By City



## Results Sorted by Policy Maker Role

Elected officials were more likely to get their information from the *media* and *journals*, whereas technical staff were more likely to get their information from the *internet* and *colleagues*.

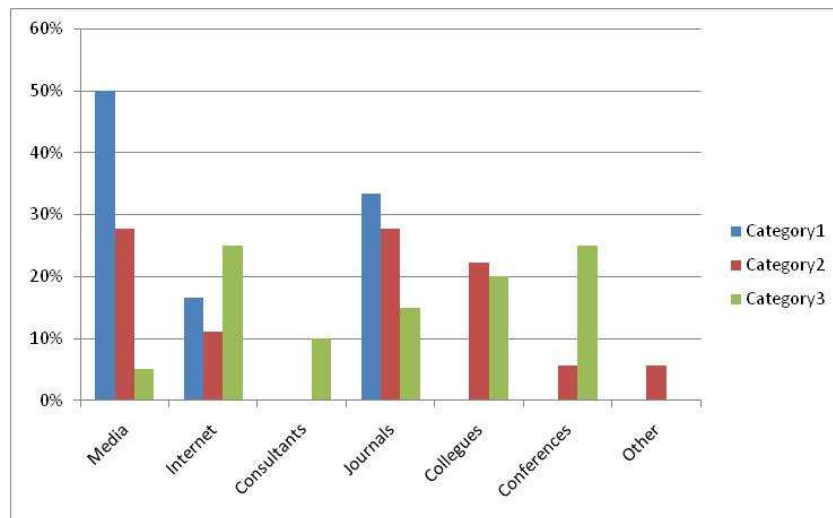
Figure 84 Source of Information about Peak Oil – By Policy Making Role



## Results Sorted by Level of Concern about Peak Oil

Those in category 1 were more likely to get their information from the *media*. Very few of those in category 3 get their information from the *media*, instead they get it from a wide range of sources.

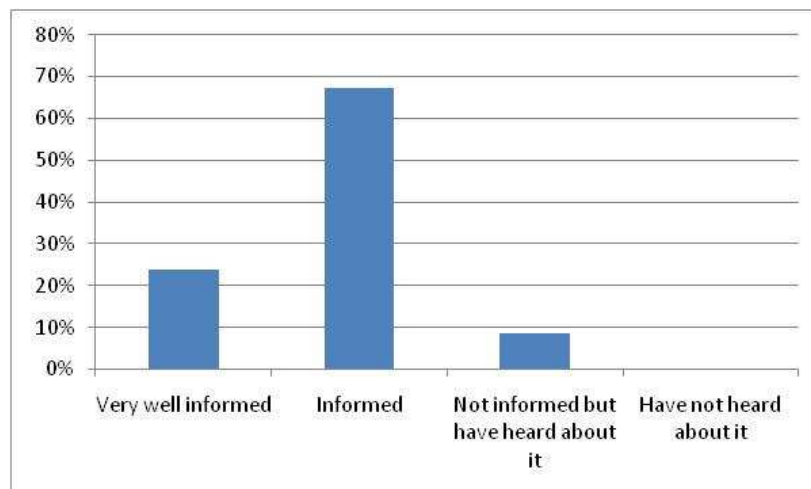
Figure 85 Source of Information about Peak Oil – By Level of Concern about Peak Oil



## Knowledge of the peak oil subject

Respondents were asked about their level of knowledge about the peak oil subject. The majority were either *informed* or *very well informed*.

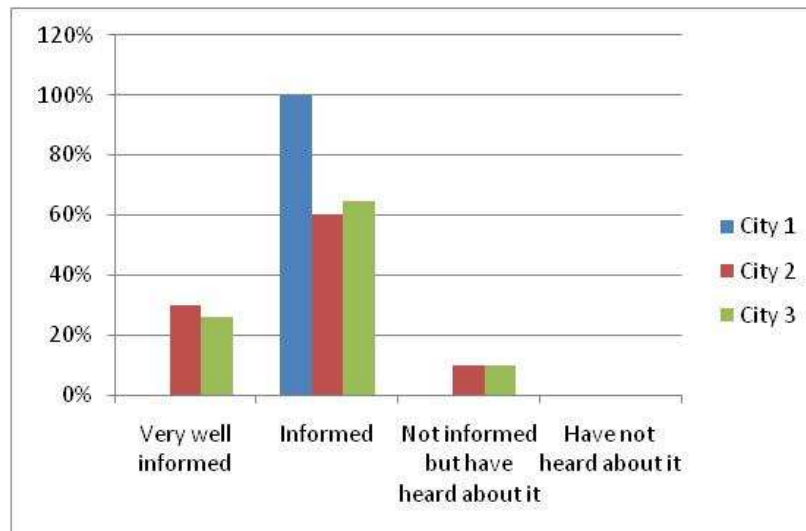
Figure 86 Knowledge of Peak Oil



## Results Sorted By City

The results did not differ greatly by city, apart from 100% of those in city 1 being *informed*.

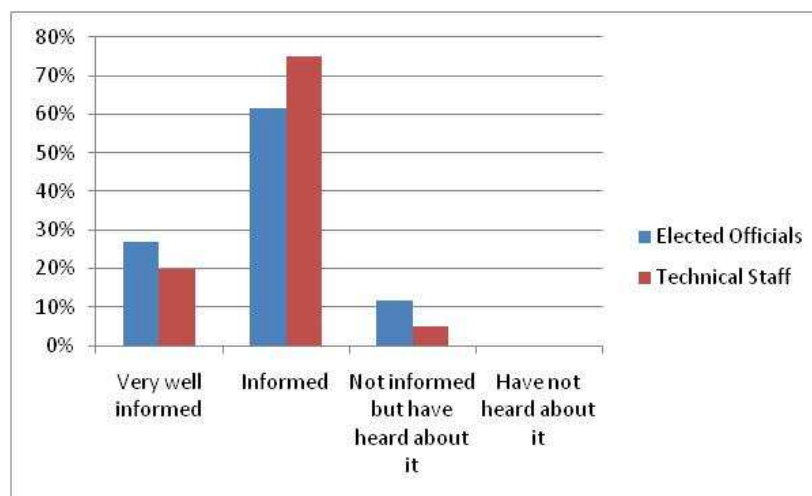
Figure 87 Knowledge of Peak Oil - By City



## Results Sorted by Policy Maker Role

Elected officials were slightly more likely to consider themselves *very well informed* compared to technical staff. Elected officials were also slightly more likely to be *not well informed*.

