

Future Funding

The sustainability of current transport revenue tools model and report

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Ministry of **Transport**
TE MANATŪ WAKA

Ensuring our transport system
helps New Zealand thrive



Future Funding: The sustainability of current transport revenue tools model and report

The Future Funding project is one of three Strategic Projects the Ministry of Transport undertook in 2014. The other two projects are Future Demand, and Economic Development and Transport. These projects consider the changing world and how our transport systems, including funding, can be ‘future proofed’ while adapting to known and uncertain economic, environmental and social changes.

Future Funding addresses land transport funding. The project aims to promote informed and critical thinking among Ministry staff and external stakeholders regarding how much we should invest in the land transport system and how we should raise that money.

The key questions considered in this project are set out in the quadrants of the circle in the diagram below with the key reports produced for each question outlined in the adjacent boxes. This report outlines a model developed to assess the sustainability of current revenue tools in response to question four.

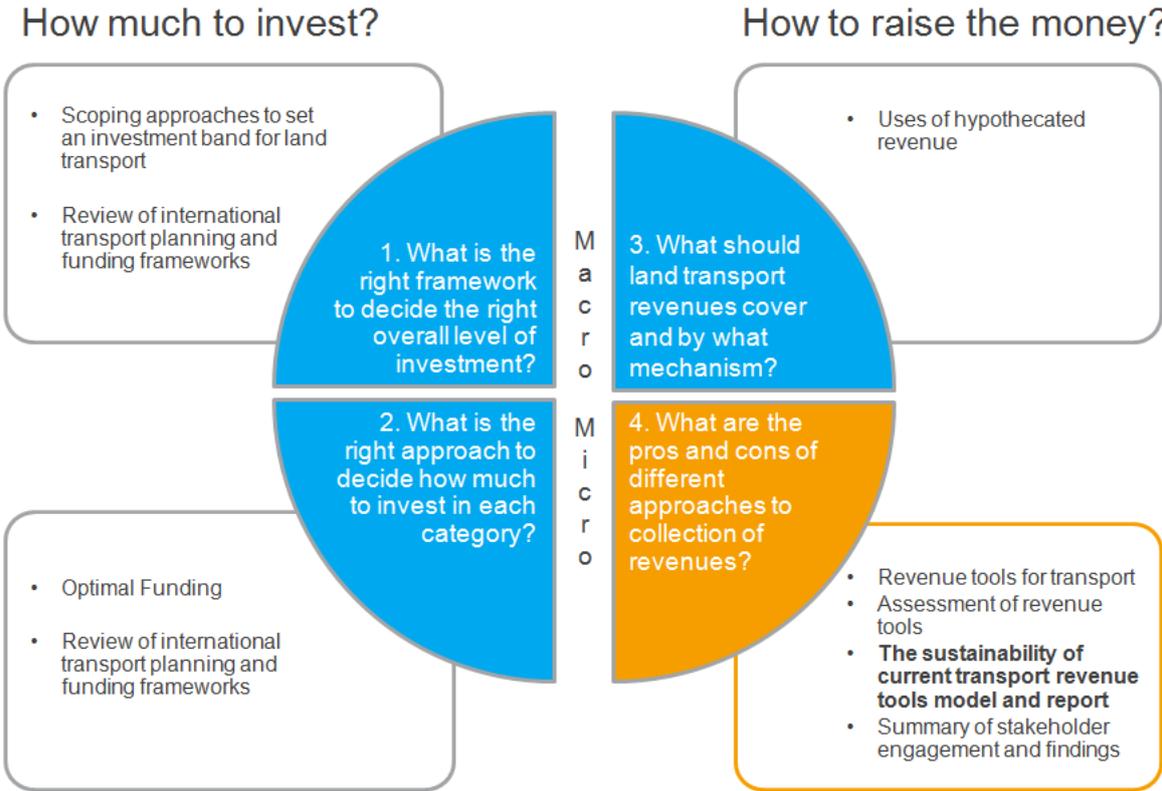


Figure 1: Key questions of Future Funding and its associated reports

This paper is presented not as policy, but with a view to inform and stimulate wider debate.

Summary of findings

Under current forecast assumptions, petrol excise duty (PED) and road user charges (RUC) are forecast to be sustainable for the next 15 years. Over this time they will provide adequate revenue to meet National Land Transport Fund expenditure targets¹, and the average PED paid per-km of travel would be consistent with the per-km charge set for light RUC vehicles.

However, PED revenue (the largest transport revenue stream, 54 percent), depends on fuel consumption, which is affected by vehicle fuel efficiency. Current revenue forecast assumptions for improvements in the petrol fleet's fuel efficiency are modest. They are based on trends since 2008 of around 0.4 percent improvement in fleet efficiency a year, and possible changes to this trend are not anticipated. The uptake of new vehicle types, such as hybrid vehicles (which pay PED but use around half as much petrol as the average car) or electric vehicles (which are currently RUC exempt), has not been forecasted. Under the current settings, significant changes in either of these could significantly erode revenues, and increase the variation in contribution per-km for different vehicle types.

