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Planning The Transportation System for Economic Development – A Survey of some Of the Initiatives being Investigated In Wellington

The Wellington Region has been experiencing modest economic and population growth in recent years. Lack of investment in essential transport infrastructure has been identified as a contributing factor to weak economic performance. This lack of investment in infrastructure is largely attributed to the lack of sound policy analysis and clear direction at the Government level in the transport sector.

As the policy framework in New Zealand lurches from one ideological position to another practitioners must make an overly complex and unsound framework work in the real world. Government agencies are adept at protecting their “powerbase” and frustrating progress by the construction of processes and procedures that thrive in their bureaucratic culture. Practitioners must find creative means of navigating these defence mechanisms if they are to deliver outcomes that communities and businesses desire.

This paper surveys the role of transport in economic development in the Wellington region. It considers a diverse range of initiatives to facilitate business activity. Some of the approaches are creative. Many of the obstacles are due to lack of sound national level policy directions and the processes and procedures generated by Government agency bureaucrats. Many of these defy logic but nevertheless have to be navigated.

A number of opportunities are examined. The issues created by national level bureaucracy are highlighted and the steps taken to deal with these obstacles are described. The costs that are imposed on these opportunities by these procedures and processes are illustrated.

1. INTRODUCTION

Under funding of New Zealand's transportation network has been an ongoing problem for some years. Modest flows of people and traffic have been allowed to grow with little investment in infrastructure. Problems are now beginning to appear.

We are seeing levels of congestion in New Zealand's major cities that are surprising for a country of only 4 million people. Economic pricing mechanisms are likely to be much more cost effective in reducing congestion than direct regulation because they allow citizens and businesses to rely on a variety of response channels to reduce external costs (European Commission Directorate-General for Transport-DG VII, 2001).

New Zealand per capita oil reserves are only one fifth of Australia's per capita reserves and is far less self sufficient in Oil. Australia will only be 40% self sufficient by 2015 when world oil reserves are possibly in rapid decline with escalating oil prices New Zealand may be reduced to economic chaos without a strategic plan to guarantee future transport energy supplies. The merit of congestion pricing is that it will reduce petroleum consumption and is recommended for that purpose in a West Australian government report (Transport Energy Strategy Committee; interim report June 2003).

The Census data for New Zealand trips to work and other studies indicates that car dependence has increased in the last five years and shows that greenhouse gas emissions in the transport are increasing. Preliminary studies by the Australian National Transport Secretariat (NRTC 2003) indicate that congestion pricing will also reduce greenhouse gas emissions.

This paper examines that national funding problem and considers the consequences of under funding on regions such as Wellington. A number of initiatives are discussed which are designed to support economic growth in the region. Alternative options to fund these proposals are required to deal with the funding deficit and bureaucratic quagmire.

These emerging problems are largely due to a lack of sound policy framework not only in land transport funding, but also in project evaluation, planning, and other areas in the transport sector. Note that London's congestion pricing scheme since starting in February 2003 has produced 40% reduction in congestion during charging hours (Litman 2003). The London experience has implications for New Zealand, particularly Auckland. However there is no Japanese style national energy security plan or Dutch style national environment plan to act as coordinating framework for the development of infrastructure or for the introduction of congestion pricing schemes. Perhaps it is because funding procedures in New Zealand devised by the Transfund do not recognise the important role that transport efficiency has in sustainable regional economic development or the energy security of the nation.

2. BACKGROUND

The Wellington region has been experiencing modest population and economic growth over recent years. The population and employment statistics for the 1991 to 2001 period as recorded in the respective census years are:

	Population	Population per annum growth	Employment (FTE)	Employment per annum growth
1991	400284		180705	
1996	414048	0.69%	175367	-0.59%
2001	423765	0.47%	186162	1.23%

There has been some concern that lack of investment in transport infrastructure has constrained the economic performance of the Wellington region. It is not so much that efficient transport infrastructure promotes economic growth but rather inefficient transportation adds cost to product and makes an economy less competitive. This ultimately limits the potential for economic growth. Infometrics (2003) have provided evidence that inefficient road transport can adversely impact on a region's economic performance. Similarly inefficient transportation reduces the attractiveness of an area not only as a place to do business but also as a place to live.

3. NATIONAL INCOME AND EXPENDITURE

The breakdown of national income and expenditure for Transportation as reported by the Ministry of Transport for 2000/01 is presented below.

