



Universal, mass × distance road user charging for Australia

An options paper prepared by the Australian Electric Vehicle Association Ltd

Executive summary

The AEVA recommends that a universal, mass-multiplied, distance-based road user charge (RUC) be introduced to replace fuel excise as the user-pays element of motoring. The RUC should be led by the Federal Government and administered through state/territory transport departments, with revenue being redistributed proportionally for road maintenance.

The universal RUC should be applied to all light vehicles (<4.5 t) and all heavy vehicles (>4.5 t) regardless of fuel source. The rate levied should eventually be equivalent to what the fuel excise would have ordinarily collected; 3 c/t·km for light vehicles and 0.2 to 0.5 c/t·km for heavy rigid and heavy articulated vehicles respectively. Light vehicle tare weights in running order should be used, and the laden, or gross combined mass (GCM) of heavy vehicles and their trailers should be used when calculating the final charge.

The RUC serves as an effective user-pays component, reflecting the otherwise externalised costs associated with motoring. Unlike fuel excise, the RUC addresses road use directly, and is not linked to the energy source powering the vehicle. Regional Australians will not be negatively impacted by the universal RUC any more than fuel excise as both are proportional to vehicle kilometres travelled.

Finally, the fuel tax credit (FTC) scheme should be wound up, as the RUC will only charge motorists for every kilometre travelled on public roads. Removal of FTCs would free up an additional \$10 billion annually – funds which could be used to further accelerate a fully electrified transport system.

Introduction

In Australia, road construction and maintenance is funded by all levels of government through general taxation, excises and tolls, stamp duties, licensing fees, registration fees, and parking fees. In total, over \$34 billion is spent on roads annually¹, with fuel excise collecting roughly half this total. Fuel excise has been decoupled from road expenditure for decades, but still forms part of general consolidated revenue which, in turn, supports the transport budget.

Once constructed, road costs can be further broken down into parked costs, and mobile costs. Parked costs relate to land use, signage, provision of space for parking, planning conditions and administration. Mobile costs relate to the broader cost associated with driving on roads – air pollution, wear and tear, noise, accidents and emergency services, traffic congestion and time spent commuting.

¹ [Australian infrastructure and transport statistics yearbook 2023 \(BITRE\)](#).

Generally state licensing and registration fees address the parked cost of motoring; that is, the cost of administering a well-engineered road network regardless of how much one uses them. Commonwealth fuel excise directly relates to the mobile cost of a vehicle; the impact it has on infrastructure, society and the environment through its operational life, proportional to the amount it is driven. Fuel excise is collected on every litre of fuel consumed on public roads for transport, and as of July 2024 is 50.6 c/l on petrol and diesel fuel. It is effectively a 'user-pays' proportional costing mechanism which reflects maintenance and upkeep of roads and motorways.

User-pays is a fair way to address the discretionary aspect of motoring; those who drive further, and/or drive inefficient vehicles will buy more fuel and pay more excise. The cost of fuel (a large part of which is fuel excise) is also a powerful economic lever, moderating the amount of driving people will do, and therefore the impact on society and the environment. Fuel excise is also one of a small number of economic relief options governments can use to address public cost of living pressures. However, if the marginal cost of motoring declines or the ability to drive gets easier, people will tend to drive more often, so a fuel excise cut would actually increase road use, while collecting less revenue.

The Australian Electric Vehicle Association (AEVA) is advocating for a *universal*, mass \times distance road user charge which adequately and fairly reflects the broader cost of motoring. This discussion paper explores options for implementation, settings, timeframes and likely outcomes.

The limitations of fuel excise

The concept of charging road users according to the distance driven is not new, however it has only seen limited implementation around the world. This is because fuel excise, or 'gas taxes' have been very effective proxies for road use up until now. In the early days of road construction, drivers were expected to pay for the privilege of using them, but not every vehicle had a reliable odometer, let alone automated logbooks. Charging motorists a levy on each litre of fuel burned on the road was a very close proxy. It not only addresses the distances driven, but it also incorporates the mass of the vehicle by virtue of the efficiency with which fuel is burned. In the early days of the automobile, most vehicles were the same size and weight, and had very similar fuel consumption rates.

Steady improvements in the average fuel consumption of passenger vehicles and hybrid propulsion systems means that drivers are travelling just as far and causing as much wear and tear on roads as before, while using less fuel, and paying less excise. Hybrid vehicles weigh the same as any other vehicle, but consume about half as much fuel, and therefore pay half the fuel excise. In the interest of equity, the proportional cost of motoring in a hybrid is inadequately reflected in fuel excise. Plug-in hybrid vehicles have a similar problem, with the added complication of the driver's charging and refuelling behaviour resulting in vastly differing contributions to road use and maintenance. The growth of fully electric vehicles (EVs) will only see this trend continue.

