ENGINEERS AUSTRALIA

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Senate inquiry into the road transport industry

The importance of a viable, safe, sustainable and efficient road transport industry

November 2019

Senate inquiry into the road transport industry

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1. Introduction

1.1 About Engineers Australia

Engineers Australia is the peak body for the engineering profession in Australia. With about 100,000 individual members across Australia, we represent individuals from a wide range of disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia's response is guided by our Charter and Code of Ethics which states that engineers act in the interest of the community, ahead of sectional or personal interests towards a sustainable future. Engineers are members of the community and share the community's aspirations for Australia's future prosperity.

This submission has been informed by members of Engineers Australia's Transport Australia Society (TAs). TAs is an Engineers Australia technical society for transport professionals in Australia. TAs focusses on key transport decisions affecting the well-being, productivity and sustainability of our cities and regions. TAs seeks to improve public debate on strategic transport issues, and to provide valuable expert advice to governments making decisions regarding transport policy, reform and infrastructure investment.

1.2 Background

Engineers Australia commends the aspirations of the Senate Standing Committees on Rural and Regional Affairs and Transport, Inquiry into the importance of a viable, safe, sustainable and efficient road transport industry (the inquiry) and we are pleased to make this submission.

Improving efficiency in the road transport industry is essential, but not at the expense of safety, which often happens when operators try to reduce margins for contract gain. Government policy must be applied to provide the right commercial settings for the safest, most efficient and most sustainable transport modes to thrive.

Comprehensive integration of safe systems principles in all road design standards will be essential to improve road safety outcomes and better funding and pricing models will be essential to expanding, upgrading and maintaining our roads for greater sustainability and efficiency outcomes. The primary focus of this submission is on improving safety outcomes and economic road reform.

1.3 Terms of reference

Engineers Australia will be responding to the importance of a viable, safe, sustainable and efficient road transport industry, with reference to items b, d, e, f, g and h.

b) the development and maintenance of road transport infrastructure to ensure a safe and efficient road transport industry;
d) the training and career pathways to support, develop and sustain the road transport industry;
e) the social and economic impact of road-related injury, trauma and death;
f) efficient cost-recovery measures for industry stakeholders;
g) the impact of new technologies and advancements in freight distribution, vehicle design, road safety and alternative fuels;
h) the importance of establishing a formal consultative relationship between the road transport industry and all levels of government in Australia.

1.4 Recommendations

- Road industry policy must be applied with integrated safe system management principles. The safe system pillars and context must be expanded to maximise safety outcomes.
- The National Road Safety Strategy requires update to expand the pillars and ensure they are not considered in isolation.
- Australia's road safety management system requires review to ensure road design standards match the intention of the safe system in practice.
- New vehicles should be at a minimum 4-star crash rating and regulation should support greater market penetration of 5-star safety rated vehicles.
- The collection and analysis of data for use in decision making processes to inform safety management is essential.
- A framework to support training and development objectives in industry, academia and the community is essential to development and maintenance of road transport infrastructure.
- Governments should proactively undertake planning for road pricing in advance of the widespread deployment of emerging technologies such as electric and automated vehicles.
- Any proposed road pricing initiative should have clearly defined objectives to clarify its purpose.
- The development of network pricing schemes should be coordinated through COAG's Transport and Infrastructure Council.

1.5 Contact details

To discuss the contents of this submission further, please contact Sybilla Grady, Senior Policy Advisor, on (02) 6270 6195 or SGrady@engineersaustralia.org.au.

2. Safe systems

b) The development and maintenance of road transport infrastructure to ensure a safe and efficient road transport industry

Road industry policy must be applied with integrated safe system management principles. The safe system pillars and context must be expanded to maximise safety outcomes.
The National Road Safety Strategy requires update to expand the pillars and ensure they are not considered in isolation

The National Road Safety Strategy (NRSS) 2011-2020 is based around the safe system approach and is comprised of four key pillars:

- Safe roads
- Safe speeds
- Safe vehicles
- Safe people

Whilst these pillars provide a framework for road safety, in practice the NRSS pillars have not applied integrated safe system principles. For the practical application to realise the theoretical objectives of safe systems, the pillars must expand to include post-crash response. Safe speeds and safe people should be incorporated under safe road use and drivers should be separated out of the group. Safe road use purposely separates drivers out as the use of roads extends to heavy vehicle and freight management. Furthermore, these four pillars of integrated safe system management must be applied in the broader social, economic, and environmental context.