Income	\$million	Expenditure	\$million
Road Users		LTSA (safety)	29
Road user charges	565	Police (education, enforcement)	185
Petrol excise	1003	Licensing Administration	58
LPG/CNG excise	172	Regional Councils	132

Vehicle Licensing	189	Local Councils	743
Subtotal	1929	Transit NZ	639
		Transfund Administration	13
Rate Payers		Subtotal	1799
Regional Councils	70	Consolidated fund	597
Local Councils	400		
Subtotal	470		
TOTAL	2399	TOTAL	2399

There are a number of conclusions that arise from this income/expenditure table. These are:-

- 20% of income is derived from non-use related sources (rates)
- local government contributes 54% of its own expenditure in non-safety related areas
- 25% of income is transferred to the consolidated fund
- administration of the licensing system costs 31% of the licensing revenue

4. WHAT THIS MEANS FOR THE WELLINGTON REGION

In the Wellington region annual average daily traffic in 2001 was approximately 17% above 1996 levels. In the same time period regional population grew by 2.3% and vehicle ownership increased by 5.5%. However the 2001 Census revealed that Wellington was less car dependent for the journey to work than either Christchurch or Auckland. Wellington has better balanced transport system as only 60% of Wellington commuters drove to work compared to 77% in Christchurch and 76% in Auckland and the growth of car commuting was stabilised in the 1996/01 intercensus period.

Wellington's transport system also contributed to public health with its high level of incidental exercise due walking and cycling all the way to work or to access public transport. Wellington had approximately 31% of work trips involving a significant amount of incidental exercise compared to 13% in Auckland and 17% in Christchurch (Parker 2003). Wellington's transport system is clearly more sustainable and there is a need to keep it that way through adequately funding the Regional Land Transport Strategy (RLTS). Indeed there are hidden health benefits to be had as a spin off from road pricing and congestion pricing.

Under the Land Transport Act Regional Councils are required to produce a RLTS which outlines a multi modal plan to respond to the region's anticipated needs. Implementing authorities such as Transit New Zealand, Regional Councils and Local Councils must progress these projects. The Wellington RLTS 1999-2004 (Wellington Regional Council, 1999) anticipated expenditure on the region's state highways, local roads and passenger transport that is identified in the table below. The state highway expenditure assumed at least a \$100 million cash injection for tolled roads.

Anticipated RLTS Expenditure 1999-2019

	1999-2004 (\$ million)	2005-2019 (\$ million)	Total (\$ million)	Average expenditure p.a. over 20 years (\$ million)
State highways	250	360	610	30.5
Tolled state highways		100	100	5.0
Local roads	70	268	338	16.9
Passenger transport	246	738	984	49.2
TOTAL	566	1466	2032	101.6

The current average level of expenditure over the five years 1997/98 to 2001/02 has been:

Average per annum expenditures 1997-2002 (\$ million)

State highways	18.8
Local roads	7.9
Passenger transport	37.2
TOTAL	63.9

This leaves for the following funding gap per annum assuming current levels of funding continue into the future.

Funding gap for implementing the RLTS 1999-2019 (\$ million per annum)

State highways	11.7
Tolled state highways	5.0
Local roads	9.0
Passenger transport	12.0
TOTAL	37.7

This means there is a need for an additional \$38 million per annum to fund all the proposals of the RLTS. This suggests that current funding levels are about 63% of what is required to fund the RLTS.

Clearly there is a major mismatch between current anticipated levels of funding and what was proposed for the RLTS.

5. CONSEQUENCES

The current RLTS does not plan for a major improvement in level of service over the 20 year period for all modes of travel. It plans for a modest deterioration in the current level of service in response to likely demographic and economic trends because it recognises the shortage in available funding. Underfunding of the RLTS at the level consistent with current funding levels will lead to a serious deterioration of the level of service offered by the transport network in future years compared with the present day.

An illustration of the deterioration of the level of service offered by the transport network has been obtained from modelling of the network.

	1996	Estimated 2016 on current investments	RLTS
AM peak motor vehicle travel time	32597	38312	36607
AM peak total vehicle hours below service level D	13839	19202	15000
AM peak cost of congestion (\$)	137600	182461	139750

The consequences of this are

- A reduction in measurable regional accessibility with a significant growth in congestion levels.
- A likely decline in the region's economic performance due to the added cost of transport making business in the region less competitive.
- An unnecessary loss of life and increased road trauma.
- A deterioration in the regional environment and quality of life.
- Little improvement to network resilience against incidents and major civil defence emergencies.
- A risk that Wellington will be vulnerable should fuel prices escalate in future years as both New Zealand's oil and gas reserves are likely to be depleted.