Existing revenue tools can be adjusted to respond to such changes to maintain revenues. Fuel excise duty rates can be increased annually to offset improvements in fleet fuel efficiency. New technologies, such as hybrid, electric or alternative fuel vehicles, could be charged on a per-km basis through RUC. RUC could also replace fuel excise duty for petrol vehicles.

However, increasing the size and scope of light RUC increases the administrative and compliance costs for road users (2.8 percent of net revenue), and evasion burden on road users (6 percent of net revenue). Emerging technologies may provide more efficient and effective distance charging mechanisms that could reduce compliance and evasion costs when the technologies become effective and affordable.

¹ NLTF Revenue and expenditure are within \$50 million (1.5 percent) between 2017 and 2029.

The base case

Description

National Land Transport Fund (NLTF) revenue forecasts as at September 2014 form the base case. The NLTF revenue forecasting model provides forecasts of vehicle travel and revenue. Key assumptions include:

- ▶ PED and RUC increase equivalent to 3 cents per litre (10 percent for light RUC, and 3 percent for heavy RUC) on 1 July 2015, and 1 July 2016, followed by annual increases in line with consumer price index
- ▶ Annual improvements in fleet fuel efficiency of 0.4 percent a year initially, with more modest improvement in out-years
- ▶ Nil forecasts for the impact of the uptake of hybrid, alternative fuel, or electric vehicles (excluding the degree to which they may be captured in fleet efficiency assumptions)
- ▶ Expenditure targets for the next ten years are provided by the draft GPS2015, with growth extrapolated in out-years (3.5 percent per annum).

Analysis

Sustainability

Under the base case the existing revenue tools and policies will provide adequate revenue to meet expenditure targets for the next 15 years. Figure 2 shows under the base case, NLTF Revenue and expenditure are within \$50 million (1.5 percent) between 2017 and 2029.

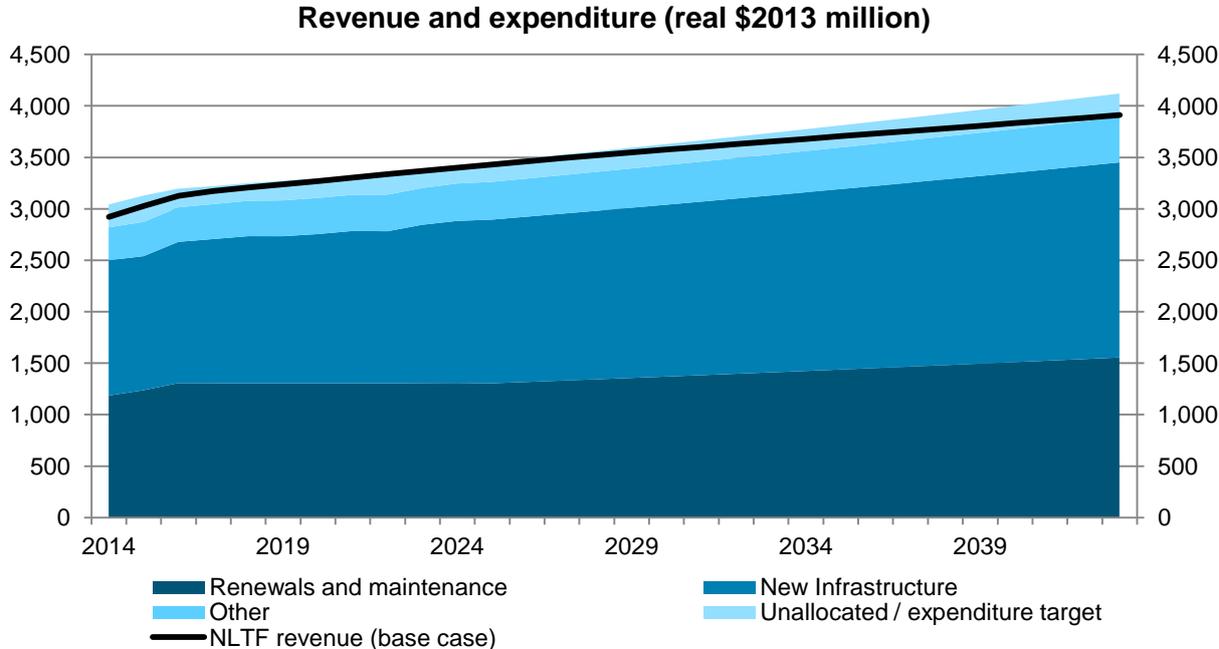


Figure 2: NLTF Revenue compared to expenditure under the base case

Contribution by road users

Figure 3 shows current NLTF revenue is dominated by PED (54 percent), followed by heavy RUC² (26 percent), light and medium RUC (14 percent), and vehicle licensing and registration (6 percent).