Figure 88 Knowledge of Peak Oil - By Policy Maker Role

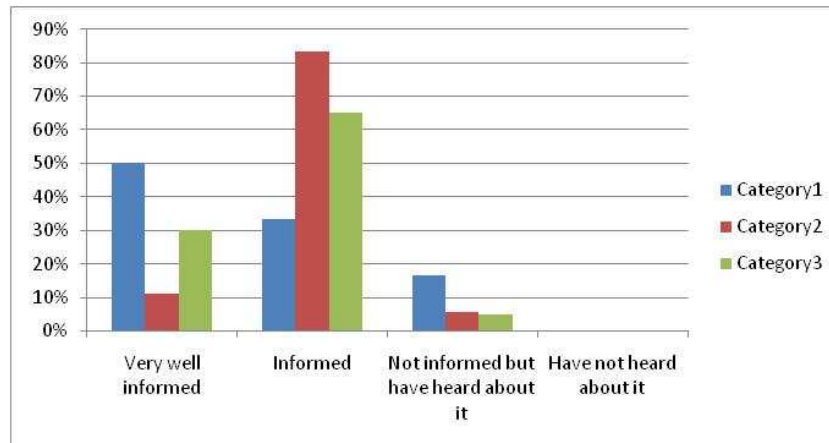




## Results Sorted by Level of Concern about Peak Oil

50% of those in category 1 considered themselves to be *very well informed*. More than 80% of those in category 2 considered themselves to be *informed*.

**Figure 89 Knowledge of Peak Oil - By Level of Concern about Peak Oil**



## 6 Results Analysis and Discussion

The following sections analyse the results obtained for the online survey and interviews (as described in Section 0), as well as the location factors (as described in Section 5.3), and assess which of the five main criteria and their sub-criteria are influential in determining how a transport policy maker makes decisions about planning for peak oil.

The results indicate that there is a relationship between the level of planning for peak oil and:

- Location factors: The population density of the city and transport and activity systems;
- Personal factors: The age of the majority of elected officials;
- Beliefs about transport policy: Investment in sustainable transport;
- Beliefs about transport policy: The tendency to want to carry out incremental policy making styles in order to gain public and political support for policies;
- Beliefs about transport policy: The role of economic growth;
- Influential actors: Central government and funding, road lobby, local businesses and general public;
- Knowledge of and attitude towards peak oil: The level of concern about peak oil amongst the majority of elected officials and conflicting views of technical staff;
- Knowledge of and attitude towards peak oil: The belief that alternative fuels and new technologies will mitigate any peak oil impacts amongst elected officials and technical staff; and
- Knowledge of and attitude towards peak oil: Level of information available, level of knowledge and source of information.

These relationships indicate that these criteria and sub-criteria are influential in determining how transport policy makers perceive, and act towards, peak oil. The relationships are described in the sections below.

## 6.1 Location Factors

It was expected that there would be differences in the level of planning for peak oil in each of the three case study cities as a result of location factors. The population density of the city is an important factor and the results show that a lower population density results in a lower priority placed on planning for peak oil.

The population density of city 1, along with other factors such as a rural activity system and a simple transport system based on the private vehicle are all possible reasons why planning for peak oil is not prioritised. The ability for city 1 to implement planning for peak oil using traditional methods that aim to reduce reliance on the private vehicle (e.g. public transport) would be difficult and costly given the existing budget and physical constraints. A number of interviewees indicated that they had more pressing issues to deal with besides peak oil and several stated “we are doing all we can just to maintain the status quo [in terms of the level of service on the roads] in order to meet the needs of the residents and farming community in the district”. Under such circumstances, planning for peak oil is not able to be assigned a high priority.

Many of New Zealand’s local councils have characteristics like city 1, and this is reflected in the government’s response to questions as to why planning for peak oil is not a priority in New Zealand: “the reality is that given our population density and history of the development of our transport system, private vehicles will continue to be the method by which most people will travel within the foreseeable future, and our investments need to reflect that reality” (Joyce, 2010, p.1).

In city 3, where the population densities are much higher and the transport system and activity systems are urban and far more complex, pressures such as congestion and pollution are strong drivers for implementing sustainable transport solutions such as public transport, walking and cycling. With congestion being linked to negative impacts on the economy, incentives to reduce congestion in city 3 are high in the presence of the economic growth paradigm. As a result planning for peak oil can happen as a by-product of the aims of reducing congestion and protecting the environment. City 2 has similar characteristics to city 3 however the congestion pressures are less significant, resulting in less urgency to introduce travel demand management measures and public transport services.

In city 2 and 3 the rating base is far larger than in city 1, resulting in more money available from local rates for the transport budget and projects that assist towards peak oil planning. However, in both cities concerns were expressed about the amount allocated in transport budgets for sustainable transport modes such as walking, cycling and public transport.

## **6.2 Personal Factors**

The results showed that technical staff and young people have more concern for peak oil than older people and elected officials. As a group, the elected officials were older than the technical staff group. It appears that older people in general may be less inclined to have concerns about peak oil, a statistic that is supported by market research (Research First, 2010) carried out in Canterbury that looked at transport issues out to 2041. When asked to rank future priorities for the transport system the research found that older people (55+) were less likely to give “reduces reliance on oil” a high ranking. This has important implications for peak oil planning if elected officials, who finalise policy, are generally in the older age bracket.

The results also showed differences between different organisations, with a higher percentage of those from regional councils more likely to have major concerns about peak oil than those from local councils. However, the very small sample size for regional council staff means that this cannot be taken to accurately represent the position of regional and local council staff respectively.

Differences between elected officials and technical staff within an organisation are crucial to understanding policy outcomes. The role of technical staff is to advise the elected officials, however it is elected officials who make the final decisions. The differences of opinion held by different policy maker roles are described in the following sections.

## **6.3 Beliefs about transport policy**

### ***6.3.1 Barriers to investment in sustainable transport policy***

The majority of respondents consider the amount of investment in sustainable transport solutions to be inadequate. This was a strong view of the people in city 2, technical staff and those with major concerns about peak oil.

As was to be expected, people with little or no concern for peak oil were more likely to consider that the existing amount of investment in sustainable transport is adequate. If we also consider that many elected officials fit into this category, and that technical staff consider elected officials influence the transport decision process by controlling the funding for projects, this could suggest that getting elected officials to direct funding towards investment in sustainable transport could be difficult.

In terms of what people consider to be the priority areas for investment, in the cities with higher population densities (city 2 and 3) there was a clear desire for investment in a wide range of sustainable policies such as improving bus services, and facilities for pedestrians and cyclists. In city 1, which has different location factors, the priority areas were road and pavement maintenance, and safety.

Elected officials considered a wide range of areas to be a priority for investment, whereas 50% or more of technical staff indicated that travel demand management, bus services and facilities for pedestrians or cyclists to be priorities. This would seem to indicate that elected officials have a wide range of views on how money should be spent on the transport system. Again, considering elected officials finalise policy, it could be difficult to get a majority backing of any one project if they have differing opinions on where money should be spent.