The consequences should fuel prices escalate will be a real problem in Wellington as it will be for all New Zealanders. New Zealand has only one sixth of the per capita oil

reserves as Australia which is not a healthy position to be in. To make matters worse the option of using gas as a transitional fuel for motor vehicles combined with congestion pricing as proposed in Western Australia may not be available as New Zealand has only one fourth of the per capita gas reserves that Australia has.

There is a growing recognition that the current buyer's market will become a seller's market as oil production begins to fall. (Australian Energy News 2001) Indeed, Woodside Petroleum's Managing Director said recently that:-

Australia has been consuming oil three times faster than it has been discovered. The economic implications for Australia are significant including a rapid deterioration in Australia's trade deficit on liquid hydrocarbons (from a surplus of \$1.2 billion in 2000/01 to a projected annual deficit of A\$7.6 billion by 2009/10. (Akehurst, 2002).

The general view of the international oil industry regarding world oil; reserves is even more depressing. (Laherrere, J., 2003) It is against this depressing long term prospect that the need to introduce congestion pricing must be seen.

The current RLTS proposes to spend \$102 million per annum to achieve \$224 million per annum in economic benefits. These benefits are the direct economic benefits of time, vehicle operating and accident benefits. In addition there will be further economic development benefits not accounted for in this analysis due to a more competitive regional economy.

Expenditure at current levels will yield approximately \$141 million per annum in economic benefits at a cost of \$64 million per annum. This means approximately \$83 million per annum of direct economic benefits are foregone by underfunding. In addition there will be additional economic development benefits foregone due to a less competitive regional economy.

6. THE CAUSE OF THIS PROBLEM

The current funding problem in New Zealand is a combination of several factors. Each of which need to be understood.

6.1 FUNDING

Let us consider the nation's state highway network as an example. Similar arguments apply for local roads and the rail network.

In 1993 the state highway network was valued at 7055 million using the optimised depreciated replacement value. If this figure is increased by 2.5% per annum to allow for improvements and inflation then the 2003 value of the state highway network is approximately \$8800 million. The average capital investment into the nation's state highway network over the 1997/98 to 2001/02 period has been \$261.2 million. This represents an annual capital investment rate of 2.96% of asset value. This is well below what is normally recognised as prudent levels of capital reinvestment in infrastructure in the private sector. It is not unusual for private sector capital reinvestment in infrastructure to be at a rate of 10 to 15% per annum. This would suggest that a doubling of the current levels of capital investment in our transportation infrastructure is not unreasonable. This is consistent with the

conclusion in Section (2) that the Wellington RLTS is currently receiving about 63% of its required funding.

It needs to be acknowledged that there are some key differences between the public and private sectors so that the private sector capital reinvestment rate should only be understood as a broad benchmark. A private sector company reinvests capital to maintain competitiveness in the market place or even to increase market share. A proxy for this activity in the public sector is maintaining a level of service

Another argument that makes the same point is the funding cut-off for benefit cost ratios. Until last year a project had to have a benefit-cost ratio of 4.0 or better to be funded. It is acknowledged that the funding allocation framework has now changed to reflect Government's priorities. However, it is expected that this new system will make changes only in the margins. The fundamental issue of the inability to fund worthwhile projects remains the same.

Staying with the funding benefit-cost ratio cut off of 4.0 to illustrate the point. Anything with a benefit-cost ratio better than 1.0 is worth doing. A cut-off of 4.0 is saying that the net present value of benefits must be more than 4.0 times the net present value of costs. A 400% return over the life of the project is required to fund the project or better than a 40% annual rate of return. We would be queuing up to purchase projects that had the same rate of return in the market place. In fact, the situation is worse than this. Transfund excludes regional benefits in its calculation of a benefit cost ratio. Only "national" benefits are included. This means that the total worth of a project in economic terms could be significantly more than 4.0 times its cost if it gets funding. The position of Transfund in not recognising regional economic benefits is in complete contrast to the Infometrics (2003) report.

Typical annual rates of return used in the private sector are in the order of 20%. This allows for a profit margin and an element of risk. The provision of public infrastructure does not need to factor in a profit margin. Public sector infrastructure has virtually no risk. An annual rate of return of 10% is widely used in the public sector.

The conclusion that must be drawn from this analysis is that transport infrastructure is being either grossly under funded or Treasury has little confidence in Transfund's benefit-cost procedures. It is acknowledged that there is widespread concern about the quality and integrity of Transfund's benefit-cost procedures in the industry. However, it would appear Treasury is building in an enormous safety margin to cover the risk generated by the lack of confidence in Transfund's procedures.