Engineers Australia recommends applying integrated safe system management to road industry policy, within the broader triple bottom line context, with human crash impact tolerance at the centre and expanding the pillars as pictured in the diagram below.[1]

[1] *Road Safety – Transport Australia Society Discussion Paper,* October 2019, p6, https://www.engineersaustralia.org.au/sites/default/files/Learned%20Society/Road%20Safety%20Discussion%20Paper%20October%202019.pdf

3. Safe roads

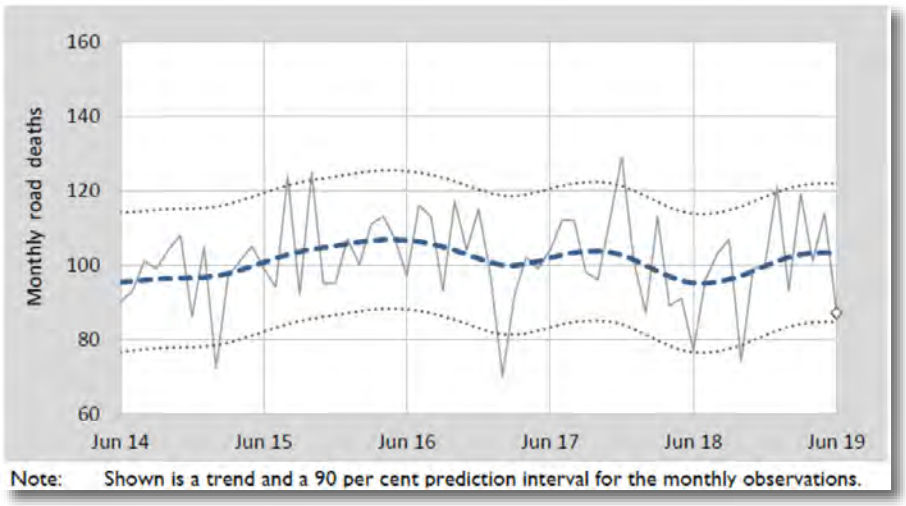
b) The development and maintenance of road transport infrastructure to ensure a safe and efficient road transport industry, and h) The importance of establishing a formal consultative relationship between the road transport industry and all levels of government in Australia

Australia's road safety management system requires review to ensure road design standards match the intention of safe system in practice for consistent application across states and territories.

National, state and territory safe system road safety strategies have been implemented since the mid-2000s with the objective to reduce the annual number of deaths and serious injuries by at least 30% by 2020. However, based on current trends, it is unlikely this target will be achieved.

While these strategies are soundly based on the safe system approach, implementation has seen mixed results. The economic, social and environmental context of road safety continues to change and the reduction in fatalities and injury has now plateaued. Further improvement is increasingly challenging but certainly remains possible.

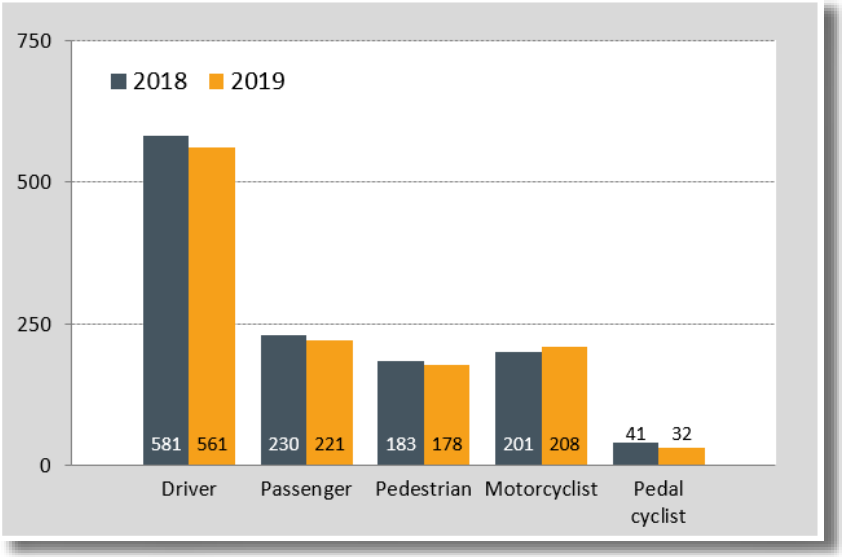
Road deaths in Australia have plateaued and begun increasing over the past five years[2]



