

SUBMISSION TO ROAD USER CHARGES REVIEW GROUP

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EXECUTIVE SUMMARY

Review of RUC Regime

The user pays Road User Charges (RUC) regime of weight and distance charges for Heavy Vehicles (HVs) made New Zealand a world leader in transport policy. The RUC regime is well founded and is required to ensure users pay for their infrastructure costs and to promote a level playing field between competing transport modes.

In contrast to fuel excise and registration taxes, RUC provides an explicit link between HV use and damage, and expenditure on the land transport system. The RUC regime is consistent with economic efficiency and equity because charges are related to road usage, vehicle type and weights carried.

However the paper-based and manual compliance system is now well past its use-by-date, and consideration needs to be given around the best way to charge light diesel vehicles. RUC evasion is estimated to be around 5-10% (\$40-80 million) of RUC revenue, and regulatory credibility is further undermined because mechanical hubodometers are not reliably fit for purpose given financial importance of RUC.

There is little doubt that high compliance costs are a key contributor to poor relationships between the transport industry and regulatory agencies. There is a strong case to recommend substantial reform of the existing paper-based RUC regime.

RUC Reform Agenda

The opportunity exists to make substantial and meaningful reform to improve and modernise the RUC regime. In particular RUC administration and the Cost Allocation Model (CAM) need to be updated to ensure they reflect current thinking and technology developments, and support wider government transport policy objectives. Specifically:

1. Adopt a next generation internet based service model to facilitate the purchase and management of RUC online for HVs.
2. Facilitate the management and payment of RUC refunds online.
3. Lower RUC transaction fees so that they are cost reflective, based on a technologically advanced service model.
4. Replace Distance and Supplementary Licences with a new Distance Licence that can be purchased in any km increment and reflects actual GVWs.
5. Allow accredited operators to pay for their RUC in arrears, in line with normal commercial arrangements.
6. Facilitate the introduction and adoption of secure electronic hubodometers.
7. Modify RUC rates to incentivise the adoption of low emission, hybrid, safe and road friendly HVs.
8. Allow heavier loads and increased dimension rigs on designated routes through the establishment of an access regime based on the Australian Intelligent Access Program.

9. Modify RUC rates to incentivise HVs to travel off-peak, thereby increasing the efficiency of infrastructure use, improving environmental outcomes, and lowering industry costs.
10. Modify RUC rates to incentivise the adoption of modern diesel, electric and hybrid light vehicles.

Benefits from RUC Reform

The proposed package of reforms will:

- create substantial savings in administration, transaction and compliance costs
- lower RUC evasion and improve relationships across the sector
- generate higher RUC revenues and reduced opportunity for fraud
- reduce enforcement and agency costs
- help promote a modern HV fleet with fewer and more safer vehicles
- resolve shortcomings associated with the use of mechanical hubodometers
- reduce disputes and level of regulatory oversight because of improved reliability and accuracy of electronic hubodometers
- remove requirement to operate and support cumbersome Direct Connect facility
- improve returns to operators and drivers and generally reduce stress and hassle associated with RUC compliance
- improve economic performance through a significant improvement in transport productivity
- contribute to improved environmental and community outcomes
- lower greenhouse gas emissions
- provide for enhanced service levels and on-going incentives for innovation
- future-proof New Zealand for adoption of next generation of road charging technology
- contribute to the promotion of the objectives of the NZ Transport Strategy and Government Policy Statement on Land Transport Funding.

Overall the program of suggested reforms will improve the achievement of transport efficiency goals and ensure a fair outcome for users by minimising compliance and transaction costs, while at the same time ensuring that users continue to pay for their fair share of infrastructure costs. The package has the potential to deliver significant gains to the transport industry, Crown agencies and the New Zealand economy.

Timetable and Transition Arrangements

Widespread deployment of internet based e-commerce service models have been shown to dramatically reduce costs while at the same time providing enhanced service levels and on-going incentives for innovation. The migration of the existing RUC regime to a modern internet based service delivery model should be undertaken in the shortest possible timeframe.