Interestingly though, a lack of political support from within the organisation was not cited as a barrier to implementing sustainable transport policy. Instead the most commonly cited barriers were lack of funding at local level and at Central government level as well as a lack of political support from Central government.

Individuals in city 2 were far more likely to cite a lack of public acceptance of sustainable policies, as well as concerns about policies having a negative impact on local business and the economy, as being barriers compared to the other cities. This would suggest that there could be localised problems which have been experienced following attempts to implement sustainable policies in city 2. Several interviewees from city 2 also mentioned that moves to provide incentives to using public transport, such as bus lanes, which reduce parking availability, are often met with resistance.

### **6.3.2 *Economic growth paradigm***

The results show that those who had a higher level of concern about peak oil placed a lower priority on economic growth and a higher priority on environmental sustainability compared to those with little or no concern about peak oil. This would suggest that policy makers who place importance on economic growth are more likely to not be concerned about peak oil. This is reflected by the elected officials, who placed slightly more importance on economic growth, and who, as a group, were less concerned about peak oil.

The majority of respondents agreed that economic growth can be achieved with a sustainable transport system that reduces dependence on fossil fuels and protects the environment, and that the current government's policy of 'roads of national significance' is not good for long term sustainability objectives. Approximately 10% of people, all elected officials, disagreed with both of these statements. Disagreement with the first statement could indicate that they consider economic growth and sustainability to be mutually exclusive. However to also disagree with the second statement would seem to indicate the opposite: that the policy of 'roads of national significance', designed to facilitate economic growth, does not inhibit sustainability, suggesting that economic growth and sustainability are compatible. It is presumed that these people are in fact defending the policy of 'roads of national significance', rather than indicating that it promotes sustainability.

Almost half of the respondents suggested that sustainable transport policies were difficult to implement because of fears from within the organisation about negative impacts on local business and the economy. This result would suggest that the desire for economic growth is a relatively dominant paradigm within transport policy making. However, the majority of transport policy makers consider that economic growth can be achieved alongside a more sustainable transport system, suggesting that economic growth should not come at any cost.

### **6.3.3 *Incrementalism in policy making***

Technical staff were far more likely than elected officials to consider a lack of political and public acceptability of policies related to peak oil planning, and a lack of political will within the organisation, to be the reasons planning for peak oil is not prioritised. Almost a third of technical officials clearly stated in the interviews that they considered that elected officials did not have

any concerns about peak oil. Fifty percent of all respondents said that politicians were too short sighted and focussed on localised issues to deal with wider, long term issues such as peak oil. These comments were made during the interviews in relation to conversations about the three year election cycle. Some suggested that the three year election cycle does not enable politicians enough time to get involved with more long term strategic thinking; instead they are forced to look towards 'narrower' localised issues in order to build their reputation and assist with public popularity.

These results would indicate that political aspects of transport policy making can be barriers to planning for peak oil.

The observed level of agreement with an incrementalist policy making style can provide an insight into how the political aspects of transport policy making influence transport policy makers. The results show that the majority of policy makers, both technical staff and elected officials, agree that *(a) there are a wide range of stakeholders to satisfy, therefore compromises need to be made to ensure broad support for policies, (b) making small changes to existing policy, rather than introducing major new changes helps to ensure the political feasibility and acceptability of any proposed policy, and (c) the general public are usually reluctant to accept major changes to policy and tend to support minor policy changes that are more familiar and have the least uncertainty.* Agreement with these statements indicates a relatively high level of agreement with an incrementalist style of policy making.

Given the dominance of the private vehicle in New Zealand, it is presumed that transport policy makers anticipate any policy that severely inhibits private vehicle use to come up against public and political opposition. In these circumstances, a high level of agreement with an incrementalist style of policy making is unlikely to see policy that goes against the perceived desires of the public being implemented. This in turn will make it difficult to introduce the dramatic change needed should peak oil eventuate: away from the status quo of transport by private vehicle, towards a system that is more resilient to disruptions in fossil fuel supplies.

Surprisingly, despite the prevalence of agreement with incremental policy making, almost 50% of respondents agreed that *major changes to policy should be made regardless of lack of public support, if such changes are necessary for the long term greater good of the public.* This would suggest that if policy makers can agree that prioritising planning for peak oil is in the interests of

the longer term greater good of the public, then policies could be introduced to that effect. However, for such agreement to take place, it would require a dramatic shift in opinion away from the current thinking about transport planning and policy making in New Zealand that focuses on the private vehicle (Lee *et al*, 2009).

## **6.4 Influential actors**

### **6.4.1 Central government**

A lack of funding from Central government was a dominant theme to emerge from the research. The majority of respondents considered the amount of investment in sustainable transport to be inadequate in their city and that much of the responsibility for investment lies with the Central government. In the interviews, the most common comment was that Central government should provide more funding for public transport, walking and cycling. When asked “what are the barriers to implementing sustainable transport policies in your city?”, transport policy makers across all three cities clearly identified firstly a lack of funding from Central government, and secondly a lack of political support from Central government. When asked to rank challenges for the future, funding and affordability was identified as by far the most significant challenge. The Auckland Region’s RLTS reflects the concerns of those surveyed (ARTC, 2010). With councils reluctant to increase rates during tough economic times to fund sustainable transport projects, this makes prioritising planning for peak oil very difficult for both local and regional governments.

It is also clear from the results that not only is Central government influential through funding but also in terms of the strategic direction transport policy takes at the local and regional level. When asked for reasons why planning for peak oil was not a priority, the most common answer was that policy direction to plan for peak oil needs to be led from Central government first. This was also reflected by several interviewees stating that the signals from Central government do not encourage planning for peak oil. The current signals from Central government indicate that peak oil is not an issue worth prioritising (Joyce, 2009).



#### **6.4.2 Other influential actors**

Many participants considered negative impacts on local business and industry to be a barrier to implementing sustainable transport policies. Technical staff were more likely to hold this view compared to elected officials. This would suggest that local businesses are in fact influential, despite not being identified as an influential group in the survey responses. In city 2 and 3 several interviewees noted that there were often very vocal business groups, for example groups concerned about reduced revenue as a result of a loss of parking due to implementation of bus lanes.

Interviewees were asked whom they considered to be influential from outside the organisation. A few mentioned the influential role of the roading lobby, in particular the Road Transport Forum, stating that they were far more organized, vocal and had better funding than other groups such as environmental or community groups. The political links between the Road Transport Forum and central government were also highlighted, with the leader of the Road Transport Forum being a former Minister and member of the National Party. These political links could partly explain why the current government (National Party led) favours funding for State Highways ('roads of national significance') over other activity classes.

The results highlight the fact that political and public acceptability of policies is important and a lack of such acceptability can be a barrier to implementing policies which plan for peak oil. The fact that "public acceptability drives political acceptability" (Banister, 2008, p.79) would suggest that the general public (voters) are also an influential group when it comes to developing and implementing transport policies.