Road fatalities are distributed across different user groups[3]

[2] Bureau of Infrastructure, Transport and Regional Economics (BITRE) (2019). *Road Deaths Australia, June 2019*, Department of Infrastructure, Regional Development and Cities https://www.bitre.gov.au/statistics/safety/

[3] Bureau of Infrastructure, Transport and Regional Economics (BITRE), June 2019, https://www.bitre.gov.au/statistics/safety/



Whilst the safe system framework has been beneficial and remains appropriate in terms of the pillars, context and objective of the framework, implementation must be consistent. Any ambiguities need to be reviewed and clearly defined. For example, the Austroads' Guides to Road Design advises:

> *The design of roads should be based on the capabilities and behaviour of all road users, including pedestrians, cyclists, motorcyclists...*

The capabilities and behaviours of road users vary widely. Therefore, clear determination of a minimum threshold of capability and behaviour is necessary to embed the safe system principles in Austroads' fundamental design considerations.

When detailing Austroads' highest road design priority, *Speed Parameters*, the Guide advises:

The speed to be adopted, which typically provides some margin over the proposed posted speed limit, directly influences the principal parameters used in road design which include:

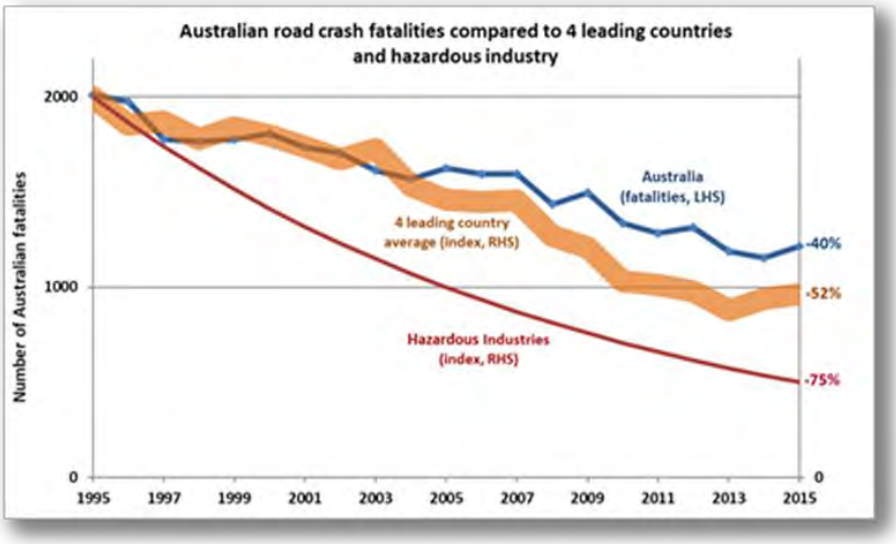
- *sight distance*
- *stopping distance*
- *horizontal curve radii*
- *pavement superelevation*
- *traffic lane width.*[4]

This demonstrates that Australia's detailed road design process remains reliant on driver compliance rather than placing the onus on road design. Essentially, in practice, Australia is still operating according to traditional road safety principles, despite valiant attempts to conform with safe systems principles.