The scale of compliance costs associated with the existing paper based RUC regime indicates that a prolonged implementation timetable is not desirable and indeed will simply postpone the achievement of productivity and environmental benefits available from a reform package.

Although RUC reform could affect the existing distribution of charges, incidence issues are not likely to be of a significant magnitude, and would be overwhelmed by savings for users and agencies in administration, compliance, transaction and enforcement costs.

International Review

The international review highlights a steady movement towards electronic HV charges and road pricing to finance infrastructure, control congestion and improve community and environmental outcomes.

Increasing vehicle fuel efficiency and the rapid growth of alternative fuels and hybrid light vehicles and HVs, have also contributed to a developing consensus that a major shift in transport funding is required away from fuel excise and registration taxes towards distance, time, location, and emission based charges.

European experiences of using electronic HV tolling show that a distance/emission charge can contribute to:

- an environmentally friendlier vehicle fleet and significant reductions in greenhouse emissions
- more efficient use of HVs and increased load factor
- possibilities to route traffic to roads where it is least disruptive
- better conditions for increasing the proportion of rail and sea transport.

Alternatives Available to RUC

International trends are consistent with New Zealand's experience with light vehicle fuel excise revenue trends and reinforce the original logic behind the introduction of the RUC regime. In this sense New Zealand truly was a leading light in transport policy when it introduced weight and distance charges for HVs in 1978.

The suggestion that RUC could be replaced by a fuel excise and vehicle registration tax regime would be a backwards move, completely at odds with international trends, and ultimately unsustainable as the revenue potential of excise taxes continues to be eroded by:

- increasing vehicle fuel economy
- very poor ability to link use with road damage, congestion and environmental costs
- blended and alternative fuels
- increased availability and adoption of electric and hybrid cars and HVs
- policy targets to shift more freight by rail and sea
- higher construction costs
- increased revenue demands.

Electronic Road User Charges (eRUC)

An increasing number of successful electronic eRUC schemes are now in operation. The technology tools to implement an eRUC scheme in New Zealand are available, while at the same time costs and risks are falling. When combined with a competitive institutional model that promotes service delivery and innovation, New Zealand has the opportunity to regain its place as a transport innovator and move RUC away from a narrow focus on cost recovery towards the achievement of wider policy targets.

New Zealand has a large pool of relevant technology skills and capacity to develop and implement an eRUC solution. The introduction of an eRUC scheme would provide a timely opportunity to develop a local high technology sector based on road pricing and related services. An eRUC scheme would generate export opportunities for New Zealand providers from the global move towards electronic HV charging. Looking to the future some commentators have suggested that the intelligent road charging industry will form the vanguard of the next industrial revolution.

About EROAD

EROAD Limited is a leading New Zealand owned technology company that is focused on the field of vehicle charging and associated services using state-of-the-art hardware and an internet based delivery application.

EROAD CEO Steven Newman was previously CEO/COO and joint-founder of Kiwi success story Navman. Steven leads a large development and support team based at its Albany headquarters on Auckland's North Shore.

EROAD's core product, the eHubo[®], is the world's first secure electronic distance recorder designed specifically to support the New Zealand RUC regime. Manufactured in Auckland, the eHubo has been developed to offer the transport sector a cost effective and superior alternative to imported mechanical hubodometers. EROAD has also developed a bank grade internet application to provide integrated RUC management and associated services.

Additional material and references available at www.eroad.co.nz

1 REVIEW OF RUC REGIME

1.1 Introduction

The user pays RUC regime of weight and distance charges for Heavy Vehicles (HVs) made New Zealand a world leader in transport policy. However the paper-based and manual compliance system is now well past its use-by-date, and consideration needs to be given around the best way to charge light diesel vehicles.

1.2 Background

The RUC regime is well founded and is required to ensure users pay for their infrastructure costs and to promote a level playing field between competing transport modes. In contrast to fuel excise and registration taxes, the RUC schedule provides an explicit link between HV use and damage, and expenditure on the land transport system. The RUC regime is consistent with economic efficiency and equity because charges are related to road usage, vehicle type and weights carried.

