INCORPORATING ENVIRONMENTAL EFFECTS IN ROAD REFORM POLICY IN NEW ZEALAND

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Abstract: This paper looks at environmental issues related to road transport reform in New Zealand. Government is considering commercial models for roading having implemented far-reaching reforms in all other modes of transport. There is an urgent need to set in place environmental indicators for transport to ensure impacts can be monitored. Without such indicators, the incorporation of environmental externalities into road pricing cannot be undertaken with much precision. Transport users need to be assured that any implementation of charges will be fair, equitable and reflective of reality.

1. TRANSPORT REFORM

New Zealand has undertaken far-reaching reforms in its transport sector in recent years. Central government has removed itself from operational and ownership responsibilities. It has corporatised or privatised its interests in aviation (airline and air navigation) shipping, seaports and airports, railways and public transport. Local government as well have been required to divest themselves of ownership and operational transport roles, or if they retain ownership, the operations must be conducted by trading enterprises that are directed by Boards whose members are appointed for their expertise rather than through Local Body elections.

Deregulation has been a key plank in the reform process. Quantity licensing has been abolished. Restrictive conditions of entry have been removed in order to encourage competition both within and between the various modes of transport. Regulations are focused on safety issues with respect to facilities, operating standards and environments and on the qualities required of the personnel involved. Road maintenance must be open for tender with any Local Government owned trading enterprise required to compete with private enterprise for the work.

Labour requirements on the waterfront are no longer closed unionised fieldoms, with several stevedoring firms now able to compete. Demarcation disputes, once commonplace, have all but vanished. The productivity gains have been enormous, epitomised by the quick turnaround of vessels at the seaports, similar volumes of rail freight being handled with greater customer satisfaction by less than half the previous work force, and domestic air fares kept down by fierce competition from new entrant carriers.

2. UNFINISHED BUSINESS - ROAD REFORM

Roads have not been subjected, as yet, to the blow-torch of reform. However, the signals are clear that the New Zealand Government has every intention of lighting that blow-torch to reshape the way we build, maintain and manage roads in New Zealand. Following a process of extensive consultation since 1994, a publication *Better Transport Better Roads* (Ministry of Transport, 1998) was released by the government in December 1998 along with draft legislation for the proposed changes. All submissions on the proposals were required by 30 April, 1999.

In his "Foreword" to *Better Transport Better Roads*, the Minister of Transport, Maurice Williamson, states (page 2):

- Changes in our society and economy mean our road system is under pressure. The growth of our big cities has led to congestion. Developments in dairying, forestry and tourism mean that many rural roads are also under pressure;
- Our roads are not as safe as they could be safety should be a key feature in their design and operation to reduce the human and financial costs of crashes;
- Environmental costs associated with our roads and their use is too high including air, water and noise pollution, as well as the impact of roads on the landscape;
- 75 different entities managing our roads is too many for a country of New Zealand's size and population;
- We need a system where people are given a clear understanding of the costs of their road use, and that is smarter at deciding where new investment should go. A system that results in our resources being used very wisely;
- Lowering the benefit cost ratio required for a road project to be funded by Transfund, and spending more money on roads, would add costs to our economy, including our exports, but would not ensure the most beneficial projects proceed;
- Approximately \$400 million raised by petrol tax goes to roads, another \$600 million is used as general revenue to help fund areas like health and education. That cannot be used for roads unless Government finds the money from somewhere else; and
- If we wait, the problems will get worse, and the costs of changing will increase. If we act now, the changes can be managed in a gradual process without creating major upheaval. Taking the easy decision today, of doing nothing, means that only hard options will be available in the future.

Government is therefore proposing what it claims to be a simpler, commercially focused system of road management involving fewer specialised organisations that will be directly responsive to user's needs. It is important to note that users are not just the occupants of motorised transport but include pedestrians, cyclists and a myriad of other services that occupy space underground, overhead and on the surface of the road corridor. Local government taxes (property rates) would no longer be used to fund roads. Transport Minister, Maurice Williamson contends that 'over time users would be able to choose how they paid for the roads they want and they would be able to join together to negotiate better deals'. Particular lobby groups and vested interest groups such as a motorist's association or the commercial vehicle association could influence the road controlling companies to provide the facilities they want. Less powerful groups in the economy may find such 'deals' harder to forge.