Fuel excise does not come close to matching the damage done to road infrastructure by heavy vehicles, which is where the bulk of road maintenance and upkeep costs can be

attributed. Fuel excise alone does not fund new road construction, nor is it earmarked for use on roads in general - it simply supports the budget, of which roads are a line item.

Fuel tax credits

Australian businesses which consume liquid fuels not used for travel on public roads are entitled to claim fuel tax credits (FTCs)². The main beneficiaries of this scheme are the mining and energy sector, where vast quantities of diesel are burned through earthworks and on-site production, and the agriculture sector where fuel is consumed on farms for production of crops and livestock. Businesses must prove the fuel (which was subject to the excise at purchase) was not used on public roads for a full refund.

Buses and heavy goods vehicles also consume significant volumes of diesel. The sector is highly competitive and therefore very sensitive to business input costs. A reduced fuel excise still applies to heavy vehicles (currently 30.5 c/l) and is often described as a heavy vehicle road user charge. Businesses operating heavy vehicles on public roads may claim the difference (20.1 c/l) under the FTC scheme.

Roughly \$21 billion of gross fuel excise is collected each year, and about 40% is handed back as FTCs. The FTC scheme may be viewed as a rebate (return of excess tax paid) or as a fossil fuel subsidy (financial assistance for sectors unable to compete) depending on who the recipient is. If the purpose of fuel excise is to serve as a 'user-pays' mechanism reflecting road maintenance, and FTCs are a means to address tax redress, then fuel excise removal must also coincide with removing the fuel tax credit scheme.

Proposed universal RUC

With growing pressure for a shift to distance-based road use charging, the AEVA has proposed models where *all* road-going vehicles are charged a fixed rate in cents per tonne-kilometre (c/t•km) for on-road use. It has four key attributes which makes it, in our opinion, the fairest way to address the mobile costs of motoring:

Federally issued – The universal RUC must be advanced by the Federal Government. A High Court challenge of the brief Victorian EV RUC scheme was successful, concluding it was a Commonwealth concern. The alternative would have been up to eight separate RUC schemes, with complications for anyone travelling outside of their state.

Universal – The RUC must be universal. If the goal is to ensure all road users contribute to the upkeep of infrastructure, all vehicles must be subject to it regardless of fuel type. It should be applied to any vehicle with a license plate – motorcycles and mopeds, cars and light commercial vehicles, buses, trucks and road trains.

Mass-multiplied – The road user charge must take into account the vehicle's weight in tonnes. This serves two important roles. First, it better reflects the damage inflicted on roads and the community – heavier vehicles carry a much higher risk of fatalities when involved in a crash. Second, it serves as a disincentive to purchase and operate a needlessly heavy vehicle since travelling the same distance could cost up to 50% more.

² [Australian Taxation Office, 2024](#).

Distance based – The RUC would be calculated for each vehicle based on how far it is driven within a reporting period. A simple odometer reading ahead of registration renewal would be used to calculate distance travelled since the last report. Alternatively, a global positioning system (GPS) device may be fitted however this may present privacy challenges. Offering the choice of reporting options may prove beneficial and earn trust.

How a RUC would work

The RUC must be led by the Commonwealth Government. The short-lived Victorian EV RUC was deemed unconstitutional by the High Court, primarily because it sought to address a shortfall in fuel excise, despite this being a Commonwealth responsibility. The charge was implemented in concert with purchase rebates for EVs, but those rebates did not extend to electric motorcycles, which were nonetheless subject to the RUC. Other issues around reporting, enforcement and automated averaging left many Victorians confused about compliance, while it did not adequately address kilometres travelled outside of Victoria. Moreover, if the goal of the scheme is to adequately, and fairly reflect the maintenance demands of motoring in the state, it makes more sense to apply the same charge to all road-going vehicles, regardless of fuel source.

Motorists would submit their odometer reading to the relevant state department of transport which also keeps a record of the vehicle's tare and GCM. Provided within a particular time frame, either online, over the phone or at a licensing centre, the vehicle registration renewal invoice would then be issued with the calculated RUC for that vehicle. If an odometer reading is not provided within the timeframe, an estimate based on averages from previous readings could be used. Enforcement would be managed through computer-based checks for anomalous readings or roadside checks by police and state transport authorities.