1.3 Cost Allocation Model

Although recognised as internationally progressive the underlying cost allocation model (CAM) now suffers from a number of shortcomings and the RUC schedule needs to be updated. The CAM:

- encourages HV vehicle configurations to be 'over-axled' relative to international norms
- does not reflect reduced damage from the use of road friendly tyres and suspension
- does not encourage the adoption of modern low emission vehicles
- does not encourage the adoption of renewable fuels
- is not designed for allocating costs to the growing light diesel vehicle fleet.

In addition the underlying 4th Power rule for allocating pavement wear should be reviewed to ensure it reflects the latest thinking around pavement wear. Likewise the existing load and averaging assumptions should be reviewed to ensure they reflect contemporary truck and trailer load patterns.

1.4 RUC Administration

Market research conducted by EROAD has found a clear preference for on-line service delivery of RUC and related HV services. By comparison the existing RUC system can be very inconvenient for HV customers, imposes significant compliance costs, and is vulnerable to fraud and evasion. Specifically under the existing paper-based regime HVs have no ability to:

- purchase and manage RUC Licences online 24/7
- purchase RUC online with credit cards
- manage off road refunds online
- purchase Distance and Supplementary Licences in flexible increments
- pay for RUC when it is consumed in line with normal user pay arrangements.

In addition RUC transaction fees are not consistent with forward-looking costs, and are significantly greater than comparable electronic transaction fees.

1.5 Mechanical Hubodometers

In addition to the requirement to update the CAM and address shortcomings in the administration of RUC, high failure rates for imported mechanical hubodometers are a constant source of irritation and frustration for both users and the enforcement agencies. Specifically:

- not designed for left-hand drive vehicles
- RTF study found 100,000 Kms is typical service life
- annual failure rate is around 15% (20,000 units) p.a. (+5000 new units p.a.)
- rigidly mounted on axle with tyre being only protection from road shocks
- accuracy can vary widely and difficult to verify
- subject to error, estimated at 4%, from tyre wear and inflation pressure
- wheel hop and bumps can introduce further errors
- mounting problems and accidental damage contribute to high failure rates
- time and place of failure cannot be accurately determined
- cost and administration of changing a failed hubodometer onerous and time consuming – estimated to be around \$500 per failure
- many change of hubodometer RUC refund claims challenged on basis of odometer readings, but odometer inaccuracy can be up to 10%
- easy to tamper with and difficult to detect.

1.6 Conclusion

RUC evasion is estimated to be around 5-10% (\$40-80 million) of RUC revenue, and a Road Transport Forum study suggests that the existing paper-based system imposes around \$100m p.a. in administration and compliance costs. Regulatory credibility is further undermined because mechanical hubodometers are not reliably fit for purpose given financial importance of RUC.

Research undertaken for the MOT shows that many operators are overbuying RUC for their average weights due to onerous penalties for non-compliance¹. In addition many honest operators find themselves in situations where they are penalised for accidental non-compliance. When coupled with high rates of evasion, the present regime has created a situation whereby aggregate RUC revenues are being maintained because honest operators end up cross-subsidising unlawful operators. This is clearly a poor outcome in terms of the objectives of economic efficiency, equity and cost recovery.

There is little doubt that high compliance costs are a key contributor to poor relationships between the transport industry and regulatory agencies. To conclude there is a strong case to recommend substantial reform of the existing paper-based RUC regime.

¹ *Heavy Vehicle Road User Charges Investigation*, Ministry of Transport, 2008.

2 RUC REFORM AGENDA

2.1 Introduction

The opportunity exists to make substantial and meaningful reform to improve the RUC regime within the broad constraints of the existing framework. In particular RUC administration and the CAM need to be updated to ensure they reflect current thinking and technology developments, and support wider government transport policy objectives.