The Minister contends (Ministry of Transport, 1998, p3) that there would be a number of important safeguards to protect the interests of the public:

- The roads we have would not be privatised;
- Communities would have input into decisions;
- We would retain the roads we currently have;
- The access rights of motorists, pedestrians and cyclists would be unchanged;
- People's privacy would be protected;
- Utilities would continue to use road-ways; and
- Charging for roads would be sensibly constrained.

There is debate over how local communities (what scale?) will have meaningful input into decisions that a commercial company might wish to take. Just who dictates the priorities (town, city, region, national interests) and how will these be set? Regional Land Transport Strategies exist under the *Transport Act 1962*, which may provide the means, after revisions, to signal local community priorities and desires, including concerns for environmental issues. Statements of corporate intent each year for the road companies ought not be in conflict with National Transport Policy Statements or with Regional Land Transport Strategies. Such safeguards should be mandatory. Kissling and Douglass (1993) note the need for long term strategies and holistic systems analysis in transport planning which Regional Land Transport Strategies can provide outside the horizon of political electoral cycles. Otherwise there is a danger as Bachels (1999) indicates that 'independent and uncoordinated urban transport and land use planning policies are producing synergistic and unintended outcomes, leading to increased car use and associated transport energy use.'

Just how charging for the use of roads can be 'sensibly constrained' is a moot point. There will be local monopoly control. A roading company may offer the choice of different routes, one with superior features (quicker transit etc) with differential charging. Users can make their own decision. There will not be two or more roading companies offering competing roads in the same geographical area. Roading companies with a high percentage of their roads in less well endowed areas may find meeting minimum standards difficult without considerable cross subsidy. Some areas could afford markedly better roads than other areas, encouraging further rural depopulation.

The Minister of Transport goes on to suggest that 'the new system would allow environmental costs to be better reflected in investment decisions and the way roads are used and managed.' (Ministry of Transport, 1998, p3). This is crucial to the full implementation of road pricing. Up to now, inclusion of environmental costs has been left in the too-hard basket. New Zealand has waited to see what other countries are doing. As yet there is no clearly superior methodology for incorporating environmental costs in road pricing.

3. THE ENVIRONMENTAL EFFECTS OF ROAD TRANSPORT

It is necessary to understand what are the environmental effects of road transport if meaningful policy is to be developed aimed at eliminating, reducing or mitigating unacceptable situations.

In September 1998, an interim report of the Transport and Environment Committee (TEC) of the New Zealand House of Representatives, Forty-Fifth Parliament was

released (NZHR, 1998). It is titled *Inquiry into the Environmental Effects of Road Transport*. The interim report was released because the government was well advanced in developing its policies for road reform in New Zealand and it was felt that policy should take into account the work of the TEC and its 22 interim recommendations which are:

Reform process

- 1. Make reducing the adverse environmental effects of road transport an explicit goal of any road reform proposals.
- 2. Experiment with road pricing trials to assess the feasibility and study the effects of charging full user costs, before proceeding with major institutional reform.
- 3. Put in place transitional funding arrangements which take full account of environmental effects and which will ensure alternatives to car use are "in place" in time for full road pricing.
- 4. Ensure that decisions about rights and duties of road users, road companies and the wider community are made explicitly and transparently.
- 5. Ensure reform proposals recognise the distinct needs of urban and rural area

Roading companies

- 6. Ensure that roading companies have a broad range of objectives (including environmental objectives), not only for profit maximisation.
- 7. Keep roading companies in public ownership.
- Place constraints on the borrowing of funds by roading providers during the early stages of the introduction of road pricing, until the effects of road pricing are monitored and the true demand for the building of new roads and the alternatives to doing so are assessed.

Direct reduction of environmental damage

- 9. Require that environmental damage from road transport be ameliorated to an appropriate level using road revenue.
- 10.Promote the use of CNG and LPG as transport fuels.
- 11. Implement air and noise emission control standards for new vehicles initially, but work towards mandatory testing of all vehicles as part of the vehicle inspection process.
- 12. Recognise that drivers of company cars are immune to price signals, and explore ways to rectify this. Investigate options for providing all government employees eligible for a company car or parking space with an alternative salary package, such as a cash equivalent.