Australians living in rural and remote areas would not be impacted by the RUC any more than they would with fuel excise, as both are proportional to how far a vehicle is driven. Moreover, the average distances driven by regional motorists are similar to those of suburban drivers³ with regular trips of well under 10 km, interspersed with occasional long drives to cities.

Finally, retaining the current fuel excise could serve as an effective pollution tax for motorists who continue to drive petrol or diesel vehicles. EVs are now more affordable than ever, with markedly lower running costs than ICE vehicles even with a comparable RUC. While some motorists may be charged twice, the economic case to shift to electric has never been more compelling.

AEVA has examined three implementation options:

Option 1: A staged introduction of the universal mass × distance RUC, starting at a very low rate but increased annually. Fuel excise remains in place (Fig 1).

This implementation model allows all motorists to become familiar with the operation of the scheme at relatively low cost, and is designed to gradually replace the revenue lost

³ [Information sheet 73 \(2015\) BITRE.](#)

from fuel excise over the coming 25 years. Motorists yet to buy an EV will have a few years to plan their next vehicle before the impact of both fuel excise and the RUC is felt.

Our modelling assumes a 1% year on year growth of the total vehicle fleet starting from 2024 figures (20 million light vehicles) with an average vehicle tare weight of 2.03 t, average annual distance of 12,100 km, and an initial RUC rate of 0.25 c/t•km. The rate would be increased annually by 0.2 c/t•km and adjusted for inflation. The full rate of 3.5 c/t•km would be reached by 2040. We also assume that fuel excise revenue will decline roughly in line with the expected growth in low and zero-emission vehicles.

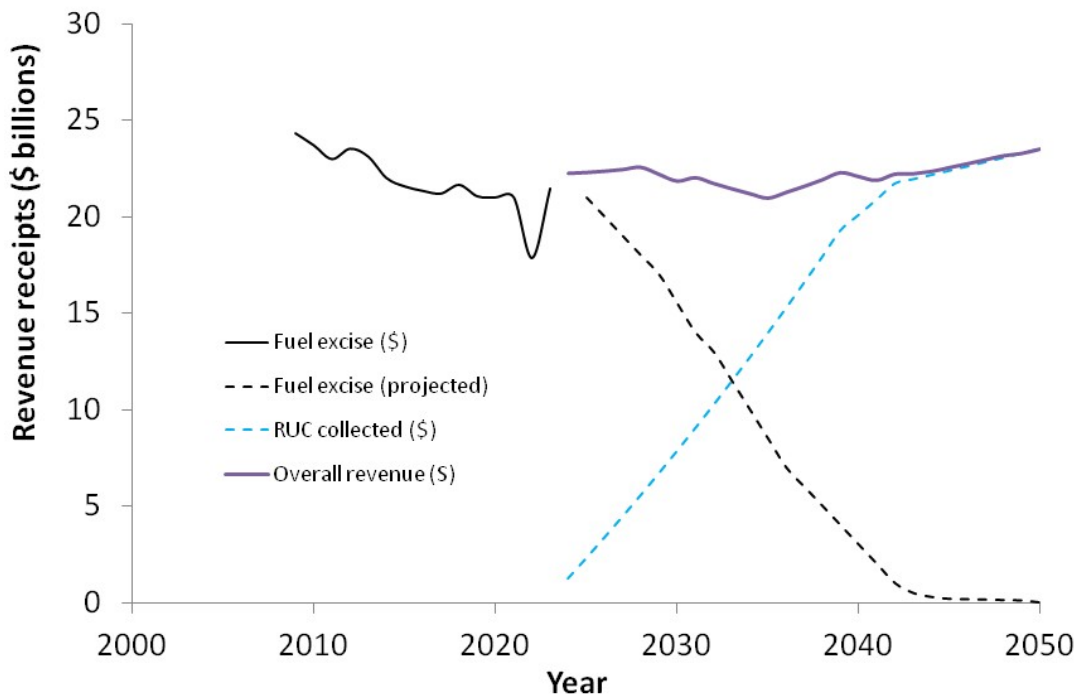


Figure 1: Proposed implementation of a low, universal road user charge which is increased annually, while fuel excise remains in place, but excise revenue declines as predicted.

The net effect of this scheme would be consistent revenue from road use through the combined revenues of the fuel excise and the RUC, with the RUC well established to become the primary source of road-related revenue.

This model means motorists who continue to drive petrol or diesel vehicles will be charged for both fuel excise and the RUC – although the RUC component will initially only add about \$60 to the \$612 per year already paid in fuel excise for a typical passenger vehicle. However, it must be noted that an EV will still be cheaper to buy and operate than an ICE vehicle over this transition period, even with a RUC. Initiatives to support EVs should be maintained to encourage more motorists to make the shift and save money.