2.2 RUC Reform Agenda

1. Adopt a next generation internet based service model to facilitate the purchase and management of RUC online for HVs.
2. Facilitate the management and payment of RUC refunds online.
3. Lower RUC transaction fees so that they are cost reflective, based on a technologically advanced service model.
4. Replace Distance and Supplementary Licences with a new Distance Licence that can be purchased in any km increment and reflects actual GVWs.
5. Allow accredited operators to pay for their RUC in arrears, in line with normal commercial arrangements.
6. Facilitate the introduction and adoption of secure electronic hubodometers.
7. Modify RUC rates to incentivise the adoption of low emission, hybrid, safe and road friendly HVs.
8. Allow heavier loads and increased dimension rigs on designated routes through the establishment of an access regime based on the Australian Intelligent Access Program.
9. Modify RUC rates to incentivise HVs to travel off-peak, thereby increasing the efficiency of infrastructure use, improving environmental outcomes, and lowering industry costs.
10. Modify RUC rates to incentivise the adoption of modern diesel, electric and hybrid light vehicles.

2.3 Benefits from RUC Reform

The proposed package of reforms will:

- create substantial savings in administration, transaction and compliance costs
- lower RUC evasion and improve relationships across the sector
- generate higher RUC revenues and reduced opportunity for fraud
- reduce enforcement and agency costs
- help promote a modern HV fleet with fewer and more safer vehicles
- resolve shortcomings associated with the use of mechanical hubodometers
- reduce disputes and level of regulatory oversight because of improved reliability and accuracy of electronic hubodometers
- remove requirement to operate and support cumbersome Direct Connect facility
- improve returns to operators and drivers and generally reduce stress and hassle associated with RUC compliance

- improve economic performance through a significant improvement in transport productivity
- contribute to improved environmental and community outcomes
- lower greenhouse gas emissions
- provide for enhanced service levels and on-going incentives for innovation
- future-proof New Zealand for adoption of next generation of road charging technology.

2.4 Timetable and Transition Arrangements

Widespread deployment of internet based e-commerce service models have been shown to dramatically reduce costs while at the same time providing enhanced service levels and on-going incentives for innovation. The migration of the existing RUC regime to a modern internet based service delivery model should be undertaken in the shortest possible timeframe.

The scale of compliance costs associated with the existing paper based RUC regime indicates that a prolonged implementation timetable is not desirable and indeed will simply postpone achievement of productivity and environmental benefits available from a reform package.

Although RUC reform could affect the existing distribution of charges, incidence issues are not likely to be of a significant magnitude, and would be overwhelmed by savings for users and agencies in administration, compliance, transaction and enforcement costs.

2.5 Conclusion

The RUC Reform Agenda would update and modernise the RUC regime, while continuing to maintain and enhance the link between road use and transport expenditures. In addition the opportunity exists to modify the RUC regime to support wider policy goals as set out in the NZ Transport Strategy and Government Policy Statement on Land Transport Funding. The reform initiatives are technologically progressive, achievable in a short time frame, and in addition, could be revenue neutral.

The legislative framework should be updated to promote the approval of modern secure electronic hubodometers. The use of modern electronic hubodometers offers the industry and regulatory agencies the opportunity to adopt an affordable and innovative technology solution to resolve many outstanding issues with the existing RUC regime. Electronic hubodometers will improve industry relationships and lower industry and enforcement costs.

Overall the program of suggested reforms will improve the achievement of transport efficiency goals and ensure a fair outcome for users by minimising compliance and transaction costs, while at the same time ensuring that users continue to pay for their fair share of infrastructure costs.

Looking to future work should be undertaken to update and future proof the supporting RUC legislation to facilitate the introduction of the next generation electronic RUC service delivery model.

3 INTERNATIONAL REVIEW

3.1 Introduction

The package of RUC reforms has the potential to deliver significant gains to the transport industry, Crown agencies and the New Zealand economy. This section discusses developments in road charging technology and also presents a survey of international experience and trends in electronic road charging.