Public Transport

13 Use some of the revenue from road pricing to finance the development of a range of efficient and attractive public transport options suited to each region.

Legislative framework

- 14. Review as a matter of urgency the legislative framework for managing the environmental effects of transport, with a view to improving its effectiveness.
- 15 Retain and clarify the strategic role of national and regional land transport strategies with any transitional funding system and any changes to the environmental management regime.

16.Retain and enhance transparent and participatory processes for the development of national and regional land transport strategies.

Research

- 17.Develop a road pricing model that explicitly incorporates environmental effects into road prices.
- 18 Initiate a work programme to assess the effects of transport on the human environment and ascertain the determinants of individual travel choice for a range of activities.
- 19. Search internationally for successful innovative models of land transport.
- 20 Monitor the effects of innovative demonstration projects, such as area-wide traffic calming.
- 21. Investigate fuel efficiency standards for new vehicles.
- 22. Investigate changes to the composition of diesel to reduce its adverse effects.

The TEC recognises the need for road reform. It notes that there are two underlying sets of issues involved. On the one hand there is the issue of *pricing and funding*. On the other hand there is the issue of *institutional design*. They have a concern that these should be considered simultaneously but the political drive at present is to first knock the institutional design into shape. Some analysts, this author included, believe that it is more important to settle upon the principles regarding pricing and funding of roads as institutional design can then be made to deliver the desired outcomes. There may be several institutional models that could meet the need. A number of local councillors express the opinion that road reform is being used as a stalking horse for further local government reform. By taking away the power of councils to set property rates to fund roads will mean a number of councils will have their major function removed. The pressure to merge and amalgamate with adjacent councils will be high and in some cases the resultant political boundaries will enclose vast geographical areas, compounding problems of local representation.

What drives the desire for road reform is that the current funding system is unfair and the distribution of costs (charges) does not reflect the distribution of benefits. For instance, commercial road vehicles pay the same per kilometre travelled regardless of whether full or empty (which has implications for damage to roads) and regardless of whether they are journeying in urban congestion or in free-flow rural conditions. Households with no cars pay the same property rates as households with two or more vehicles contributing to traffic on a daily basis.

The first TEC recommendation clearly indicates a concern within TEC that road reform might proceed without incorporating environmental effects as an explicit goal because the necessary research has not been completed. The incremental approach mentioned by the Minister would see the addition of environmental charges at a later date. How much later is a concern that is shared widely. There is a tension politically between those who wish to press on quickly with the restructuring of the institutions that look after roads, and those who wish to slow the pace of change to allow some of the environmental questions to be answered. The call in recommendation number two reinforces this desire for trials before reform, and in recommendation three there is a cry for consideration of non-car alternatives to be considered, probably for fear that new roading companies would tend to be car and commercial vehicle oriented organisations. Our present law is not all-inclusive in stating who has what rights in the use of roads. Much of the present usage is customary and unless properly codified in a transparent manner, some rights may expire upon the transfer of control to the proposed new companies. Recommendation five, recognises that whilst the economy may be articulated from urban areas where the majority of New Zealand's population reside, the rural areas are vital to that economy and have distinct transport needs that should not be overlooked as the problems of urban congestion are tackled, urged on by the urban majority.

In looking to reduce the direct environmental damage, the TEC highlights in its recommendations nine to twelve, various pathways that could be followed with good positive outcome. The thrust of recommendation twelve cuts to the heart of a cultural-behavioural shift that is needed if much progress towards reduction in car use is to be achieved. The company car is very much a part of the managerial remuneration package now in vogue. It will not be easy to shift the present mindset until the true costs of using that vehicle fall upon the driver rather than the company.

Recommendation thirteen raises the hackles of non public transport road users. They find it difficult to see why they should subsidise users of public transport even though the more people who ride in public transport, especially if it is segregated from other road traffic, the more space they will have on the road for themselves. The key lies in *efficient* and *attractive* public transport that can provide similar and timely door-to door service comparable to the private car. There is no doubt that environmentally, some forms of public transport are far superior to the private car. The accent on moving people rather than vehicles is more energy efficient and space saving with public transport. Again, it is a shift in social culture that is required unless astoundingly innovative, efficient, attractive and cheap public transport is developed to meet the needs of New Zealand's relatively low density sprawling urban populations.