#### **6.5 Knowledge of, and attitude towards, peak oil**

The attitude of technical staff towards peak oil will impact on the level of planning for peak oil as they provide advice to the elected officials; and as it is elected officials that finalise all transport policy, their level of concern about peak oil will also influence the level of planning for peak oil. However, because elected officials have the final say on what policies are implemented, it is likely that their attitude towards peak oil will have *more* of an influence than that of the technical staff.

The majority of elected officials had either minor or no concerns about peak oil and only 27% had a major level of concern about peak oil (category 3). This is reflected in the priority placed on planning for peak oil within each of the city's policy documents, and the fact that 96% of all policy makers cite that planning for peak oil is either being given some consideration or none at all at their organisation. These results confirm that the level of concern about peak oil amongst elected officials is correlated to the policy outcomes.

In city 1, none of those who participated in the research had major concerns about peak oil, and this is reflected by a low/medium ranking for peak oil planning in existing policy documents. Respondents in city 1 cited a lack of political will as well as a limited transport budget as the main reasons why planning for peak oil was not a priority.

In city 2 and 3, where there is more emphasis on peak oil in policy documents, there are more people in category 3 who are perhaps able to partly influence some of the policy decisions. As a result, cities 2 and 3 had a ranking of medium/high for peak oil planning in existing policy documents. It is likely that in city 2 and 3 other factors, such as congestion, provide a significant incentive to introduce sustainable transport policies, regardless of concerns about peak oil.

The level of concern about peak oil amongst technical staff was much higher than elected officials, with 65% of them considering peak oil to be of major concern. In city 2 and 3 the number of technical staff in category 2 and 3 was relatively even. 47% of technical staff consider that the science is inconclusive about peak oil (reality, timing, impacts etc) and almost a quarter consider that alternative fuels and technology will mitigate any peak oil impacts, highlighting the differing views of technical staff about the science behind peak oil.

It appears, however, that the major concerns of technical staff are not being directly translated into policy. This is despite the fact that technical staff were considered by respondents to be influential in determining the content of transport policy by providing technical advice to policy makers. A possible reason could be because technical staff have differing views about peak oil (not all were in category 3) and are therefore unable to provide a united, clear message to elected officials about peak oil. Research carried out by the NZTA (Lee *et al*, 2009) found that the absence of a coordinated message from technical staff, which is backed up by sound data, makes it difficult to convince elected officials, and the public, of the need to make any changes to policy.

Another factor that is undoubtedly related to the level of planning for peak oil is the fact that almost half of the respondents consider that investments and improvements in technology and alternative fuels are the reason why planning for peak oil is not a priority in their organisation. This is a common response to the peak oil problem (Buchanan and Dantas, 2010). The majority of these people were elected officials and those who considered peak oil to be of minor, or no concern (category 1 and 2). These views match the views of the current Central government on the subject of peak oil (Joyce, 2009). 70% of people also said that significant investment will be made in alternative fuels to mitigate any peak oil impacts when asked to consider any scenarios that may arise from a shortage in fossil fuels in the future. 83% of elected officials and 55% of technical staff agreed with this statement.

#### ***6.5.1 Level of information about peak oil***

The results show that the level of information available about peak oil is related to the level of priority placed on planning for peak oil. The majority of respondents in city 1 and 2 considered that they do not have adequate information to make effective policy decisions and these cities also have lower levels of planning for peak oil in their policy documents. Questions surrounding the science of peak oil, and a lack of understanding about the subject, have been cited as reasons why planning for peak oil is not prioritised (Heinberg, 2007).

A lack of information or understanding about peak oil did not seem to be a major issue for those from city 3, with 60% considering they had adequate information to make effective policy decisions. This is reflected by a slightly higher level of planning for peak oil in policy documents in city 3.

37% of all policy makers consider that they do not have enough information about peak oil to make effective policy decisions and only 52% said they did have enough. This is significant because if many policy makers consider they do not have adequate information, it makes it difficult for them to make an informed decision about an issue such as peak oil that has the potential for major and wide-reaching consequences.

The level of information available appears to also relate to the level of concern about peak oil amongst policy makers, in that people who had strong views about peak oil (no concern (category 1), or major concerns (category 3)) were more likely to consider they had adequate

information about peak oil. People who abstained from expressing a strong level of concern either way about peak oil (category 2) generally did not consider that they had adequate information. They were also less likely to consider themselves “very well informed” compared to those in category 1 and 3. It appears that a lack of information could be preventing those in category 2 from having a strong view either way. Having more information and becoming better informed could result in them either raising or lowering their concerns about peak oil, and consequently fitting into either category 1 or category 3 respectively.

Of those who said they did not have enough information, the majority said they would like more information about how a long term fuel supply shortage may affect people and businesses and potential policy options to respond to the risks. When asked who they thought should supply this additional information about peak oil, 88% said Central government.

Central government was not identified by anyone as being a source of information about peak oil; instead people get their information about peak oil from a wide variety of sources. The information source could be related to the level of concern about peak oil, as there are obvious differences between the sources of information about peak oil for elected officials and technical staff and differences in their levels of concern about peak oil. Technical officials mainly get information from the internet and colleagues, and elected officials get information from the media and journals. A large percentage of those people in category 1 and 2 also get their information from the media. This would suggest that the media is portraying peak oil as an issue of little concern.

## **6.6 Inter-relationships between criteria**

Naturally each of the criteria identified above do not influence the level of planning for peak oil in isolation. There is a complex web of relationships between each of them that will influence how each transport policy maker perceives peak oil and how they act towards the problem.

Some criteria, such as level of information about peak oil and beliefs about alternative fuels, influence the level of concern about peak oil, which will in turn influence the attitude of the policy maker towards investment in sustainable transport and will ultimately influence the actions of the policy maker. However, the Central government will then influence the *ability* of a

transport policy maker to carry out investment in sustainable transport through its funding and policy mechanisms.

Likewise, the Central government will influence the level of concern about peak oil, attitudes towards sustainable transport, and the level of belief that alternative fuels and new technologies will mitigate any peak oil impacts, through its policy position. Influential actors such as the general public and local businesses will influence the policy making style through the need for public acceptability of policies.

These criteria combine to influence a transport policy maker's actions, and how they combine is crucial in determining the level of planning for peak oil. For example, the results of this research show that a high level of concern about peak oil does not necessarily translate directly into a high level of action in terms of robust planning for peak oil. Likewise, the perception that the level of investment in sustainable transport is inadequate does not necessarily translate into more investment in sustainable transport. This is because the transport policy maker must take into account a *combination* of influential criteria, including the need for political and public acceptance, the level of funding and political support from Central government, and the location factors, when making a decision about transport policy. The views of technical staff, who generally have higher concerns about peak oil and consider the level of investment in sustainable transport to be inadequate, may be translated into action in the form of policy advice. However, this advice then goes through a 'filter', in the form of the elected officials who take it into account along with the other influential criteria, before it is able to be translated into policy.