At this point it is worth commenting that current Transfund procedures condemn the country to a strategy of low cost band aid measures. This is adhoc incrementalism. A rational strategic approach to address issues effectively is not possible. This is for several reasons:

- Budget constraints require a project to be low cost
- The high rate of return required is likely to cause the project proponent to cut back the project standards to the bare minimum to get the rate of return necessary for funding.
- The high discount rate used in benefit-cost analysis in New Zealand means the project must produce large short term benefits. Long term benefits are irrelevant

(New Zealand uses a discount rate of 10% whereas overseas typical values are in the range 3 to 7%).

- Major long term projects are disadvantaged because of the fixed 25 year analysis period which includes the construction period. A project that takes several years to build will have its costs up front which are not heavily discounted. The benefit stream will be shortened due to the lengthy construction period and the same benefits will be heavily discounted.

It is useful to note that both NZIER (1995) and BERL (1996) in their reviews of Transfund's Project Evaluation Manual raise many of the same concerns.

An international comparison of road expenditure provides further evidence that New Zealand is underfunding its transportation network. Data from the World Bank's World Roading Statistics 2002 gives the road expenditure of 21 OECD countries for comparison. There are good reasons to expect that New Zealand should have one of the higher expenditure rates. These reasons include:

- low population density
- difficult terrain
- it is a long and narrow country
- it is a country with many rivers and water ways
- it is a seismically active country

All these factors increase the cost of providing transportation infrastructure.

The World Bank data ranks New Zealand 19 out of 21 in road expenditure per kilometre of road. New Zealand spent \$4,628 per kilometre of road in 2002 compared to an average for the 21 countries of \$19111 per kilometre.

The same data ranks New Zealand 20 out of 21 for road expenditure per registered motor vehicle. In 2002 New Zealand spent \$159 per registered motor vehicle compared to an average of \$372 for the 21 countries.

Instead of the expected higher than average expenditure compared with other OECD countries, New Zealand's current rate of expenditure is amongst the lowest of the 21 OECD countries. This further supports the hypothesis that New Zealand is underfunding its transportation networks.

6.2 DEMAND

The under funding of the country's transport infrastructure is only part of the problem. The country's transport infrastructure is subject to excessive and growing demand. As discussed earlier traffic has grown by 17% in the Wellington region over the 1996 to 2001 period whereas population has grown by 2.3% over the same period. This is because people are now making significantly more journeys on a daily basis than they did in previous generations.

A large part of this problem is due to the road system not being efficiently priced. Basic economic principals state that demand for use is a function of cost. If infrastructure is under priced then it will be excessively used. New Zealand does have some pricing of road use through petrol service tax and road user charges. There are problems with current pricing of roads in New Zealand. The 1993 Land Transport Pricing Study suggested that road users were not paying enough to cover

the economic costs of their use and the pricing system in New Zealand is a blunt national averaging system which leads to some users being subsidised by others.

The above two issues suggest that the road user is not being sent the correct pricing signals.

The current situation with New Zealand's transport infrastructure is the result of a demand on the road system that is excessive due to poor pricing and a capacity to build new infrastructure that is well below demand. It is likely that as a country we will never be able to afford to build new infrastructure at a rate fast enough to meet demand. This means that whilst there are good reasons to increase funding levels, and we should, we must also manage the demands on our infrastructure at the same time so that the gap between demand and our capacity to build is closed.

The other difficulty in New Zealand is structural. Major transport infrastructure investment is by nature very lumpy. This is because of two reasons. Transfund funds roads on a capital upfront basis rather than through the life of the project. The other problem is that Transfund insist on breaking down sensible integrated transport packages into individual projects and funding them individually. This eliminates the possibility of larger packages being offered to the construction market where the benefits of competition would be greater and cost distributed over time.

This situation does not appear to be helped by provisions provided in the Land Transport Management Bill. The constraints around PPP's and tolling in this Bill are so tight that few PPPs are likely to proceed and it is likely to be more efficient for public sector agencies to loan fund projects as the public sector can borrow at lower rates than the private sector.

7. FUNDING AND PRICING PROPOSALS TO ADDRESS THESE ISSUES

(a) Regions would prepare their Regional Land Transport Strategy which would need to have a 10 year implementation programme explicitly identified. The Regional Land Transport Strategy and its 10 year programme would be audited to ensure:

- The strategy is not inconsistent with the New Zealand Transport Strategy (and therefore Government policy)
- The strategy is robust, includes rational demand management and meets a minimum specified economic efficiency requirement
- The 10 year programme implements the strategy
- There is a demonstrable mandate from the regional community to implement the strategy
- That expenditure is appropriate and consistent with the 10 year programme.