4. ENVIRONMENTAL LEGISLATION

4.1 Resource Management Act 1991

New Zealand's main piece of environmental legislation is the *Resource Management* Act 1991 and subsequent amendments (RMA). Currently, in 1999, there are proposals to make significant alterations to the RMA which may impact the way transport environmental issues are handled in the future. Most other pieces of legislation in New Zealand, including the *Transport Act 1962*, must conform to the principles set out in the RMA with respect to environmental matters.

The main legal and regulatory issues with respect to transport and the environment relate to air pollution, noise and the disturbance caused by congestion (Alexandre, 1991, p3). In New Zealand, the most effective piece of legislation to deal with these issues is the RMA (Harrison, *et.al.* 1998, p2-1) The Act sets up a system of policy and plan preparation and administration which allows the balancing of a wide range of interests and values. Central Government has direct influence on environmental issues through the Act, which has a clear purpose and identifies issues of national importance. The Government may use National Policy Statements to specify national priorities, and can promulgate national environmental standards on such matters as noise, contaminants and air quality. Regional and District Plans produced by Regional

Councils and territorial authorities cannot be inconsistent with a National Policy Statement. Section 32 of the Act requires that any environmental Standard, Policy, Statement or Plan under the Act should pass the tests of being necessary, and is the most efficient way to achieve the desired result. This means that the evaluations of alternatives must be considered.

4.2 Noise

"Transport is by far the major source of noise, ahead of industry, building, etc., with road traffic, mainly in urban areas, the chief offender (15 percent of the OECD population exposed to noise levels above 65dBA).... Forecasts show that because of traffic growth and despite current international standards (UN-ECE and EEC for motor vehicles and ICAO for aircraft), noise will increase unless more stringent measures are adopted....(T)he extent of the "grey areas" (mediocre noise levels - 55 to 66 dBA) is constantly increasing because noise sources are spreading in time and space." (Alexandre, 1991, p3)

As Harrison, *et.al.* 1998 note, "The Resource Management Act 1991 includes specific definitions on noise and excessive vibration (Sections 2(1) and Section 326(2)(e))." The Act gives a duty to avoid unreasonable noise. Case Law has shown that the application of standards does not result in any degree of enforceability which means that ultimately one has to fall back on Section 16 of the Act which focuses on the duty to always take the best practicable option in relation to noise. Important factors are the time, location and extent to which any person is annoyed. Awareness of noise can be very subjective. At night noise is more significant as there is generally less background ambient noise, especially in quiet residential areas.

4.3 Air Pollution

"Fuel combustion is the largest single contributor to air pollution, with mobile sources becoming increasingly responsible for the biggest share. Road traffic, the dominant cause of pollution, produces carbon monoxide (CO) and dioxide (CO₂), hydrocarbons (HC) and nitrogen oxides (NOx), lead, fine particulates, various compounds. Some pollutants combine and form photochemical oxidants (smog) and acid deposition." (Alexandre, 1991, p3)

New Zealand's participation in two international Conventions, the Montreal Protocol 1987 held on substances that deplete the ozone layer and the Earth Summit meeting in 1988 in Toronto, have led the New Zealand Government to adopt policy on carbon dioxide emissions that has the target of a net reduction of 20 percent by the year 2005. Over 40 percent of New Zealand's carbon dioxide emissions are from transport with 2.7 million tonnes of carbon dioxide emissions in 1989 increasing to 8.86 million tonnes by 1992 but reducing to 6.144 million tonnes in 1995 (Ministry of Transport, 1995). New Zealand ranks fourth in the world behind the United States, Australia and the United Kingdom in carbon dioxide emissions per capita (Ministry of Commerce, 1991, p19) reflecting our highly motorised society. Fortunately we are small such that our total contribution to greenhouse gasses is small; approximately 0.1 percent of total carbon dioxide emissions.