Strong travel growth is forecast for light and medium RUC vehicles (2.0 percent per annum) and heavy vehicles (1.8 percent per annum) compared to light petrol vehicles (0.1 percent per annum).³ Figure 3 shows in 2043, PED will still remain the largest revenue stream (42 percent), but by a reduced margin. Strong growth in the contribution by light RUC vehicles means light vehicles will continue to provide the majority of NLTF revenues.

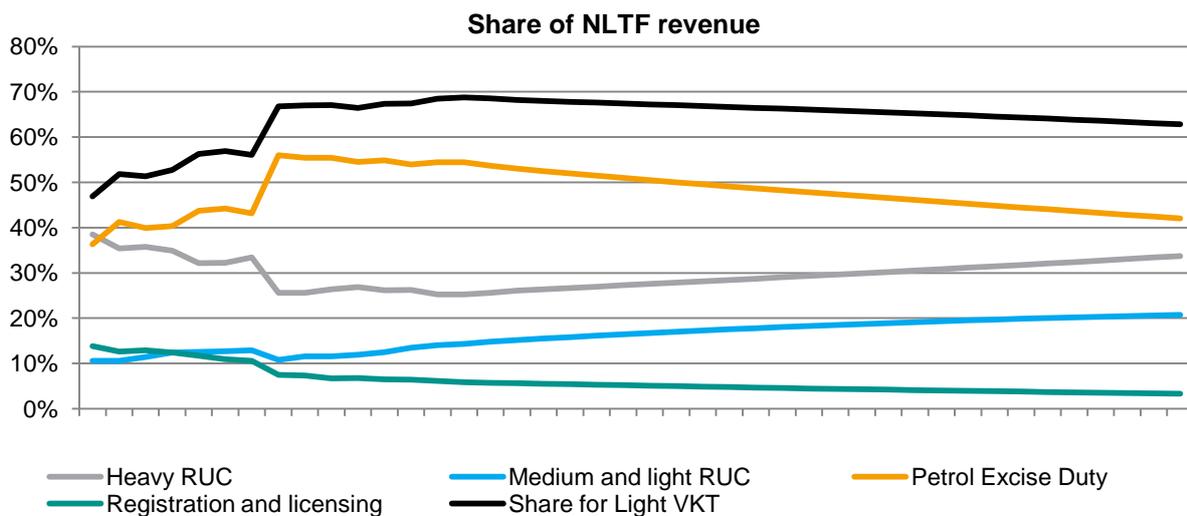


Figure 3: Share of NLTF revenue by revenue stream

Relativity between light vehicle types

Figure 4 shows the contribution per-km for different vehicle types varies significantly. The fuel efficiency of some of the latest petrol and hybrid vehicles means they contribute as little as half as much as the average petrol (or RUC) vehicle for the distance they travel. Not many such vehicles currently exist. By 2017, when planned rate increases are expected to have brought light RUC into line with the cost allocation model, a petrol vehicle travelling 10,000km a year would pay \$558 on average. A light RUC vehicle would pay \$524.

The estimated fuel efficiency of new vehicles shows the variance in contribution per-km for different petrol vehicles. The difference between the most and least efficient light petrol vehicles could be up to \$300 a year. This would create an equity issue given lower socio-economic groups would not be able to access the most efficient vehicles.

For environmental or other reasons it could be a desirable objective to provide an incentive for low fuel use vehicles. This is not an intention of the current PED regime; rather, it is a by-product. For such an incentive to exist (those with less efficient vehicles paying more per-km) there will inherently be a cross-subsidy in relation to roading contributions, which may raise equity issues where it adversely increases the variance between socio-economic groups.

² Heavy is greater than 6 tonnes, medium is between 3.5 and 6 tonnes, and light is under 3.5 tonnes.

³ Compound annual growth rate over the forecast period from 2014 to 2043. Total light vehicle kilometres travelled growth is 0.6 percent per annum