It is at this point that the process becomes politicised and technical advice and personal views on transport and peak oil may be weakened by the influence of other criteria, especially given the fact that the research suggests that elected officials are concerned about gaining public and political acceptance (69% of elected officials agreed with the statement that *there are a wide range of stakeholders to satisfy therefore compromises need to be made to ensure broad support for policies*; and only 42% agreed that *major changes to policy should be made regardless of a lack of public support*). The results also show that 53% of technical staff consider a lack of political will from within the organisation to be a barrier to planning for peak oil. These statistics highlight the strong influence of an incremental policy making style.

It is in this sense that the ability of a policy maker to make a purely rational decision based on scientific evidence is questioned, and that the “bargaining and compromise” (Hayes, 2001, p.3) of the incremental theory appears to be a more appropriate description of the process. It also brings into question the fact that a third of all policy makers desire more adequate information about peak oil. However, would this additional information necessarily translate directly into better policy decisions given the limits of rational decision making?

The policy making process is further influenced by the fact that it is democratic, and that the elected officials charged with making the decisions have differing opinions based on how the criteria combine to influence each of them individually. Ultimately it is the views of the majority that are expressed in the policy outcomes.

Regardless of the advice of technical staff, and the political desires of elected officials, both sets of transport policy makers at the local level are constrained in their abilities to act by the level of funding and political support from Central government. They are also constrained by location factors such as population density, the existing transport and activity systems, and the available budget. Transport policy makers consider a lack of funding from Central government (85% of respondents) and a lack of political support from Central government (80% of respondents) to be barriers to implementing sustainable transport. These are significantly more common barriers than others such as lack of public support (26% of respondents) and lack of political support at the local level (28% of respondents). This would suggest that the Central government criterion is strongly influential in determining the policy outcomes, more so than the criterion of public and political acceptance.

The following example at one of the councils in city 3 highlights the vastly differing opinions of people on the subject of peak oil, and the inability for those with major concerns about the issue to translate them into action. The existing policy at this council does not prioritise planning for peak oil. There is some recognition of the fact that fossil fuels are non-renewable and that the transport system is dependent on them, however the recognition of the need for sustainable transport systems is more due to the need to accommodate future growth and ease congestion, rather than mitigate any possible peak oil impacts.

A technical staff member at the council concerned expressed the following during their interview:

- Has major concerns about peak oil;

- Their role is to provide information to senior staff and elected officials about any new information about peak oil and other related issues;
- Has problems getting senior staff and elected officials to acknowledge the seriousness of the information presented because it requires a vastly different way of thinking compared to the status quo of transport policy development. This is partly due to the fact that many senior staff have been in the role for a number of years and are very “set in their ways”; and
- Has real concerns about the lack of funding from Central government and the amount of investment in sustainable transport.

The other technical staff members at this council did not express such strong concerns about peak oil, some of whom only have minor concerns about peak oil and believe that alternative fuels and new technologies will mitigate any peak oil impacts.

An elected official at the same council had a vastly different view of the peak oil problem:

- No concerns about peak oil;
- Considers peak oil will not occur, there is plenty of oil available;
- Considers Central government’s ‘roads of national significance’ policy to be an effective policy for the future; and
- Considers the amount of investment in sustainable transport to be very adequate.

Another elected official presented similar views in saying:

- Electric cars will solve any fuel crisis and people will adjust to rising fuel prices;
- We need more roads as well as public transport;
- Central government is influential in determining transport policy outcomes; and
- Peak oil has not been raised as an issue at council meetings.

As there is some acknowledgement of the fact that fossil fuels are non-renewable in policy documents at this council, it would appear that *some* of the concerns of the technical staff about peak oil are being recognised by *some* elected officials. However, if we were to compare the levels of concern about peak oil expressed in the interviews above with the level of concern about peak

oil expressed within policy documents, the policies are more closely aligned with the elected official's views of peak oil, rather than those of the technical staff.

Based on the comments in the interviews, it is likely that the priority placed on peak oil in planning documents is low due to the majority of elected officials: (a) dismissing the views of the technical staff with major concerns about peak oil (as the technical staff member claimed elected officials do), (b) possibly being influenced by the policy advice from technical staff that have lesser concerns about peak oil, and (c) being influenced by signals from Central government that do not promote planning for peak oil.

## **6.7 Summary of influential criteria**

Now that the relationships between the level of planning for peak oil and the five criteria have been refined, we can then return to the diagram showing influential actors and factors in transport policy planning for peak oil (Figure 10 from Section 4.1) and modify it to indicate these relationships, as shown in Figure 90. The diagram has been modified from the version in the theoretical framework to show the criteria and sub-criteria which have been identified in the results analysis as being influential in determining the attitude of transport policy makers towards peak oil, as well as determining their actions in terms of planning for peak oil.

The diagram has been further modified to show the inter-relationships between the criteria and how they work to shape the level of planning for peak oil. Some of the criteria directly influence the policy outcomes (solid line), and others influence the policy outcomes by influencing other criteria (dashed line). Those criteria which are deemed to be more influential in determining the policy outcomes are indicated by a thicker line.