Regional Councils hold statutory responsibility in New Zealand under Section 15 of the RMA for carbon dioxide emissions as the definition of contaminant in Section 2(1) includes gases (Harrison *et. al.* 1998, p 2-12). A Working Group on Carbon Dioxide Policy noted in June 1996 that there was no explicit policy to govern transport sector emissions either under the RMA or any new proposal. Encouraging adoption of best practicable means and a "no regrets" approach to resource consents to reduce carbon dioxide emissions and monitoring are the limit to current intervention.

Even though the RMA does not provide exact controls for emissions from vehicles, it is possible for Regional Councils under Section 75 of the RMA, when drawing up Regional Air Quality Plans, to impose some localised requirements that might limit the time and place of use of vehicles that are the worst offenders, thus mitigating the adverse effects of road transport vehicles on air quality. The development of Regional Air Quality Plans is in process and subject to widespread consultation. It is unlikely any two Regional Air Quality Plans will be the same and only the worst affected areas will be subject to such plans in the medium term.

Whilst vehicle emissions are in conflict with the RMA's purpose, there is no control in reality in that an activity lawfully established before a Plan under the RMA was notified; which activity has not been discontinued for a continuous period of more than 6 months since the proposed Plan was notified, may continue in accordance with Section 20 (1). Short of the whole country coming to a halt for six months, transport can continue its emissions with impunity.

Nevertheless, the Government of the day has power to intervene under RMA Section 360 (1)(h) by "Prescribing exemptions from any of Section 15, either absolutely or subject to any prescribed conditions, and either generally or specifically or in relation to particular descriptions of contaminants or to the discharge of contaminants in particular circumstances or from particular sources, or in relation to any area of land, air or water specified in the regulations." Getting tough on road transport vehicle emissions may not be a politically attractive option until such time as the climate of public opinion has been altered and there is general acceptance that change is required perhaps for our very survival.

4.5 Odour

"Odour is the human perception of chemicals in the air that we breath. It is not a separate discharge, but rather the effect of the discharge we experience" (Williams, 1997, p 375). Refuse collection vehicles are a potential source of obnoxious odours as are refuse collection sites where rubbish is accumulated, perhaps sorted for recyclable materials, before transfer to a place of final disposal. There is a real possibility that decomposing odorous material can adversely affect the working environment of adjacent businesses and residences. Where the adverse effects cannot be avoided or mitigated, even with elaborate operating conditions imposed, then such activity would not meet the purpose of the RMA, and alternative disposal methods and sites need to be considered. Odour is an effect. Therefore odour problems become a management issue.

4.6 Discharge

Under the RMA, the definition of "discharge" includes emit, deposit, and allow to escape. The Act prohibits the dumping of offensive material on roads and the discharge of contaminants. It obliges councils, through their plans and other planning instruments, to ensure that adverse effects of activities on the roading network be mitigated, remedied or avoided. A very real problem is that there is no explicit power under the Act for enforcement officers to stop vehicles on the road (Harrison *et.al.*, 1998, p2-20). The use of usual enforcement instruments such as the service of an abatement notice, or undertaking an inspection in order to determine compliance with a plan or consent, are therefore limited when dealing with a moving target.

An example of a particular transport discharge problem from vehicles in New Zealand is the effluent that escapes from stock trucks which are moving animals from place to place (Kissling, 1997; Thull 1998a; Thull, 1998b) Not all stock truck operators have containment facilities fitted to their vehicles, and those that do, often do not use them as there are no in-transit dump site facilities into which they can discharge the accumulated effluent. The magnitude of the problem could be mitigated by farmers standing their stock for about four hours to empty out before loading into the vehicles, by all stock cartage contractors fitting and using effluent containment tanks; by meat processing companies, saleyards and other destinations agreeing to an industry code of practice to receive both stock and their accumulated effluent (up to 400 litres per arrival), by stock agents coordinating better the exchange of logistics information between farmers, truck companies, saleyards, and meat processors, and by roadcontrolling authorities making available a strategic network of public effluent disposal facilities for stock trucks to use when travelling the State highways. This will also involve Regional Councils in the issuance of appropriate Resource Consents for the discharges. An educational video on the problem has been produced (Kissling and Thull, 1998).