3.2 The Move to Road Pricing

The free movement of passenger vehicles and freight is a central pillar of the modern economy, but global problems from congestion and environmental damage have prompted many governments and communities to promote a radical change in transport funding away from fuel excise and registration taxes towards distance, time, location, and emission based charges.

In addition fuel excise taxes are being undermined by:

- increasing vehicle fuel economy
- very poor ability to link use with road damage, congestion and environmental costs
- blended and alternative fuels
- increased availability and adoption of electric and hybrid cars and HVs ²
- policy targets to shift more freight by rail and sea
- higher construction costs
- increased revenue demands.

3.3 Road Charging Technology Overview

Rapid technological development and convergence, supported by overseas experience of electronic HV charges and extensive road trials, suggests that electronic road pricing will become widespread and a cost effective means of replacing fuel excise and registration taxes for all vehicle types. Traditional gantry based technologies, while useful for cordon or link charging are not a practical or cost effective solution for regional or national road pricing applications.

Road pricing technology is based on the combination of proven and widely available technology components whereby:

1. An On Board Unit (OBU) uses GPS signals to pinpoint and record vehicle location
2. Position, distance and time data is then transmitted via a mobile data network from the OBU to a computer centre to calculate toll fees on the route segments travelled

² Appendix One contains an overview of the emerging hybrid HV market. Light hybrid and electric vehicles are also becoming widely available. For example BMW will release an electric Mini in 2009, and Hyundai is expected to be first to market with an electric car in New Zealand.

3. An invoice can then be generated and sent to the user at pre-determined intervals or deducted from a pre-paid account to ensure user privacy

Using this technology platform, road pricing can be differentiated according to distance, time, location and vehicle emissions. Moreover GPS tolling is infinitely flexible and can be used for proactive traffic management, or to respond to dynamic events such as accidents or congestion. Finally a GPS tolling platform can provide a host of value added services around safety, navigation, communications, and security.

3.4 International Survey

Since 2001 **Switzerland** has operated an eRUC regime for all HVs > 3.5 tonnes, charging by weight, distance and emission class. The maximum weight of the vehicle and the emissions class are stored in the OBU which contains a GPS and DSRC (Dedicated Short Range Communication). In order to record the distance driven, the OBU is coupled to the odometer (via the tachograph), enabling the unit to register the distance travelled within the country.

To prevent charges for trips outside of Switzerland, microwave transmitters are mounted on overhead gantries at all major border crossings to deactivate and reactivate the OBU. To prevent toll evasion, DSRC stations are distributed throughout the road network to verify the correct functioning of the OBU. The recording of the data cannot be manipulated by the drivers. The only information they are entitled and able to enter themselves is the coupling or uncoupling of a trailer. Each month, the data stored in the OBU is registered on a chip card and forwarded to the federal authorities who use it as basis for the calculation of the fee and the appropriate monthly invoices.

An evaluation of the Swiss eRUC Scheme found that the system generated significant gains in both economic efficiency and improved environmental outcomes. Vehicle figures demonstrate that the Swiss scheme generated an overall gain in productivity of 18% in road transport due to higher weight limits and fewer vehicles. The introduction of the polluter-pays principle, inherent to the scheme also reduced HV greenhouse gases by 30% through higher payloads and fewer, cleaner vehicles. Administration costs represent around 5% of revenues (€1000 million)

Since 2005 **Germany** has operated an autobahn based system of GPS based electronic charging for HVs > 12 tonnes to recover infrastructure costs. The scheme has in excess of 500,000 vehicles and covers the entire German motorway network. The main objectives of the system are to:

- recover system costs associated with HV use of motorways in order to finance ongoing maintenance, repair, and improvements
- promote environmental improvements by sending price signals that encourage a shift to lower emissions vehicles and a mode shift from road to rail
- reduce deadheading thereby encouraging more efficient use of vehicle stock.