The auditing could be undertaken by Audit New Zealand to verify that the above requirements had been met.

The demonstrable mandate from the community is very important to the process. It establishes an upfront explicit contract with the community that says that in return for paying more they will get an agreed programme of works and services.

This proposal is consistent with Wellington Regional Council's experience with the Transmission Gully willingness to pay exercise. In this exercise the community demonstrated a high willingness to pay for transportation

infrastructure where there was an explicit link between the paying and the proposal to build new infrastructure. This willingness to pay is a contribution to the total cost of the project so that large projects could be progressed more rapidly.

This proposal has the strengths of being transparent, robust and audible. The stringent requirements identified above ensure that it is not inconsistent with Government policy, is rational and well founded, ensures value for money and has community agreement.

This is a far stronger position than current practice or that envisaged by the Land Transport Management Bill which lacks transparency and accountability. The Minister has unfettered powers to establish priorities. Transfund must somehow interpret these priorities but they have no direct public accountability for their decisions but only respond to the Minister and the auditor. The Board is appointed by the Minister. Their decision making process lacks transparency as

Transfund has no clear weightings for the Minister's priorities as the Board goes through a process to allocate large sums of money. How they make those decisions is unclear. There is no right of redress for agencies who are unhappy with Transfund's decisions. This lack of transparency coupled with little public accountability is potentially a very dangerous situation.

- (b) The collective public agencies in transport are empowered to loan fund their programme and to offer sensible large packages to the construction industry to take best advantage of the competitive market. This enables the funding burden to be smoothed and distributed over time and uses the market environment to get attractive cost structures.

In principle the collective public agencies in a region will act as a single entity with power to borrow at government and or local government rates. Their ability to borrow will be supported by a guaranteed revenue stream (as discussed below) and a series of infrastructure assets. It may be institutionally advantageous to constitute these public agencies into a single entity.

Such a single entity would have to be carefully constituted. Its role, functions and powers would have to be clearly defined. It would need the power to borrow and underwrite loans. Its accountabilities would need careful definition. This entity would need the powers to levy charges such as those discussed below and be responsible for ensuring that the "contract" that it has with the community to implement an agreed set of transport proposals is complied with.

- (c) **Funding and Demand Management**

The implementation of an agreed package of proposals will yield benefits to many groups with the community. Some of the benefits will accrue to road users but they will not be the only beneficiaries. Business will also benefit through more efficient transport and lower costs. Land owners will have enhanced

access to their properties which will be reflected in increased land values. There are a range of other possible benefits including environmental, strategic, option and others.

Using the principle that the beneficiary should pay a rational funding policy should be developed so that costs are correctly allocated and appropriate mechanisms defined for funding necessary infrastructure and services. The entity discussed in 7(b) above should have the responsibility of developing this funding policy. New Zealand lacks a national cost allocation framework to facilitate this process. This is due to a lack of sound cost and benefit analysis.

As discussed in section 6 it is important that synergies are developed between funding and demand management so that the gap between demand and capacity provided is closed. It is envisaged that there will need to be a transition period where interim measures are put in place before a pricing scheme could be implemented. It is also assumed that the Government would still require approximately \$600 million for the Consolidated Fund. Revenue required for the consolidated fund could still be raised using petrol tax. Below is an analysis of the likely revenue streams per annum generated by various measures in the

Wellington region and their broad level impact on travel demand. These analyses are based on increases over and above existing charges.

Petrol Tax	1c/l	2c/l	3c/l	4c/l	5c/l	10c/l
Revenue (\$million)	2.9	5.9	8.8	11.7	14.6	28.7
Travel demand impact	negligible	negligible	negligible	low	low	low
Comment: impacts mainly on long distance trips						

Road User Charges

% increase	1%	2%	3%	4%	5%	10%
Revenue (\$million)	0.6	1.2	1.8	2.5	3.1	6.0
Travel demand impact	negligible	negligible	negligible	low	low	low
Comment: impacts mainly on long distance trips						

LPG/CNG Excise

Excise increase	1c/l	2c/l	3c/l	4c/l	5c/l	10c/l
Revenue (\$million)	0.3	0.5	0.8	1.1	1.3	2.6
Travel demand impact	negligible	negligible	negligible	low	low	low
Comment: impacts mainly on long distance trips						

Vehicle Licensing

% increase	1%	2%	3%	4%	5%	10%	20%
Revenue (\$million)	0.2	0.4	0.6	0.8	1.0	2.1	4.2
Travel demand impact	negligible	negligible	negligible	negligible	negligible	negligible	low
Comment: once a vehicle is licensed there will be little impact on trip making.							