The Transit New Zealand Act 1989 establishes the main statutory framework for the control of effluent discharge from stock trucks on State highways (Harrison *et. al.*, 1998, p2-21-22). Section 51 of that Act states every person commits an offence who:

(e) causes or allows any water, tailings, or sludge, or any offensive matter, to flow from any vehicle, building, or land under the person's control or in the person's occupation on to a road, or into any ditch or drain associated with a road, whether or not on the road; or

(f) causes or allows any material or thing to fall on to a road from any vehicle to the danger of lawful road users; or

(h) wilfully or negligently causes or allows any substance harmful to sealed or paved road surfaces, or likely to create a danger to vehicles on such surfaces, to escape on to any road having a sealed or paved surface; or

(m) does or causes or permits to be done any act whatever by which any damage or obstruction is caused to a road -

is liable on summary conviction to a fine not exceeding 1,000 and to a further fine of 50 for each day the offence continues. Section 51(3) provides for a further penalty for the clean up costs to be imposed in addition to any penalty.

Seemingly, this law should eliminate the effluent escaping from stock trucks on roads, but only one prosecution under this legislation has taken place. The *Transport Act*

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1962 also defines strict liability for offences involving insecure loads and loads falling from heavy vehicles. Subsection (1) states that the operator of every heavy motor vehicle shall ensure that any load carried in or on the vehicle or any vehicle being towed by a heavy vehicle operated by him is secured or contained in such a manner that it cannot fall or escape from the vehicle. However there is a problem in that Section 70(7) defines the term "load" as not including animal waste discharged from animals being carried on the vehicle at the time. Until this section is repealed or amended, there remains inconsistency between the *Transit New Zealand Act 1989*, the *Transport Act 1962*, and the *Resource Management Act 1991* on the issue of effluent escaping from stock trucks (Heffernan, 1997).

Authorities have been reluctant to pursue truck operators where there is some ambiguity in the law and before there are adequate discharge facilities available for them to use. Widespread prosecutions could impact severely on New Zealand's livestock industry which is very important for the New Zealand economy.

4.7 Dangerous Goods

As indicated in Harrison *et.al.* 1998, p 2-25 the transportation of dangerous goods over land is an environmental issue only if there is an accidental escape of the goods. Based on United Nations recommendations on the transport of dangerous goods (United Nations, 1995), New Zealand has developed its own *Land Transport Rule 45001 Land Transport Safety (Dangerous Goods)*, see (Land Transport Safety Authority, 1996). This document provides guidance on packaging, labelling and marking, documentation, segregation, placarding, transport procedures, training and compliance.

5 LAND TRANSPORT PRICING

The Land Transport Pricing Study (1996) was written by the Ministry of Transport to provide a basis to "develop a safe, sustainable transport system at reasonable cost that will meet the needs of New Zealand in the twenty-first century. This will necessitate establishing the appropriate pricing and regulatory framework to ensure that users face the full economic costs of their decisions to use land transport." (Ministry of Transport, 1996, p5). The terms "safe", "sustainable" and "at reasonable cost" were defined in the document *Transport Directions 1994-1999* (Ministry of Transport, 1994, p3). "Safe" means having a reasonable freedom from danger, personal risk and the risk of property damage. "Sustainable transport" is taken to include meeting certain social, economic and environmental targets in the development and operation of New Zealand's land transport system. "At reasonable cost" is taken to mean where the benefits to New Zealand exceed the costs to New Zealand.

One of the component areas addressed in the *Land Transport Pricing Study (1996)* was environmental externalities in which a review was made of the environmental impacts of transport on air quality; greenhouse gases, water quality, and noise. The study noted that "Externalities are those unpriced effects associated with the production, distribution and consumption of goods and services....(E)externalities are costs which individuals impose on others and the environment through their behaviour...." (Ministry of Transport, 1996, p11). Measuring the costs of

environmental externalities has proved to be a very difficult process. There has been no concerted attempt to look at congestion costs and pricing at this stage.