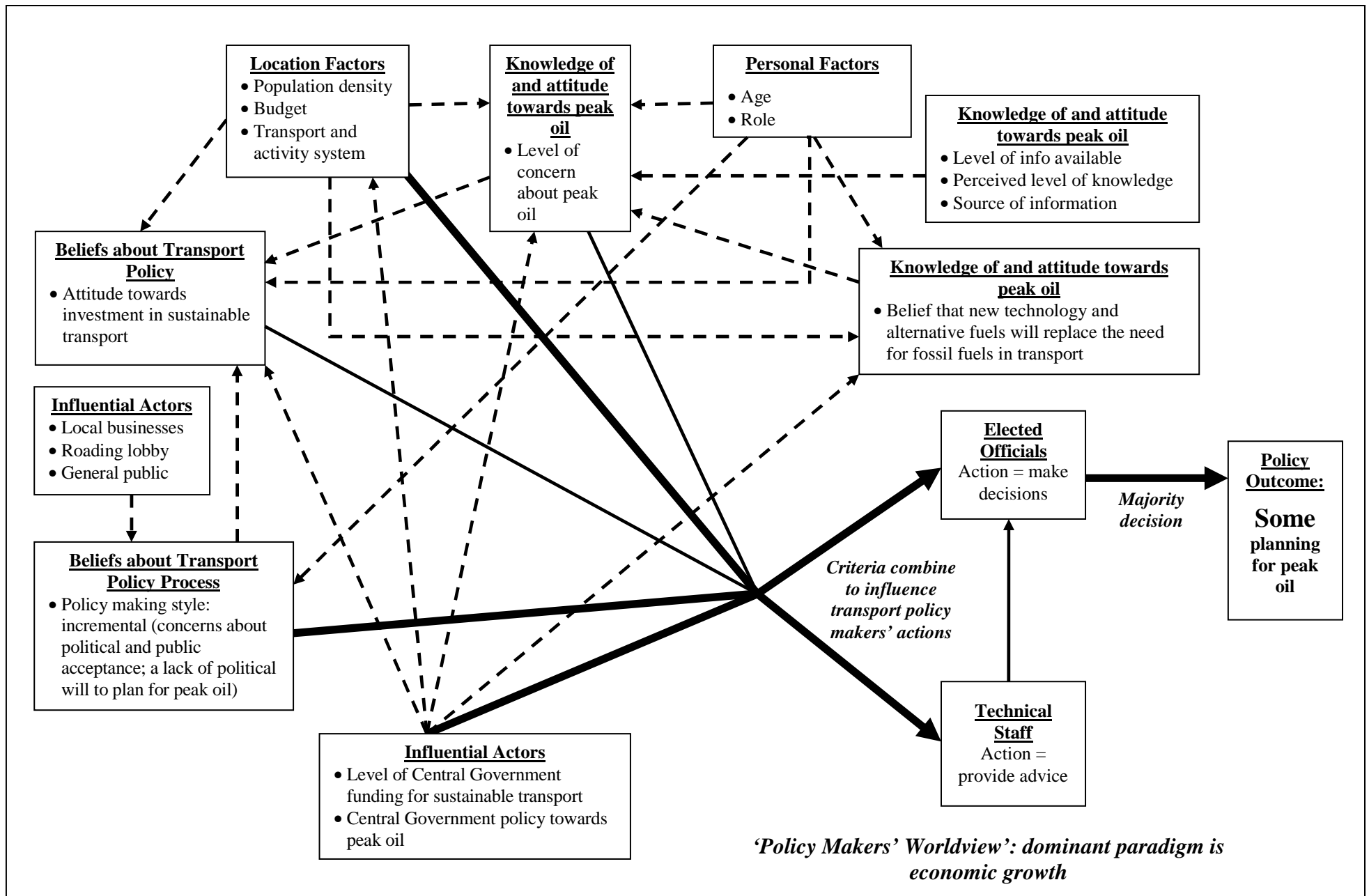


Figure 90 Inter-relationships between influential criteria that determine the level of planning for peak oil

## **6.8 Limitations of the results**

There are several aspects of the sample size and data collection method that must be taken into account when looking at the results and reading the analysis and discussion above. These are described in the following sections.

### **6.8.1 *Sample size***

Whilst carrying out the interviews it became apparent that those people who had more concern for the peak oil subject were more willing to participate in the research. It was suggested by one interviewee that the wording of the initial email request for interviews, including the term peak oil, possibly caused those who consider peak oil to be nonsense to dismiss the request (see an example of the email request for interview in Appendix 3). Several interviewees, who had major concerns about peak oil, made suggestions of people to contact to carry out interviews who they knew to be dismissive of the peak oil issue. These people had been approached and an interview requested, but had either declined to be interviewed or not responded to the request.

As a result it is thought that the relatively low number of people in category 1 (no concern about peak oil) could be due to the fact that they were less likely to agree to participate in the research, compared to those with a higher level of concern. Therefore the number of people in category 1 in this research may not accurately reflect the actual percentage of people in category 1 in each of the organisations.

In hindsight a more robust number and variance of opinions may have been obtained with a more generic description of the research in the initial interview request. However, at the same time it was important not to be misleading in the description of the research, in order to meet guidelines of the University of Canterbury Human Ethics Committee.

There were also limitations in the number of regional council staff able to be interviewed and surveyed. It was decided at a later stage in the research process to include regional council persons in the survey process and as a result it was difficult to obtain appointments for interviews at late notice. The Regional Council for City 1 was approached to carry out interviews and surveys but declined to be involved in the research on the grounds that they considered the data

collection method and analysis would provide misleading information. As a result the views of regional council persons are under-represented in the results, in particular for city 1.

Because 67% of respondents in the online survey and 63% of interviewees were from city 3 this could have provided misleading results that over-represented the views of persons from city 3. The sorting of results by city helped to lessen this effect. As city 3 is split into 4 different local councils, the possibility also existed for one of the local councils to be over-represented. This was the case with local council A, as it represented 39% of respondents from city 3.

The particularly low number of participants from city 1 (13%) has meant that the views of transport policy makers in smaller, predominantly rural based organisations have been under-represented in the results, in particular technical staff, as only 1 technical staff member from city 1 completed the survey.

These uneven sample sizings are mainly due to difficulties getting potential interview and survey candidates to participate.

In summary, more time to allow more flexibility for carrying out interviews and surveys, along with a better designed initial request for participation, could have helped to increase the sample size, thereby enabling more robust conclusions to be drawn from the research.

### **6.8.2 *Question wording***

In hindsight, question 12, which asked about influential groups in transport policy making, could have been worded differently in order to obtain better information about the groups from outside the organisation that may be influential. By including elected officials and council technical staff as options to be ranked, these were the two groups chosen most often. It was presumed that this was because they obviously are directly, and most closely, involved in transport policy development. Without these two options, respondents could possibly have been forced to think more about who influenced them from outside the organisation in terms of the way transport policy is developed.

## 7 Conclusions and Recommendations

### 7.1 Aims, Objectives and Hypothesis

The purpose of this research was to gain a better understanding of transport policy makers, and in turn make recommendations as to how peak oil could be assigned a higher priority by transport policy makers. The two main aims of the research were to:

1. To understand how transport policy makers perceive peak oil and what their attitudes are towards the issue; and
2. To understand why transport policy makers act the way they do when faced with the possibility of peak oil.

These aims have been met and the four objectives of the research carried out: development of conceptual model and theoretical framework, conducting a case study and providing recommendations (see Section **Error! Reference source not found.** below). The hypothesis proposed in Section 1.5 has been confirmed through an analysis of the results of the case study.

### 7.2 Key Findings

The key findings of this research that meet the aims and confirm the hypothesis are described in the following sections.

#### 7.2.1 *Level of concern about peak oil*

It can be concluded from the research that in New Zealand the majority of transport policy makers are aware of the peak oil issue, but that transport policy makers at the technical staff level appear to have a higher level of concern about peak oil compared to elected officials. Those who have a lower level of concern generally consider that alternative fuels and new technologies will mitigate any effects of peak oil in the future. This belief could be a major reason why planning for peak oil is not prioritised. The differences in attitude towards peak oil and beliefs about alternative fuels and new technologies expressed amongst elected officials results in a lack of clear consensus about the level of planning needed for peak oil. This lack of consensus is compounded by the fact that technical staff, who advise elected officials, also have differing attitudes, which could result in

mixed messages being presented to elected officials. At the same time it appears that more than a third of all policy makers are making decisions about peak oil despite the fact that they consider they do not have adequate information about peak oil to make effective decisions.