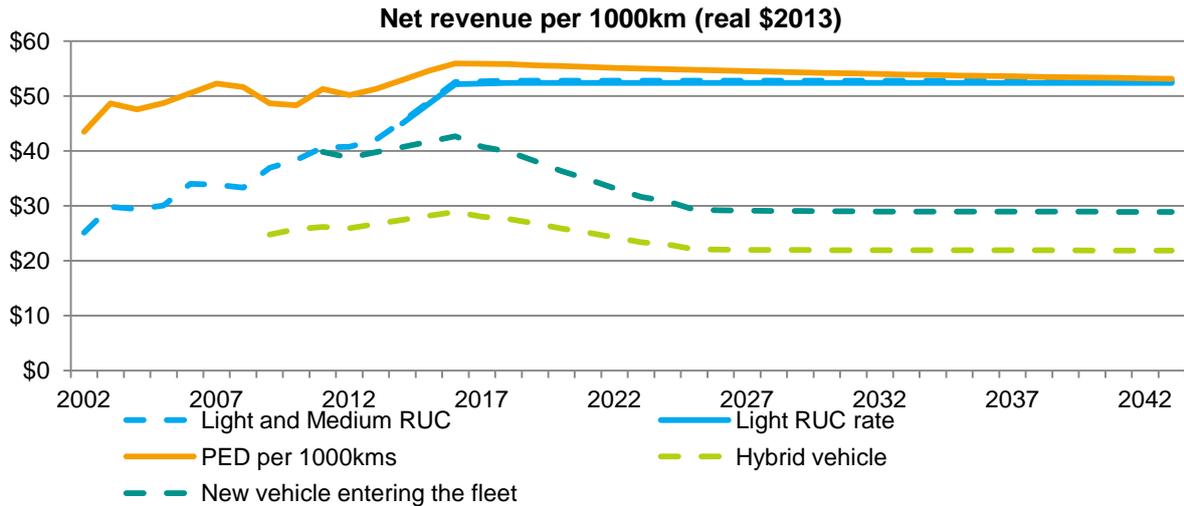


Figure 4: Tax paid per-km by different vehicle types

The efficiency of revenue tools

Three main taxation costs have been considered. All are borne by road users. They are:

- ▶ Administration costs
- ▶ Compliance (time) costs
- ▶ Enforcement costs

Figure 5 outlines the efficiency of NLTF revenue tools, measured by the cost of the revenue tool compared to the level of revenue collected. PED is difficult to evade and requires no specific enforcement. PED is collected directly on a monthly basis, from a handful of oil companies and the Marsden point refinery. It has little administration or compliance costs compared to a system dealing with millions of individual vehicles or road users. Processing refunds has associated small administrative and compliance costs. Total costs are in the order of 0.2 percent of net revenue.

Light and heavy RUC costs are estimated at around 2.8 percent and 3.8 percent of revenues respectively. Compliance costs are assumed to be equal to administrative costs, which may be conservative.⁴

Vehicle registration and licensing costs are more significant. Figure 5 shows these costs as a percentage of the revenue collected. Revenue includes Accident Compensation Corporation (ACC) levies, which make up the majority of vehicle registration and licensing revenues (79 percent). ACC motor vehicle licensing levies are set to reduce by 41 percent in 2016. The collection costs do not change. Figure 5 shows this has the effect of significantly reducing the cost efficiency of this revenue stream, when measured by the costs of revenue tool compared to the level of revenue collected.

⁴ This assumes for every administration cost, and every minute of time-cost in processing road user charges transactions, road users have an equal cost and time-cost.

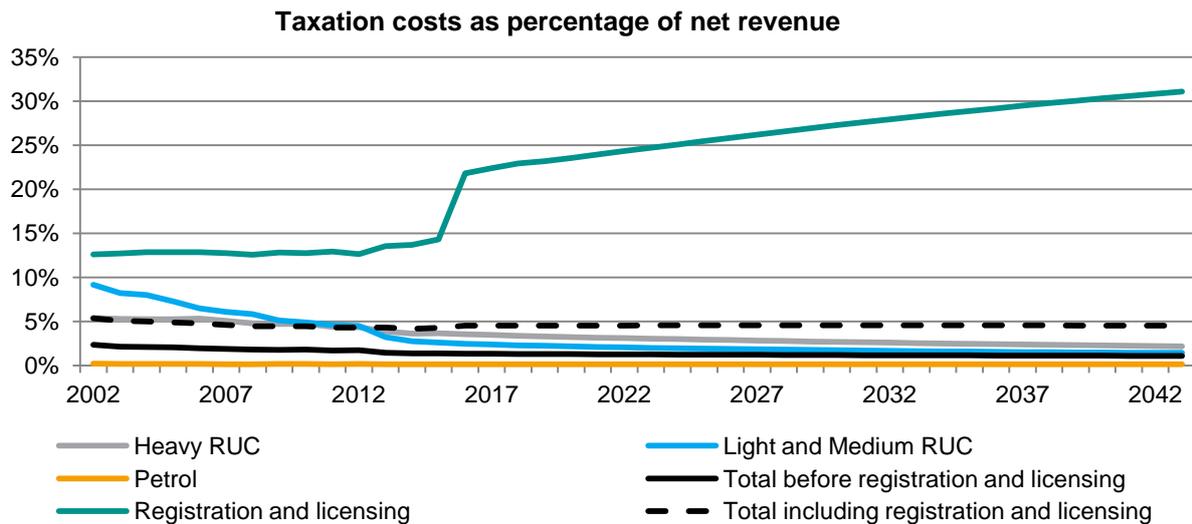


Figure 5: The efficiency of revenue tools measured by the costs of the revenue tool compared to the level of revenue collected

Evasion

Evasion of RUC is not considered in the cost analysis. Rates are set in the cost allocation model net of evasion. In this way net revenue is achieved, with those who pay covering the costs of those who do not. Evasion represents a transfer rather than an economic cost.

Higher levels of evasion result in higher tax rates. Levels of evasion become important when considering changes in revenue tools. PED is considered to have no evasion. Light RUC evasion is estimated (perhaps conservatively) at 6 percent of net revenue.