After feedback on the various volumes in the Land Transport Pricing Study (1996) from interested parties, The Ministry of Transport brought out another document Options for the Future, Land Transport Pricing Study, Discussion Document (1997) (Ministry of Transport, 1997). Three major concerns relating to the current system of roading are identified:

- Traffic growth of 3.9 percent per year over the past decade
- Funding for maintenance and expansion of the roading system is not sustainable over the long term under current formula
- Population and traffic growth, urban expansion and development pressures, together with a growing awareness of the environmental and safety impacts of vehicle use, are now changing the focus of our roading system.

The publication also notes that "Road transport is currently the single largest sector of the economy that does not have its environmental effects systematically controlled by either central or local government... (T)he costs of these adverse (environmental) effects are significant, and, with growth in the use of our road transport system, these cumulative impacts are growing rapidly. However, there are difficulties in applying pricing mechanisms to these costs, as:

- current work has not been able to determine the scale of these costs with sufficient accuracy to have them incorporated into any road-charging regime; further work must be undertaken,
- appropriate institutional and legal mechanisms for instituting any charging regime need to be developed and put in place, and
- pricing alone may not provide least cost solutions to externalities." (Ministry of Transport, 1997, p32-33).

6. IN SEARCH OF TRANSPORT ENVIRONMENTAL INDICATORS

A National Environmental Indicators Programme (NEIP) has been set in train. "Recognising the need for environmental indicators for key environmental conditions to enable consistent impact measurement and assessment, the Ministry for the Environment is coordinating a programme to develop a core set of national environmental indicators. This programme of work is occurring at the same time as the Ministry of Transport's work programmes which are outlined below. Monitoring of environmental indicators will provide accessible and understandable information for decision-makers. Work is under way to develop a draft set of indicators for air (including noise), land, and fresh water. A discussion document seeking consultation on this draft set of indicators is planned for release in 1997. In addition, specific sector and global environmental indicators are also proposed. These include climate change and transport, and a draft set of environmental indicators for the transport sector will be produced mid-1997. These indicators are a crucial part of establishing environmental bottom lines against which transport impacts can be evaluated to determine the degree of their impact." (Ministry of Transport, 1997, p90).

As it has transpired, work on the Environmental performance indicators for transport only commenced late in 1999, and a Transport Indicators Focus Group (TIFG), chaired by the author, accepted its terms of reference from the Ministry for the Environment in December 1999. The aim is to have a draft set of about 10 appropriate transport indicators for the New Zealand Environmental Performance Indicators Programme, by July 1999. These will add to the core indicators produced for air, fresh water, land, ozone and climate change as part of the Government's *Environment 2010 Strategy* (Ministry for the Environment, 1995).

The working papers produced during the transport indicators selection process are confidential to the TIFG. However, given the expected release of a draft set of indicators for discussion by August 1999, the author may be able to present an update on progress to the Taipei conference meeting of the Eastern Asia Society for Transportation Studies (EASTS) when this paper is scheduled to be delivered.

7. CONCLUSIONS

Road reform is seen as necessary to complete the restructuring of the overall transport sector in the New Zealand economy. There is a strong desire to incorporate consideration of environmental outcomes in the framework for future road transport infrastructure planning and for the conduct of transport operations. This is reflected in environmental legislation such as the *Resource Management Act 1991*.

It is expected that late in 1999, a consultative document concerning transport environmental indicators will have identified a limited set of indicators that are of immediate value as they can make use of existing data series. However, effective monitoring of transport-environment interactions is likely to require additional quantitative and qualitative indicators for which new data collection is required. Responsibilities for that process and data maintenance will need to be established.

There is a parallel desire to ensure that roading is provided effectively and efficiently under the *Transport Act 1962* with users bearing their fair share of the costs in similar fashion to their use of other modes of transport. It can be argued that the haste to set in place new authorities for controlling the creation, maintenance and use of the roading infrastructure is premature given that, as yet, there is no precision in the quantification of environmental costs, nor in the attribution of those costs to different classes of road user. However, the creation of new roading companies, if implemented, may quicken the resolve to research those costs if such companies are going to be held accountable for the environmental consequences of their activities. Users of their infrastructure need to be confident that charges will be fair, equitable and reflective of reality otherwise unintended economic and social outcomes could arise from the proposed reforms.

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