A lack of major concern about peak oil amongst the majority of elected officials, coupled with a belief that alternative fuels and technologies will mitigate peak oil impacts and mixed messages from technical staff, results in a lack of political will to prioritise planning for peak oil.

### **7.2.2 *Barriers to sustainable transport policies***

The research shows that despite differing levels of concern about peak oil, the majority of transport policy makers understand the need for a sustainable transport system, in particular in the larger cities where congestion is an issue. However transport policy makers experience several barriers to implementing sustainable transport systems. This poses problems in planning for peak oil.

Undoubtedly the low density urban form that characterises many New Zealand cities, and the significant rural component, make alternatives to the private car difficult to promote for many councils. This highlights the importance of integrating transport and land use policy and planning in the future, in order to create land use patterns that enable sustainable transport systems to be effective. This process was highlighted as a major concern for transport policy makers in the future.

The research shows that there is a tendency for transport policy makers to agree with incremental policy making styles in order to guarantee public and political acceptability. It is presumed that transport policy makers perceive that the majority of the public have a desire to use their car, so they plan accordingly, making the car the cheapest and most convenient mode. Sustainable transport solutions are introduced in an incremental fashion, to retain the favour of the car driving public. However, because sustainable transport modes are not the cheapest and most convenient mode, there is little mode shift away from the private car...and so the cycle continues. Transport policy makers in New Zealand appear to be caught in a “transport planning gridlock” (Manners, 2002, p.9) whereby the desire for public and political acceptability of policies and resulting incremental policy making style is in opposition to the desire for a sustainable transport system.

It is recognised that as long as the cost of travelling by car is lower than that of alternative modes, people will tend to use their car (Kamba *et al*, 2007). As a result alternatives to the car need to be

made cheaper and more efficient to see a mode shift. However, developing an efficient and cheap transport system based on alternative modes requires both a significant investment in alternative modes and significant disincentives to using the car; yet the current funding balance does not allow this investment, nor does current policy significantly discourage car use. The transition from the ‘predict and provide’ paradigm to ‘new realism’ is still taking place. However, as long as roads and cars remain at the forefront of policy makers minds (Lee *et al*, 2009) and are perceived to be the ultimate desire of the public, the transition will be slow, and it is unlikely that the funding balance will change or the ‘political will’ will shift to a level that would help to mitigate peak oil impacts.

### ***7.2.3 The role of Central government***

It has been established in this research that the Central government has a large role to play in providing leadership in planning for peak oil. Transport policy makers consider Central government should provide more information about peak oil to fill the apparent ‘knowledge gap’ of some policy makers about peak oil, and therefore enable them to make more effective policy decisions. It is apparent, however, that if Central government is not overly concerned about peak oil (Joyce, 2009), then any information they supply to local government is only likely to reflect this level of concern.

Planning for peak oil involves, among other things, developing a sustainable transport system that reduces reliance on fossil fuels. Transport policy makers have identified a lack of funding and political support at the Central government level as being significant barriers to implementing sustainable transport policy. A change in priority for funding is needed at this level in order for more investment in sustainable transport solutions to happen. However, as long as the paradigm of economic growth drives the policy direction (Key, 2008; Key, 2010; Ministry of Transport, 2009), and the ‘storyline’ that equates road building with economic growth continues, a shift in priority will be difficult to achieve. Likewise, any policy that is seen to be interventionist and discouraging car use may be difficult to implement with a government that follows an ideology of individual freedom and choice, and in a society that is very critical of the “nanny state” (Thompson, 2009, p.1).

There is only so much local and regional level transport policy makers can do without political and financial support from Central government. Considering that there are mixed views about

peak oil amongst transport policy makers at the local and regional level, it is unlikely that they will group together to lobby the Central government to place more priority on funding for planning for peak oil. As is the case with the technical staff advising the elected officials, without a clear argument presented to Central government politicians, backed up by solid scientific evidence, there is little hope for a change in mindset. Politicians at all levels are likely to go through a period of ‘enlightenment’ about peak oil, in which “the findings accumulated over time gradually alter decision-makers' perceptions of the seriousness of the problems” (Sabatier, 1991, p.148).

This has significant implications, as it has been established that because of the potential scale of peak oil impacts, there is a need for “massive mitigation at least a decade before the fact” (Hirsch, 2006, p.7), in which case there is no time for politicians to become ‘enlightened’. If the incremental implementation of sustainable transport policies continues, and a scenario in which there is a significant decrease in the availability of fuel for transport eventuates, there could be severe impacts on any transport system based on the private vehicle, and equally severe flow on effects to the economy and society.

### **7.3 Recommendations**

As well as gaining a better understanding of how transport policy makers perceive and act towards peak oil, this research aimed to make recommendations as to how peak oil can be assigned a higher priority by transport policy makers.

In order for peak oil to be assigned a higher priority by transport policy makers, resulting in a “massive mitigation” of peak oil impacts, there would need to be a general consensus amongst transport policy makers and leaders at all levels of government about the need to plan for peak oil. As such, this consensus does not exist – mixed messages are being received by both technical staff and elected officials about the peak oil issue, and many are making decisions about peak oil based on what they consider to be inadequate information.

In order to gain consensus, irrefutable scientific evidence indicating the need to plan would need to be presented to transport policy makers at all levels of government, and the scientific argument that alternative fuels and new technologies will mitigate any peak oil impacts would need to be discredited. Until the scientific evidence is strengthened in favour of the need to plan for peak oil,

peak oil planning is likely to come up against the barrier of peak oil sceptics. Internationally, these sceptics are often funded and supported by powerful multi-national corporations who have a vested interest in ensuring that fossil fuel consumption continues. Climate change sceptics have been known to be funded by corporations such as Exxon Mobil (Oberthür and Ott, 1999), who will also undoubtedly work against any movement to plan for peak oil and will fight to maintain the status quo.

Regardless of the presence of irrefutable scientific evidence, at the very least, transport policy makers should have at their disposal all the information there is available at the current time about peak oil, in order that they can make the best decisions possible.