Risks

Current revenue forecast assumptions for improvements in fuel efficiency are modest. They are based on trends since 2008, and do not anticipate possible changes to this trend. The uptake of new vehicle types, such as hybrid or electric vehicles is not forecasted. Without intervention, significant changes in either of these could significantly erode revenues, and increase the variation in contribution per-km for different vehicle types.

Conclusion

The existing revenue streams are sustainable over the next 15 years under current forecast assumptions. Over this time they will provide adequate revenue to meet National Land Transport Fund expenditure targets⁵, and the average PED paid per-km of travel will be consistent with the per-km charge set for light RUC vehicles. Current fuel efficiency assumptions have only a minor impact, and over time would bring the average contribution per-km for petrol vehicles into line with light RUC rates. With lower collection costs and evasion, PED remains more efficient and effective than RUC. The level of fuel efficiency improvement and/or the uptake of new vehicle technologies have associated risks, which would erode revenues under current settings. The spread of vehicle fuel efficiency in the petrol vehicle fleet will inherently result in variance in the tax paid per-km for individual vehicles.

⁵ NLTF Revenue and expenditure are within \$50 million (1.5 percent) between 2017 and 2029.

A fuel efficiency scenario

Description

This scenario examines the impact of stronger improvements in fleet fuel efficiency. Annual improvements in fleet fuel efficiency of 1.0 percent a year are assumed. New vehicles are more fuel efficient than older vehicles, but fleet turnover is slow.

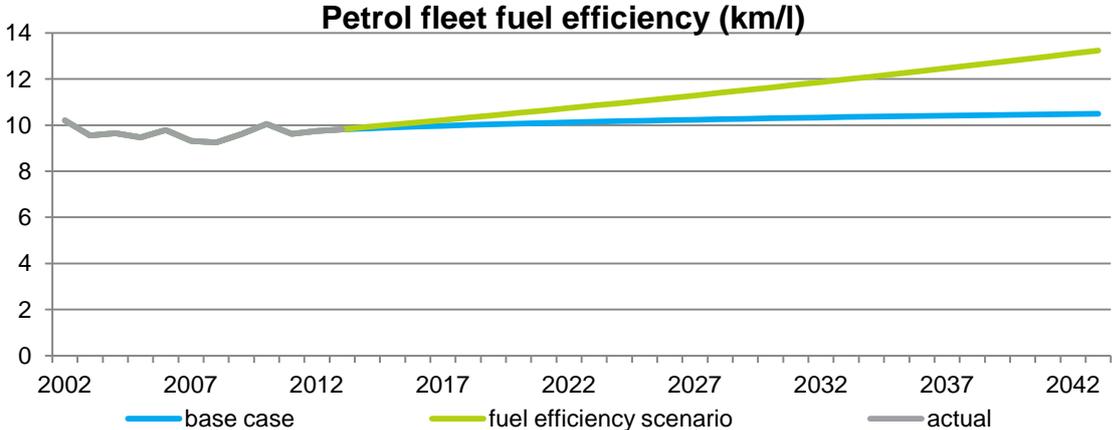


Figure 6: Assumed petrol fleet fuel efficiency in the fuel efficiency scenario

Analysis

Sustainability

PED revenue (the largest transport revenue stream, 54 percent), depends on fuel consumption, which is affected by vehicle fuel efficiency. Figure 7 shows under the fuel efficiency scenario, without intervention, PED revenue slowly erodes over time compared to the base case revenue forecasts. Revenue is \$100 million a year lower by 2018 (3 percent of PED), \$200 million a year lower by 2025 (6 percent) and \$400 million a year lower by 2040 (11 percent).