For infrequent users of the German scheme, there is a manual declaration and payment method that can be accessed via roadside toll stations or the Internet. For frequent users there is an automated electronic system based on the use of an OBU, which includes GPS and GSM. The OBU calculates the charges owed based on kms and the vehicle type, and transmits the information via GSM to the Toll Collect centre, which sends out an invoice on a periodic basis. High administration costs represent around 20% of revenues (€4000 million) and the system has proven difficult to extend to other roads.

Austria and Czech Republic operate motorway tolling schemes for HVs using DSRC technology. Under the schemes all HVs are fitted with compulsory OBUs and charged according to distance, axle numbers and emissions class (Czech Republic). The schemes rely on an extensive network of fixed and mobile gantries (similar to Australian toll roads). The system is technically low risk, has low OBU costs but high capital costs. Administration costs in Austria represent around 8-10% of revenues (€900 million). Proposals to extend the tolling infrastructure to other roads have run into cost problems, and concerns around traffic diversion and local environmental effects.

The **Netherlands** have decided they will phase in electronic road pricing, with HVs starting to pay per km charges in 2011, and eight million private cars joining before 2016. The road tax and the vehicle purchase tax will be phased out and road users will only pay per km driven.

The km charge is not a goal in itself. It is a system whereby the costs of road use are divided among road users in a different and fairer way and the scheme is not intended to generate extra national income. The aim is to improve accessibility, improve the flow of traffic, and utilise road capacity more efficiently. Dutch motorists who use their cars infrequently will pay less, whereas those who drive regularly will pay more. In addition, cars that cause more pollution will be more expensive than cleaner cars and driving in off-peak periods and on quiet roads will be cheaper than driving on busy roads in the rush hour.

The Dutch scheme will put the Netherlands at the forefront in terms of international road pricing. The scheme will be the first one in the world that covers over 8 million vehicles and a road network of more than 130.000 km. Dutch officials predict that road pricing will generate a reduction of 10-18% in CO2 volumes and similar reductions in levels of NOx and Particulates. The revenue from the km charge system will be paid directly into the infrastructure fund. This will be used to finance the construction, management and maintenance of roads, bridges and viaducts.

Sweden has initiated a major project to develop an electronic km based RUC system for HVs within a three year time horizon to replace fuel excise and registration taxes. Known as Arena, the project has been initiated to improve environmental and economic outcomes and in particular to support an extended development of the railways by 50% to 2020.

To overcome problems and costs stemming from a single monopoly toll provider, the Arena project has proposed a multiple provider model and does not prescribe any technical solutions. End-users will have a contract with a toll service provider and can choose the one that best fits their needs. System requirements will be flexible to meet the dynamics of technical innovation and provide strong incentives for innovation and lower costs

Australia uses a multi-provider model to deliver a GPS based Intelligent Access Program (IAP) for HVs. The IAP is a voluntary program which provides HVs with improved access to Australia's road network in return for monitoring of compliance with specific access conditions. Participating HVs are monitored using telematics services with an OBU supplied and operated by a private sector IAP Service Provider, certified by the Transport Certification Authority. Operators meet all costs but IAP schemes allow the use of larger and more productive vehicle combinations providing for higher payloads but improved safety. The Australian IAP is estimated to generate financial benefits in excess of \$200 million through:

- improved industry productivity
- more efficient use of the road network and reduction in infrastructure costs
- improved road safety and environmental benefits
- lower compliance costs.

Australia has also announced plans to develop a weight, distance and location based HV road user charge regime, replacing excise taxes and registration charges.

The **United States** are developing a new framework to overhaul the way transportation decisions and investments are made. As part of the reform plan tolls and direct pricing for road use will be encouraged. An extensive two-year, US\$6.5 million test of the use of GPS for road tolling is now underway in **Iowa** involving 2,700 volunteer drivers for a national evaluation of mileage-based road-user charging. Likewise **Virginia** is examining a move to a mileage tax to replace fuel tax revenue.

The **United Kingdom** Transport Agency is currently in the process of awarding contracts for a series of GPS based road pricing trials to inform long term strategic planning on transport charging options. The UK trials are explicitly examining systems that can charge according to time, distance and location.