Parking Surcharges

Charge on publicly available spaces in Wellington CBD

Charge per annum per space	\$40	\$100	\$250	\$500
Revenue (\$million)	0.3	0.9	2.1	4.3
Travel demand impact	negligible	negligible	negligible	negligible

Charge on all spaces in Wellington CBD

Charge per annum per space	\$40	\$100	\$250	\$500
Revenue (\$million)	1.3	3.2	8.1	16.2
Travel demand impact	negligible	negligible	low	low

Charge on publicly available spaces in Wellington, Hutt and Porirua CBD's

Charge per annum per space	\$40 (Well)	\$20 (Hutt Por)	\$40 (all)	\$100 (Well)	\$50 (Hutt Por)	\$100 (all)	\$250 (Well)	\$125 (Hutt Por)
Revenue (\$million)	0.4		0.5	1.1		1.3	2.7	
Travel demand impact	negligible		negligible	negligible		negligible	negligible	

\$250 (all)	\$500 (Well)	\$250 (Hutt Por)	\$500 (all)
3.4	5.5		6.7
negligible	negligible		negligible

Charge on all spaces in Wellington, Hutt and Porirua CBD'S

Charge per annum per space	\$40 (Well)	\$20 (Hutt Por)	\$40 (all)	\$100 (Well)	\$50 (Hutt Por)	\$100 (all)	\$250 (Well)	\$125 (Hutt Por)
Revenue (\$million)	1.5		1.7	3.7		4.2	9.3	
Travel demand impact	negligible		negligible	negligible		negligible	low	

\$250 (all)	\$500 (Well)	\$250 (Hutt Por)	\$500 (all)
10.4	18.6		20.9
low	low		low

Comment: Parking charges have the greatest impact on short distance trips.

Road Pricing

State Highways Only SH1, SH2 just north of Ngauranga, SH1 Paremata, SH2 Melling

Toll	\$1 pk \$0 off peak	\$1 pk \$0.50 off peak	\$2 pk \$0 off peak	\$2 pk \$1 off peak
Revenue (\$million)	\$15.8	\$52.6	\$30.7	\$81.8
Travel demand impact	Low peak Nil off peak	Low peak Negilble off peak	Medium peak Nil off peak	Medium peak Low off peak

Comment: most effective travel demand management tool even at low tolls

Inner Cordon around Wellington CBD and Ngauranga
Outer Cordon Paremata and Melling

Toll per journey	\$1 pk \$0 off peak	\$1 pk \$0.50 off peak	\$2 pk \$0 off peak	\$2 pk \$1 off peak
Revenue (\$million)	\$30.7	\$80.7	\$59.3	\$158.0
Travel demand impact	Medium peak Nil off peak	Medium peak Low off peak	Medium peak Nil off peak	Medium peak Medium off peak
Comment: Most effective travel demand management tool even at low tolls.				

The key for travel demand impact is

	Negligible	Low	Medium	High
% reduction in traffic	<1	1 < 3	3 < 7	>7

It is clear from the above tables that Road Pricing has the ability to generate sufficient revenue to fund the required infrastructure and to influence travel demand. Parking surcharges is the next best proposal for generating revenue and managing demand. It would be necessary to implement very large increases in petrol tax, road user charges, LPG/CNG excise or vehicle licensing fees before the necessary revenue and travel demand impacts can be generated. The road pricing proposals, have the ability to generate significant revenue and can influence travel demand. Road pricing offers the desirable attributes of significant revenue generation and demand management and therefore provides a rational long term funding basis. Other measures such as increases in petrol tax, road user charges, LPG/CNG excise, vehicle licensing and parking surcharges should only be used as interim measures until road pricing is introduced.

Unfortunately in New Zealand there is no national framework to implement travel demand management. Pricing of congestion is currently not legal.

Another consequence of road pricing that arose through the modelling of the Wellington network is that it will increase public transport patronage and enable passenger transport to remain viable with reduced subsidy. The modelling showed that a best estimate of fully efficient road pricing would enable the region's passenger transport system to be run commercially.

It is worth noting that regional petrol tax if used extensively throughout the country it may encourage higher fuel economy in the vehicle fleet. This means that it is unlikely to be sustainable as a long term funding mechanism but will provide benefits for local air quality and reduced greenhouse emissions.