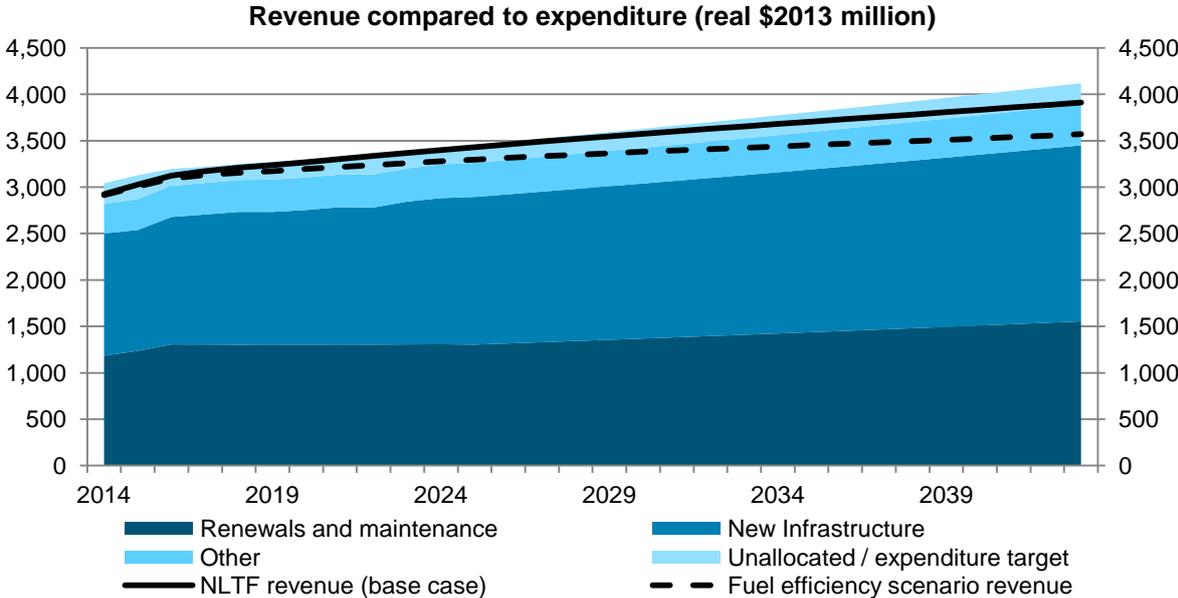


Figure 7: NLTF Revenue compared to expenditure under the fuel efficiency scenario

Relativity between light vehicle types

Figure 8 shows improvements in fuel efficiency would erode the average per-km contribution by light petrol vehicles relative to light RUC vehicles. By 2042, a petrol vehicle travelling 10,000km a year would pay \$421 on average. A light RUC vehicle would pay \$524. There would be an increasing variance in the per-km contribution for new more fuel efficient vehicles compared to existing, older and RUC vehicles.

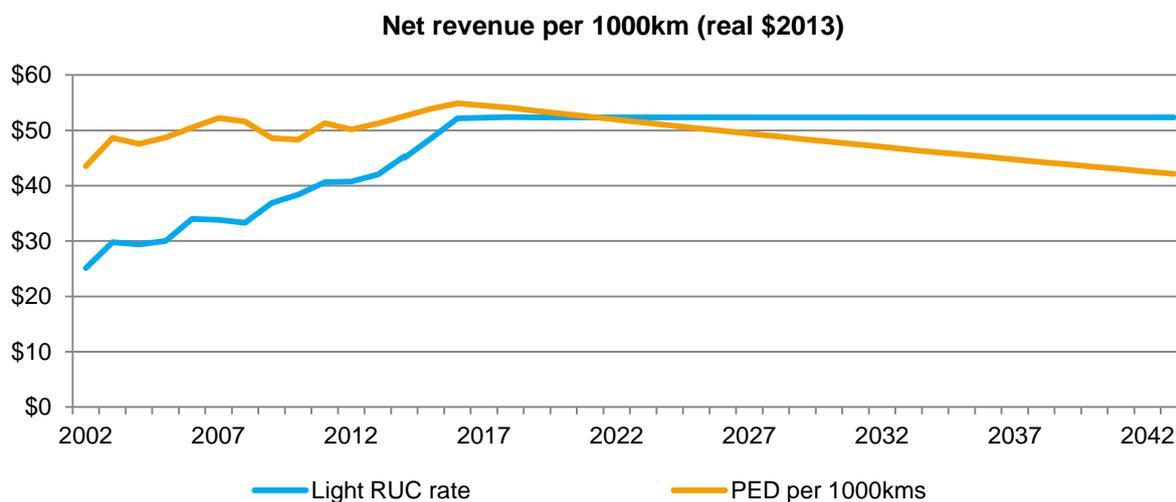


Figure 8: Tax paid per-km by petrol vehicles on average compared to light RUC vehicles under the fuel efficiency scenario (without intervention)

Intervention options

Using existing revenue tools, two interventions have been considered to maintain revenues and the per-km contribution by petrol vehicles:

- ▶ annual PED increases to offset efficiency
- ▶ switching from PED to RUC.

Annual PED rate increases to offset efficiency

Annual PED increases in the order of 0.7c/l a year increasing to 2c/l by 2043 (1 percent), on top of inflation increases in the order of 1.3c/l (2 percent) would be sufficient to offset improvements in fuel efficiency of 1 percent a year.

While tax rates on petrol would increase modestly each year, the average per-km contribution would remain the same, as less petrol is used to travel the same distance. However, there would still be an increasing variance in the per-km contribution for new more fuel efficient vehicles compared to existing or older vehicles. Fuel efficiency gains will generally be realised through the purchase of newer vehicles, and increasingly by wealthier buyers. Individuals will be adversely impacted by the PED increases over the life of their vehicle, with lower socio-economic groups increasingly paying the larger share. For modest improvements in fleet fuel efficiency, the rate increases may not be material. The annual increases required may become less acceptable if there are significant improvements in fuel efficiency, for the reasons described above.

There would be no additional collection costs.

Switching from PED to RUC

Switching would maintain the per-km contribution for petrol vehicles. There would be no revenue effect from changes in fuel efficiency. All vehicles would contribute the same per-km.