The **Slovak Republic**, and **Hungary** are also planning to introduce GPS based electronic RUC for HVs and most **European** jurisdictions now undertaking comprehensive trials of electronic road pricing.

Singapore moving to implement GPS based congestion charging to replace existing gantry tolls, and **Korea** is currently undertaking GPS road pricing trials as part of plans to introduce congestion charges to reduce traffic and greenhouse gas emissions.

3.5 Conclusion

The international survey highlights a steady movement towards electronic HV charges and road pricing to finance infrastructure, control congestion and improve community and environmental outcomes. Increasing vehicle fuel efficiency and the rapid growth of alternative fuels and hybrid vehicles, have also contributed to a developing consensus that a major shift in transport funding is required away from fuel excise and registration taxes towards distance, time, location, and emission based charges.

European experiences of using electronic HV tolling show that a distance/emission charge can contribute to:

- an environmentally friendlier vehicle fleet and significant reductions in greenhouse emissions
- more efficient use of HVs and increased load factor
- possibilities to route traffic to roads where it is least disruptive
- better conditions for increasing the proportion of rail and sea transport.

The Swiss eRUC scheme, in particular, is widely regarded as a significant success in terms of technology and costs, and in relation to the economic and environmental outcomes that have been achieved.

Developments so far highlight the importance of proper application definition, standard setting and institutional design, instead of a sole focus on the supporting technology³. Whereas the first eRUC schemes have used a single monopoly provider, a competitive multi-provider supplier model, in line with the proposed Swedish eRUC scheme, provides stronger incentives for cost effective technology development, system delivery, operations and ongoing innovation.

International trends are consistent with New Zealand's experience with fuel excise revenue trends and reinforce the original logic behind the introduction of the RUC regime. In this sense New Zealand truly was a leading light in transport policy when it introduced weight and distance charges for HVs in 1978.

The suggestion that RUC could be replaced by a fuel excise and registration regime would be a backwards move, completely at odds with international trends, and ultimately unsustainable as the revenue potential of excise taxes continues to be eroded by rapid technological developments and the requirement to pursue wider transport related policy goals.

³ For a detailed review see *Transport Regulatory Uses of Telematics in Europe*, Transport Certification Australia Limited, 2008.

4 ELECTRONIC ROAD USER CHARGES (eRUC)

4.1 Introduction

Rapid technological developments are taking place in the wider road charging area, and New Zealand is well positioned to take advantage of these developments to further improve the RUC regime through the migration towards electronic RUC, and to extend the technology to promote wider policy goals. This is consistent with the need to move away from the narrow focus of cost recovery towards the promotion of economic efficiency and environmental sustainability.

4.2 New Zealand Policy Environment

International movement towards more sustainable and productive transport sector also reflected in NZ policy environment as set out in:

- NZ Transport Strategy 2008
- NZ Energy Strategy
- NZ Energy Efficiency and Conservation Strategy
- Land Transport Government Policy Statement (GPS) targets

NZ Transport Strategy has established targets to support delivery of government's transport vision and objectives. Key targets are:

- halve per capita greenhouse gas emissions from domestic transport by 2040
- increase coastal shipping's share of inter-regional freight to 30 percent of tonne kms by 2040
- increase rail's share of freight to 25 percent of tonne kms by 2040
- become one of the first countries in the world to widely use electric vehicles
- reduce the km travelled by single occupancy vehicles, in major urban areas on weekdays
- reduce the CO2 emissions per km of combined average new and used vehicles entering the light vehicle fleet
- improve reliability of journey times
- reduce average journey times.