As well as robust scientific information being available to policy makers at all levels of government, leadership is needed from Central government to prioritise planning for peak oil at the local and regional level, in the form of political and financial support. This research has established that many transport policy makers within local government and regional government are dissatisfied with the level of funding available for sustainable transport modes. In order to address this issue, local and regional government need to either source other means of funding for their desired sustainable transport policies, or work together to lobby government to change its funding allocation. This is proposed by the ARC in their existing RLTS (ARTC, 2010):

*“New funding sources, such as developer contributions and tolling, will be necessary to make up the shortfall. New financial mechanisms such, as loan funding and public private partnerships, will also be investigated to support timely delivery of the strategy. Funding arrangements will also need to change to match the strategy – both at local and national levels” (p.68).*

Political support would need to be driven not just by robust scientific evidence, but also by public pressure on politicians in the form of a ‘social movement’, whereby planning for peak oil is ‘publicly acceptable’ and therefore ‘politically acceptable’. Moyer (2001) describes social movements as:

*“Collective actions in which the populace is alerted, educated and mobilized, sometimes over years and decades, to challenge the powerholders and the whole society to redress social problems or grievances and restore critical social values...[it is designed to] win the hearts, minds and support of the majority of the populace.*



*Because it is the people who ultimately hold the power, they will either preserve the status quo or create change” (p.2).*

In order to be effective in changing the status quo, a peak oil movement would need to be on the same scale as those movements against nuclear weapons, smoking and drink driving (Meyer in Moser, 2007). In order to gain the support of the public such a movement would require robust scientific evidence to back it, some sense of urgency to act (in the form of major fuel price rises or shortages), and an influential ‘champion’ to bring it into the media spotlight. Unfortunately the current conditions (disputable scientific evidence, a lack of urgency and a lack of influential supporters) do not encourage a social movement on such a large scale.

Ultimately, what is needed as part of this social movement is a major shift in how society conceptualises prosperity in terms of the dominance of the economic growth paradigm (Jackson, 2009). As long as economic growth is linked with prosperity, is coupled with fossil fuel consumption, and is the ultimate goal of governments and society, it will be very difficult to implement planning for an era in which fossil fuels are in very short supply.

## **7.4 Further Research**

In conducting this research it was established that there are many additional datasets and research areas which would help to provide a more detailed understanding of the characteristics of transport policy makers, and what influences their perception of the peak oil issue. These are discussed in the following sections.

### **7.4.1 Additional data**

As outlined in the limitations in Section 6.8, interviewing and surveying a larger number of policy makers would help to confirm the findings of this research in terms of providing a larger statistical base. Further research could expand on those roles and organisations covered in this research, and the study area could be expanded to cover additional roles and organisations, as listed below:

- Including more regional government and rural level participants would help to provide a wider picture of sub-national transport policy making in New Zealand;
- Considering the significant influence Central government policy and funding has on transport policy makers at the local and regional levels, expanding the study area to include

technical staff and elected officials at the Central government level would provide an valuable insight into how policy makers at this level perceive the peak oil problem, and why they act the way they do towards it; and

- External consultants, whilst not identified as being the most influential group in transport policy making, do have an important role to play in providing technical data and advice to local, regional and Central government. It would therefore be helpful to widen the study to include the views of consultants on the subject of peak oil, and how they advise their clients accordingly.

#### **7.4.2 *Relationships between influential criteria***

The changes made to the diagram showing the influential actors and factors in transport policy planning for peak oil (Figure 10) following the case study results analysis highlights the limitations of the theoretical framework proposed in Section 4. The updated version of Figure 10 (Figure 90) shows how the relationships between influential criteria that determine the level of planning for peak oil are complex and inter-connected. The theoretical framework could be modified to facilitate exploring each of these relationships in more detail in order to better establish the level of influence each relationship has on a transport policy maker's attitude and actions towards peak oil. For example, it would be beneficial to:

- Carry out a closer analysis of the level of information about peak oil available to transport policy makers, determine exactly what information they receive, determine the source of the information, and determine how it is perceived. This may provide more insight into why a policy maker perceives the peak oil issue the way they do;
- Obtain more detailed information about the relationship between the technical staff and elected officials, between technical staff and their colleagues, and between elected officials and their colleagues. This could help to provide more information about the 'politics' of transport policy making and about the ability of technical staff to influence the outcome with their policy advice. Additionally this would enable a better understanding of whether or not providing policy makers with more information, as some indicated they would like, would actually translate into better planning for peak oil; and

- Carry out a closer analysis of the relationship between influential actors in the community (lobby groups, the general public, local businesses) and transport policy makers, in particular elected officials, to gain a better understanding of the desire for public and political acceptability of policies. This process could involve obtaining more detailed information about the public's perceptions of certain transport policies, which may be helpful in terms of determining what exactly is 'publicly acceptable'. This information would help to inform policy makers about the kinds of policies that would be 'politically acceptable' and could therefore be successfully implemented.

#### ***7.4.3 Other dimensions in the conceptual model***

The conceptual model examined the economic growth as a paradigm within which transport policy decisions are made. However, it is limited in that there are other dimensions that could be explored which influence policy making, including political accountability, climate change policy and personal beliefs and values of policy makers.

This research has highlighted the influence politics has on transport policy making. Technical information is 'filtered' by the elected officials who finalise policies. The transport policy decisions that are made today, including investments of millions of dollars, have an effect on future generations, especially if these decisions prove to be incorrect. If peak oil does occur, resulting in the impacts described by DiPeso (2005), including economic and social turmoil, should transport policy makers who dismissed the scientific evidence of those who advocated for peak oil planning, and invested heavily in road building, be held accountable for their decisions? If they knew they would be held accountable would they make different decisions? The concept of accountability in political decision making brings the moral and ethical aspects of policy making into the spotlight and would provide an interesting view point from which to base a conceptual model.

Tied into the concept of political accountability, morality and ethics is the dimension of the values, ideology and belief systems of individual transport policy makers. These values and beliefs sit outside, but have an influence on, their beliefs about transport and the role of policy. The literature review revealed that political affiliations, upbringing, race and values will influence how policy makers, and those individuals who influence policy makers, perceive certain situations. A more

detailed investigation into these aspects of influence on policy makers could provide more answers as to why transport policy makers respond to peak oil the way they do.

Another dimension that could be included in the conceptual model is climate change. The literature review highlighted several similarities between the difficulties of introducing policy to plan for peak oil and introducing policy to mitigate the effects of climate change, including conflicting scientific evidence, long timeframes and lack of political will to act. Despite these barriers, the desire of many to counteract climate change has developed into a 'social movement', and has far greater exposure amongst the general public, media and policy makers than peak oil. Because policies aimed at addressing climate change and policies that mitigate peak oil impacts have similar goals (reducing the consumption of fossil fuels), it would appear that a closer examination of how transport policy makers perceive and act towards climate change may assist in understanding how they respond to peak oil.

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## **9 Appendices**

### **Appendix 1 Online Survey Questions**

## **Appendix 2 University of Canterbury Human Ethics Committee Research Approval Letter**

### **Appendix 3 Example of Email Request for Interview**

## **Appendix 4 Interview Information Sheet**