To collect the same amount of revenue through RUC instead of PED, existing light RUC rates would have to increase by around 10–11 percent over and above planned and inflation increases. This increase is needed to cover estimated evasion (6 percent), and the discrepancy between light RUC and PED rates (around 4 percent).

An increase in the order of 10–11 percent would affect existing RUC vehicles. However, it is not unmanageable, given light RUC rates have increased by around 10 percent a year over the last 3 years. This increase in rates could also be spread over a number of years in anticipation of the change from petrol excise duty, rather than a one-off shock to existing light RUC vehicles.

Owners of petrol vehicles would be impacted depending on their fuel efficiency, which determines how much tax they pay through PED.

There would be additional collection costs in the order of \$32 million a year (or 2 percent of petrol vehicle revenue). Half of these costs are administration costs which are recovered from road users through additional administration fees. The other half relate to time and compliance costs borne by road users.

In recent years we have seen the rising prevalence of cellular and satellite technologies. The purchase and operating costs of these devices have reduced dramatically. With technology improvements and their increased prevalence these devices have also become more efficient and effective. Technology improvements with improved affordability and effectiveness have also been demonstrated in vehicle charging technologies. Over time, emerging technologies (like in-car electronic devices), may provide more efficient and effective distance charging mechanisms than current RUC. These technologies could reduce the compliance and evasion costs associated with RUC, creating a cost effective alternative to petrol excise duty.

An electronic RUC system, if it included an annual fixed fee component, might also significantly reduce vehicle licensing costs and evasion.

Conclusion

Fuel efficiency improvements will erode revenue collected through fuel excise duty, and the per-km contribution by these vehicles. An increase in the variance of fuel efficiency for petrol vehicles will also increase the variance in per-km contributions. Sustained improvements, even if modest, can have material impacts on revenue and relativity.

PED rates could be increased to compensate for modest annual efficiency gains. This would maintain revenue and the average per-km contribution. The relativity of individual vehicles will still be impacted by their fuel use characteristics.

The administration costs, compliance costs, and evasion of light RUC means if it were to replace PED, significant rate increases would be needed to maintain revenue, unless new electronic technologies could provide a more efficient and effective distance charging mechanism.

A technology uptake scenario

Description

This scenario examines the impact of a significant uptake of an alternative fuel, combination fuel, or highly fuel efficient technology. The uptake of hybrid petrol vehicles, which use roughly half as much fuel as the average light petrol car, is assumed. The new technology replaces a share of petrol vehicle travel, as shown in figure 9. A similar result could occur with a smaller uptake of alternative fuel, or electric vehicles (which are currently exempt from RUC), or with the uptake of any technology which is significantly more fuel efficient.

The base case has no provision for the uptake of hybrid, electric, or other vehicle technologies, except to the degree it is captured in fleet fuel efficiency assumptions.

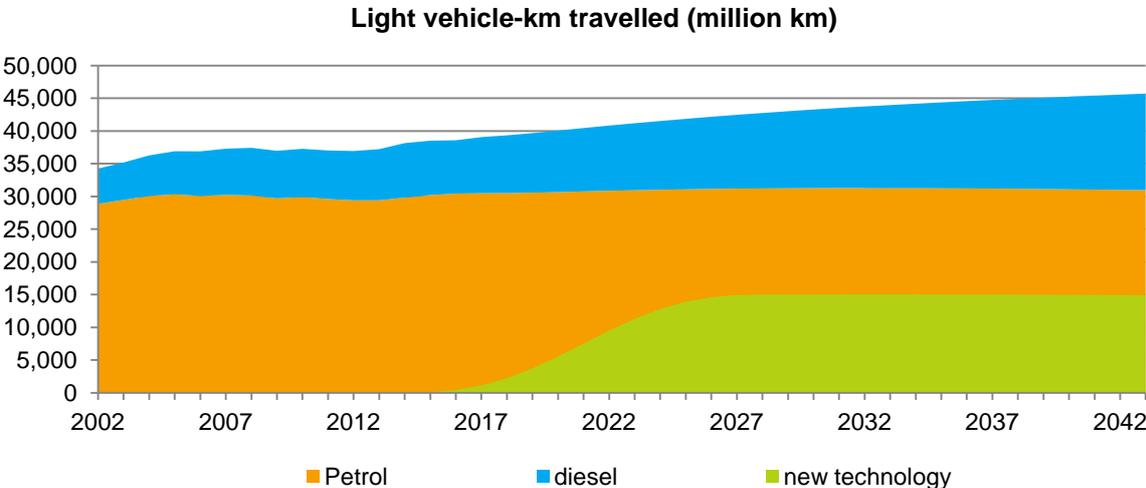


Figure 9: Assumed uptake of a new technology in the technology uptake scenario

Analysis

Sustainability

Figure 10 shows under the technology uptake scenario, without intervention, revenue erodes swiftly from 2018 (by around \$50 million dollars or 1.5 percent a year compared to revenues in the base case) with the rapid uptake of the new technology vehicles after a short lead-in. Revenue then remains below the base case by around \$450 million a year (12–13 percent).