The revenue generated by even modest road pricing schemes is more than sufficient for regional transport funding needs. This is not only because of the magnitude of revenue generation but also because of road pricing's ability to manage demand. This enables genuine consideration of the phasing out of the petrol excise tax and road user charges to be replaced by a direct pricing system. This would eliminate the need for a national funding system except perhaps for an audit function and would lead to direct accountability for funding decisions to the community.

The December 2002 regional community survey by Gravitax (2003) on behalf of Wellington Regional Council suggests that there is a real potential for the Wellington regional community to accept road pricing. This survey identified

strong community concern about current levels of congestion, an expectation that congestion will worsen in time and highlighted a need for action by responsible agencies. The survey indicated that under the right circumstances 61% of the community may accept road pricing.

It is important to consider the pricing strategy used with road pricing as there are several options. There are two principals involved in a pricing strategy. These are:

- Pricing should lead to efficient use of resources
- Pricing should lead to improving the welfare of the community

To understand whether the welfare of the community is improved we need to introduce the concept of generalised cost. The generalised cost of a trip is the sum of the monetised values of travel time, vehicle operating costs, accident costs and hard costs for that trip. In the case of public transport the hard cost is the fare paid and in a car trip it is the parking charge plus any road pricing charge.

(i) Pricing To Fund The Strategy

This has the advantage of being simple and road prices are set at a level to fund the strategy. The required funding is approximately \$38 million per annum. This would not be efficient use of resources as the pricing will influence travel demand and ultimately reduce the overall demand for capacity. Funding the strategy would see surplus capacity provided. It is also not clear whether the aggregate of all the generalised cost of trips made has reduced, improving regional welfare. The provision of surplus capacity would suggest that users are paying more than they should be.

(ii) Optimising the Pricing – Land Transport Network

This strategy is based on the principle that capacity is not added until the revenue of tolling exceeds the cost of additional infrastructure. The decision to provide additional network capacity is made when the short run marginal cost equals or exceeds the long run marginal cost. This will lead to lower road pricing charges than the above approach and ensures that additional capacity is used efficiently. This approach will normally produce minimum aggregate generalised costs for travellers and therefore improves regional welfare.

(iii) Maximising Revenue

This strategy seeks to maximise revenue. Road pricing charges are increased to a level that maximises income. Capacity is not provided unless it leads to a revenue increase. This strategy is likely to see very little additional capacity provided. It is not clear whether this strategy will improve regional welfare but a goal of maximising revenue would suggest that users are likely to be paying more than necessary.

(iv) Economic Efficient Pricing

This requires tolls to be set to reflect the cost of the next unit of capacity and best estimates of externality costs are internalised through the pricing. This strategy will generate more than required revenue and will have a significant impact on reducing demand for network capacity. In the Wellington situation it is

very likely that under an economic efficient pricing scenario the public transport operation and its capital investment requirements could be run on a commercial basis. Unless the rest of the country can be persuaded to adopt the same approach it is unlikely that the system users will be better off as user generalised costs would have increased significantly and compared with other regions.

Whatever strategy is finally chosen it is important that it meets two criteria. These are that the user is better off and that the provision of capacity recognises the demand management capability of road pricing.

Ensuring that the user is better off can only be done at the aggregate system wide level by trying to minimise total user generalised costs. The travel demand management capability of road pricing can be recognised by applying principles such as the short run marginal cost equalling the long run marginal cost formula.

Such a formula as ensuring the short run marginal cost equalling the long run marginal cost does not remove the need for an overall strategy. This formula provides information on when it is efficient to add capacity. This is a timing issue for capacity and does not provide information on where capacity should be provided or on what mode or when non capacity related investment is required.

8. OTHER MEASURES

Map of Wellington Region showing TA boundaries, SH1, SH2 and rail lines, SH58, Port, Airport, Seaview and Transmission Gully proposed alignment.



The Wellington region's development has been constrained by its difficult topography. Land use development has generally occurred in areas which the topography has permitted. This has meant that land use development has taken place in tight corridors parallel to SH1 and SH2. The highways are complemented by the rail corridor.

Part of the strategy to reduce constraints on economic performance is to ensure efficient access is provided to and between centres of economic activity. This requires efficient access to be provided to the Port, Airport, the regions central business districts, industrial and distribution centres. Efficient access is also required to and between population centres. This focus on economic development is consistent with the thrust of the Regional Land Transport Strategy. Consequently the projects described below are now going through a process for inclusion in the Regional Land Transport Strategy.