4.3 Role of Direct User Charges

The NZ Transport Strategy explains in detail how a move to direct user charges for road transport could contribute to the achievement of Transport Targets. Specifically NZTS states that direct charging could be designed to:

- provide incentives for reduced travel and low emission vehicles and fuels
- reflect the full costs to society of different freight modes which may increase freight transport by sea and rail
- allow electric vehicles to contribute to the funding of land transport

- provide a financial incentive for more efficient travel choices
- provide a greater incentive for purchasing low emission vehicles
- reduce congestion at peak times, so improving the reliability of journey times
- reduce congestion at peak times, so reducing average journey times
- provide a greater incentive to purchasing safer vehicles
- provide a financial incentive for more efficient travel choices such as public transport
- emphasize further the fact that cycling and walking, where viable, are cheap travel alternatives
- reduce congestion at locations where noise impacts are significant
- reduce congestion at locations where air pollution issues are significant
- facilitate the direct funding of regional and local infrastructure.

4.4 eRUC Road Map

eRUC refers to electronic road charging by location, distance, weight, emissions and/or time. eRUC provides opportunity to adopt affordable and innovative technology solution to resolve many outstanding issues with RUC regime.

eRUC could be developed with a functional and market-based approach supported by legislative reform, which does not prescribe any technical solution. Under this model end-users have a contract with a private sector eRUC service provider and can choose the one that best fits their needs. A private sector multiple provider model:

- helps lower technology and implementation risks, and encourages innovation
- lowers hardware and ongoing administration costs
- can deliver bundled services around safety, navigation, and other commercial features
- can support voluntary adoption of eRUC.

The government's role under multiple provider model limited to specification, certification and audit i.e. no development costs and lower operating expenditure when compared to existing RUC regime.

4.5 Conclusion

An increasing number of successful electronic eRUC schemes are now in operation. The technology tools to implement an eRUC scheme in New Zealand are available, while at the same time costs and risks are falling. When combined with a competitive institutional model that promotes service delivery and innovation, New Zealand has the opportunity to regain its place as a transport innovator.

New Zealand has a large pool of relevant technology skills and capacity to develop and implement an eRUC solution. The introduction of an eRUC scheme would provide a timely opportunity to develop a local high technology sector based on road pricing and related services. An eRUC scheme would generate export opportunities for New Zealand providers from the global move towards electronic HV charging. Looking to the future some commentators have suggested that the intelligent road charging industry will form the vanguard of the next industrial revolution.

APPENDIX I: HYBRID HEAVY VEHICLE UPDATE

Most major truck brands are now manufacturing or planning to produce diesel/electric hybrid HVs. Motivated by higher fuel costs, and tighter emission standards and local environmental requirements, hybrid vehicles will become an increasingly important part of the HV fleet.

HVs are well suited for hybrid propulsion systems whereby the conventional diesel engine is used for open road driving and the electric motor is ideal for stop/start urban situations. Moreover the battery can be recharged by recovering deceleration energy through regeneration when decelerating and braking. Recent developments of note include:

HINO, a pioneer in hybrid trucks, now market a range of diesel/electric models. These have gained widespread acceptance and have been sold in Australia since 2007. Hino claim that their hybrid truck delivers a 20% saving in fuel consumption and 25% reduction in carbon dioxide emissions over similar-sized trucks. Additionally, the new truck reduces particulate emissions by up to 85%.

FUSO, global light commercial specialist Fuso now offer a variety of hybrid vehicles that claim to reduce particulates by 46%, NOx by 41% and improve fuel consumption by 15%.

MERCEDES BENZ trucks offer a variety of hybrid models and have developed a natural gas/electric hybrid that reduces fuel costs up to 60% compared to a diesel drive system and close to zero emissions. MB trucks also produce light vans with petrol/natural gas drive systems.

Volvo have a number of hybrid production models including its new 7700 Bus that achieves up to 30% lower fuel consumption and CO2 emissions and 40-50% less particulates and NOx. Volvo also has plans to commercially release a hybrid refuse truck in 2009.

MAN offers both hybrid HVs and eco-buses that use a serial hybrid drive that saves up to 30% in fuel.

IVECO is currently trialling diesel/electric light commercial and medium cargo hybrid vehicles in trial, with production planned for 2009. Iveco claim that the hybrid power plan will save up to 30% in fuel use and emissions.