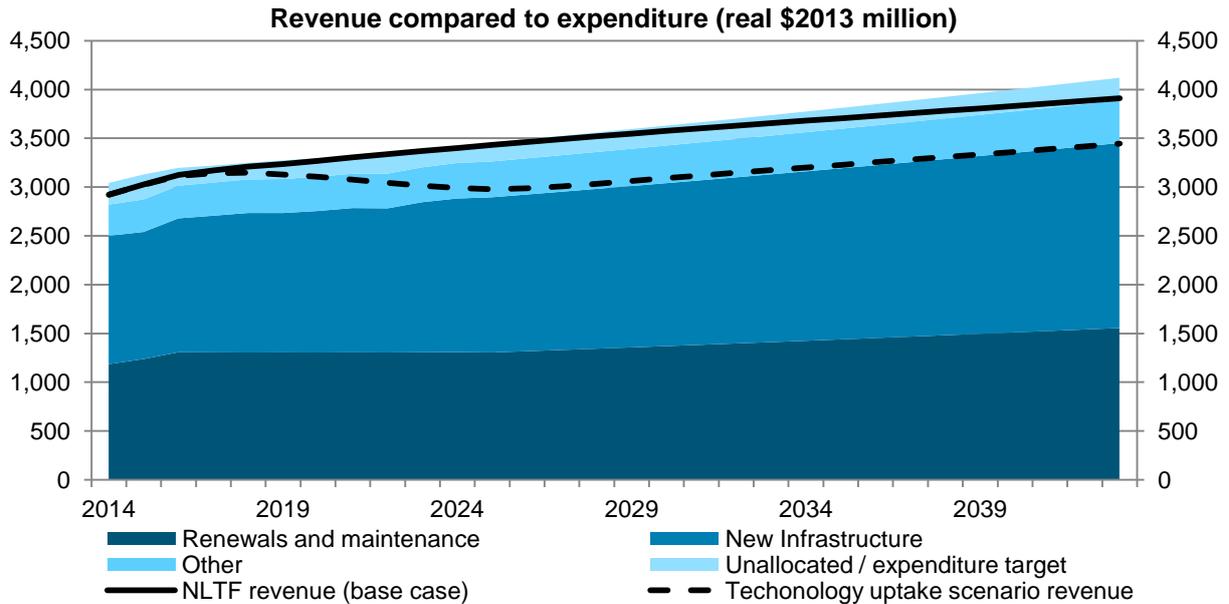


Figure 10: NLTF Revenue compared to expenditure under the technology uptake scenario

Relativity between light vehicle types

Electric vehicles are currently exempt from RUC. Hybrid petrol vehicles pay PED. However, hybrid vehicles use roughly half as much fuel as the average light petrol vehicle. A hybrid vehicle travelling 10,000km a year would pay \$280. A petrol car would pay \$558 on average. A light RUC vehicle would pay \$524. While currently there are few hybrid and electric vehicles, a significant uptake would highlight the low per-km contribution of these vehicles relative to other light vehicles, particularly as these vehicles are suited to greater amounts of travel.

Intervention options

Charging these vehicles RUC

The simplest option to ensure these vehicles pay their fair share would be to make them pay RUC. A per-km charge at half of the normal light RUC rate would make up for the shortfall in PED paid by these vehicles.

An additional increase for these vehicles would be needed to recover evasion, and the discrepancy between PED and RUC rates. Or alternatively light RUC rates for all vehicles would have to increase by around 6 percent over and above planned increases.

In addition there would be collection costs in the order of \$13 million a year at full uptake (around 3 percent of recovered revenue).

Charging these vehicles RUC to cover the shortfall is simple in theory, but it relies on the uptake of a small number of identifiable vehicle types, with known and consistent fuel efficiency characteristics. Alternatively, these vehicles could be charged full light RUC and refunded for the PED they pay. The additional administration and compliance costs associated with refunds are estimated to be around \$12 million dollars a year at full uptake (around 3 percent of recovered revenue).

Switching from PED to RUC

Switching would maintain the per-km contribution from hybrid vehicles, and RUC could be applied to all vehicles regardless of their fuel source. The costs and impacts would be as described in the fuel efficiency scenario.

Conclusion

The future uptake of existing or new technologies that are currently untaxed, or under-taxed through PED, represents a risk to revenue. A significant uptake of such vehicles (from currently negligible levels) would erode revenue. It would also highlight the low per-km contributions by these vehicles relative to other light vehicles. Recovering the lost revenue through RUC could be reasonably simple if the technology uptake is a small number of identifiable vehicle types, with known and consistent fuel efficiency characteristics. If there is a wide variation of types and technologies requiring intervention, this method would become increasingly complex.

The administration costs, compliance costs, and evasion of light RUC means if it were to replace PED entirely and apply to all light vehicles, rate increases of around 10–11 percent would be needed to maintain revenue, unless new electronic technologies could provide a more efficient and effective distance charging mechanism.