Reducing the fuel excise rate through the transition is an option, however this would only make the uptake of low and zero emission vehicles less compelling. Since a key goal of transport electrification is to cut transport air pollution and reduce our reliance on

imported fossil fuels, the additional cost to operate ICE vehicles should discourage their continued use and motivate change. Considering transport is a sector with fairly elastic demand, alternatives like public and active transport are expected to also see increased participation.

Option 2: Remove fuel excise and introduce a full RUC on all vehicles as early as 2025.

This implementation model would see the full mass × distance RUC of 3.0 $c/t \cdot km$ applied as a direct replacement of fuel excise, and indexed with inflation (Fig 2).

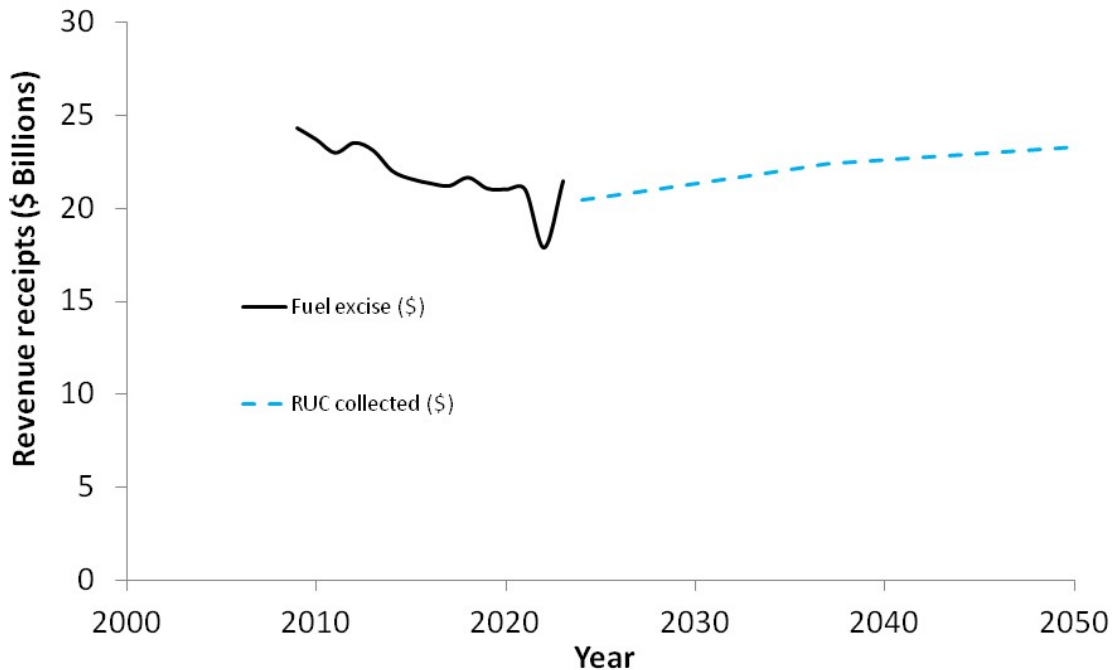


Figure 2: Proposed immediate implementation of the universal road user charge at the full, equivalent rate as fuel excise, while ending the fuel excise scheme completely.

As before, a 1% year on year growth in the total light vehicle fleet is assumed, as is the average annual distance driven of 12,100 km , and a 2.03 t average light vehicle tare weight.

This approach would result in no change to current revenue levels for road upkeep. It is equitable in that all vehicles are subject to the same mass × distance RUC, but the sudden end to fuel excise necessitates that heavy vehicles be included in the new scheme. If not, the reduced price of diesel would likely stifle innovation in heavy haulage EVs. Zero-emission buses and trucks generally lag the growth profile of electric light vehicles too, so the impact may take even longer to be felt. A more detailed discussion about heavy vehicles and road use charging can be found on page 7.

Since all vehicles would be subject to the same road user charge scheme, fuel excise could be dismantled immediately. Fuel prices would initially fall, likely resulting in a brief uptick in vehicle kilometres travelled, similar to what was observed in 2022/2023 when

the excise was halved. Without substantial influence on the price of fuel, governments will have limited ability to apply cost of living relief, or conversely, motivate the uptake of EVs in the face of cheap fuel. Conversely, removing fuel excise completely also necessitates the immediate removal of the FTC scheme; a saving of over \$10 billion annually.

Option 3: Implementation of a RUC on EVs only, at a rate equivalent to that of fuel excise, with fuel excise remaining in place.