The tight topographical constraints does not allow easy expansion of road capacity and so innovative approaches are required to capacity expansion which are complemented by bus, passenger rail and rail freight enhancements. For example, between the Hutt Valley and Wellington the four lane highway can physically only be expanded by one lane. Access to Wellington will be improved by reversible HOT lane and a major upgrade of passenger rail. The HOT lane is required to generate revenue but more importantly to ensure that the capacity between the Hutt Valley and Wellington City is in balance with downstream capacity. Unfortunately HOT lanes are not permissible under current legislation or new legislation proposals.

Access to the industrial and distribution centre in Seaview is of regional importance. Presently the Seaview area does not have an efficient connection to SH2 and is poorly connected to SH1 for travel north. The western end of SH58 is a two lane road with tight curves that does not permit trucks to travel easily. The western end of

SH58 is immediately adjacent to an ecologically sensitive inlet. This will make road improvements most unlikely.

Currently large trucks from the Hutt Valley and in particular the Seaview area have to travel south along SH2 and then up SH1 in order to travel north. This is inefficient and adds costs to the activities in Seaview and the Hutt Valley. An efficient link road from Seaview to SH2 is planned with a direct link road from SH2 to SH1. Inland of SH1 a new inland motorway is planned to make travel north-south more efficient. Modelling shows that a significant upgrade to passenger rail adjacent to SH1 will complement the inland motorway in improving access to Wellington and Porirua Cities.

The construction of the inland motorway and the link roads between SH2 and SH1 will be expensive and under the national funding system virtually impossible to fund. Fortunately these roads have all the attributes of being successful toll roads. Analysis confirms that they appear to be viable as toll roads.

The Wairarapa is the rural hinterland of the Wellington region and is made up of Masterton, Carterton and South Wairarapa districts. It is a depressed area.

East of Masterton there are significant stands of forestry which are due for harvesting. The nearest port is Wellington which is 90km away. When these logs come on stream the volume will have a significant impact on the road between Masterton and Wellington. This is particularly true of the narrow, steep mountainous road over the Rimutaka mountain range between Wairarapa and Upper Hutt. Here the road is very steep with very tight curves. The road currently carries only 3900 vehicles per day but the truck volumes involved in transporting the volumes of logs anticipated would add significantly to delay and safety problems for other vehicles. There are some bends on this road where a large truck cannot stay on its side of the road when negotiating the bend.

Upgrading the highway over the Rimutaka's to a suitable standard would be very expensive and unreasonable compared to the volume of traffic concerned. Expected costs could exceed \$200 million. Such a road upgrade would not be viable as a toll road.

Fortunately a rail line exists which has a single track tunnel under the Rimutaka Hill. An operation that involves trucking the logs from bush to a log transfer site at Masterton with the logs railroaded to Wellington to the Port appears to be a very compelling option compared to the economically inefficient highway upgrade. A subsidy for the operation that acknowledges the inefficient road expenditure avoided would appear appropriate.

9. CONCLUSIONS

New Zealand has significantly under invested in its transportation infrastructure for many years. There is growing evidence that this under investment is hurting the nation's economy and particularly the economy in the regions. Inefficient transport adds costs to product which makes the products origin less competitive economically.

Funding procedures in New Zealand devised by Transfund do not recognise the important role transport efficiency has in regional economic development.

Transfund's procedures invariably lead to short term band aid solutions to transport efficiency problems. There is inadequate funding for real solutions to transport efficiency problems.

Transfund does not recognise that New Zealand will be exposed to a national decline in oil production, leaving New Zealand vulnerable to increasing costs of imported oil or serious oil shortages. Oil depletion has major implications for the global economy, as well as national economies, and the world faces a major challenge to find clean and enduring sources of energy. An all-of-government approach to decouple per capita economic growth from per capita oil consumption is clearly needed in New Zealand.

There is no national context in New Zealand to develop travel demand management to ensure efficient use of infrastructure. Consequently demands at peak time for road transport in particular are frequently inefficient and counter productive in the main urban areas.

Strategies have been developed for the needs of regions such as Wellington but invariably these strategies are forced to plan for degraded transport efficiency and reduced economic performance due to inadequate funding and the lack of legal powers to introduce road pricing.

Sensible schemes exist to enhance a region's transport efficiency and consequently may enable improved economic performance in the regions. Unfortunately these possibilities can only be realised if regions can avoid the constraints of the national funding system and create its own destiny by its own means.

There is an urgent need for institutional and strategic reform to address these issues.

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