This would effectively be a national extension of the model put forward by the Victorian Government. Fuel excise would continue to be collected, but slowly decline. This model results in EV operating costs rapidly matching that of an ICE vehicle, and will likely slow their uptake. Infrastructure Partnerships Australia produced a report⁴ on road user charging which argued for this model, but gave no explanation of why the concept wasn't worthy of being extended to all vehicles.

If the motorist driving an ICE vehicle experiences no discernible change in their costs, and EVs end up costing just as much to operate, drivers are less likely to consider a move to electric. Given the substantial risk Australia already faces with fuel security and a desire to move toward low and zero-emission vehicles, such a move would be counterproductive. Change is often slow and time is not something we have lots of.

Heavy vehicles and a mass × distance RUC

The vast majority of road construction costs and their subsequent maintenance costs stem from engineering infrastructure capable of supporting heavy vehicles. Heavy vehicles are defined as a vehicle or prime mover exceeding 4.5 t, with even higher gross combined masses when towing trailers. Some road trains may haul well over 100 t across four trailers. Research in the 1950s confirmed the damage inflicted on roads was in fact proportional to the fourth power of the vehicle mass. Thus, if a road user charge which accurately reflects the maintenance impact of all vehicles were to be applied to heavy vehicles, a simple mass component may not be sufficient.

Heavy vehicles and their trailers are substantially more expensive to license than light vehicles, somewhat offsetting the discounted fuel excise available to heavy vehicle operators. Though, at the same time these vehicles are in revenue service, so the cost of registration and fuel is just another business input.

Still, with the outsized impact heavy vehicles have on road infrastructure, it seems prudent that a mass × distance RUC should also extend to buses, trucks and road trains. As these vehicles are motivated to be run at full loads, the mass multiplier should be based on the laden mass, or gross combined mass (GCM) for that vehicle and trailers.

Australia's heavy vehicle fleet in 2023⁵ consisted of 575,000 heavy rigid (HR) vehicles (4.5 t to 20 t GVM) and 120,300 articulated, or heavy combination (HC) vehicles (20 t to over 100 t GCM). HC vehicles move much heavier loads longer distances, so the effective

⁴ [Road user charging for electric vehicles. Infrastructure Partnerships Australia 2019.](#)

⁵ [Road Vehicles Australia, January 2023. BITRE.](#)

freight t•km is much higher. HR vehicles drive on average about 21,000 km per year, and HC about 78,000 km.

In 2020⁶, HR vehicles amassed an average of 95,000 t•km while HC vehicles averaged 1,835,000 t•km. Diesel consumption for buses and HR vehicles was about 28 l/100 km, and for HC vehicles, 53 l/100 km.

Therefore, at today's discounted fuel excise rate of 30.5 c/l, **HR and HC vehicles are paying on average approximately 0.2c/t•km and 0.5c/t•km respectively.** These values could serve as a useful benchmark for a heavy vehicle mass × distance RUC.

Finally, Australia's ongoing deference to road transport for heavy haulage of freight has resulted in a significant decline in rail freight. Rail is the most efficient way of moving vast tonnages of goods long distances, with most interstate routes being over 800 km in length - far enough to justify its use when integrated with modern intermodal logistics hubs. Reducing the number of heavy vehicles on our highways will also make our roads safer and last longer. Application of an effective mass × distance RUC would therefore facilitate a resurgence of rail freight in Australia.

Recommendations

Of the three options considered here, AEVA believes **option 1 is the most effective** implementation of a fair and equitable road user charge, while the retention fuel excise helps motivate motorists to shift to cleaner options. The staged introduction allows time for motorists to adjust to the new system while not impacting overall road-related revenue. However this will depend on EV uptake being strong, and ICE vehicles declining quickly - two conditions which cannot be guaranteed.

Option 2 is also viable, but would require complete implementation of road user charging which extends to heavy vehicles. Ending fuel excise will also mean the FTC scheme must be abolished. This option may also see a spike in vehicle kilometres travelled by ICE vehicles, at least initially. With good planning and plenty of notice, this implementation option can be effective. AEVA supports a laden mass × distance RUC for heavy vehicles in place of the discounted fuel excise rate starting at 0.2 c/t•km for heavy rigid vehicles, and 0.5 c/t•km for articulated heavy vehicles.

AEVA is fundamentally opposed to option 3, as this would result in a negligible change in imported fuel consumption, limited change to driving habits or vehicle choice, and make the switch to EVs less financially compelling at a time when uptake should be accelerating.

⁶ [Australian Motor Vehicle Census, Australian Bureau of Statistics, 2020.](#)