Australian roads overwhelmingly comply with Austroads' requirements and there has been significant reduction in road trauma since the early 1970s peak. However, in the past two decades, improvements in road safety have not kept pace with the four leading countries and have fallen short of safety improvements achieved in hazardous industries, as the following chart shows.

[4] Department of Transport and Main Roads, Austroads Guide to Road Design Part 3: Geometric Design, 2016, Section 3, Speed Parameters, p13. https://austroads.com.au/publications/road-design/agrd03/media/AGRD03-16_Guide_to_Road_Design_Part_3_Geometric_Design_revised-2017.pdf

Road deaths trend in Australia and selected countries 1995 to 2015 [5]



The 2019 Inquiry into the National Road Safety Strategy (NRSS) found that the current approach needs to be better managed and implemented. Some elements of the safe system approach, notably road design, have not been updated to incorporate the safe system philosophy. Other factors may have also contributed to this outcome, including:

- An increasingly heterogeneous vehicle fleet;
- Driver distraction through increased use of mobile phones;
- Increased walking and cycling in urban areas;
- Population growth; and,
- Increasing pressure on infrastructure.

Due to the factors described above, Australian casualty crash rates have not reduced to the levels of the leading nations up to 2016, and have since plateaued.

Australia continues to engineer roads to Austroads standards, invest in driver education, and heavily enforce compliance to minimise risk and maximise safety. However, the responsibility for road safety continues to rest primarily with road users, particularly drivers. So, in practice, Australia has not wholly implemented safe system principles.

4. Safe road use

b) The development and maintenance of road transport infrastructure to ensure a safe and efficient road transport industry

Australian road design guidelines need to be reformed to prioritise safe collision speeds based on human tolerances.

Updates in road design priorities that have occurred in the Netherlands, Sweden and UK since 2000 should inform updates to the Australian road design guidelines. This will require changes to road and intersection design practice. Major design decisions affected include:

- Permissible intersection types;
- Provision of significantly more safety barriers on roads with foreseeable traffic speeds above 70km/h;
- Increased application of variable speed technologies on motorways and expressway;
- Expanded use of audible road marking;
- Safety barrier protection of cycle lanes;
- Speed lowering traffic devices ahead of and through pedestrian precincts.

[5] Graph has been adapted from International Transport Forum (ITF), 2016, *Road Safety Annual Report* 2016, OECD Publishing, Paris, p7 https://doi.org/10.1787/irtad-2016-en

Current guidelines permit the construction of road elements that would conflict with these principles[6] and limit the use of what have proven to be the most effective engineering safety treatments. Roads with the most collective risk, where the overwhelming majority of the road safety problem lies, need a program of improvements which make them inherently safe.

Road trauma reduction policies and programs must be focused through the lens of safe collision speeds by design, managed within an appropriate systems framework, and underpinned by staff capability, as well as funding, equipment and data.

5. Safe vehicles

e) The social and economic impact of road-related injury, trauma and death, and g) The impact of new technologies and advancements in freight distribution, vehicle design, road safety and alternative fuels

New vehicles should be at a minimum 4-star crash rating and regulation should support greater market penetration of 5-star safety rated vehicles.
The collection and analysis of data for use in decision making processes to inform safety management is essential.

High quality vehicles are crucial for road safety. Older cars and new cars with less effective safety measures and performance continue to operate on Australian roads unnecessarily and should be discouraged. New vehicles should have more safety and sustainability features installed including warning systems[7], passive safety features[8] and active devices such as autonomous emergency breaking.

Engineers will continue to lead the development and deployment of innovations to improve vehicle quality and for driver warnings, crash avoidance, occupant or pedestrian protection and maintenance.

Vehicle design safety rules need to be reinvigorated, or consideration should be given to folding Australian vehicle design rules into a best practice foreign vehicle testing regime, such as in the European Union. This might also beneficially reduce vehicle importation costs.

Information, communication and electronic engineering has the potential to improve road safety through data collection and analysis, warning systems, traffic management systems, enforcement and control systems. Often under the banner of Intelligent Transport Systems, Smart Roads or Smart Vehicles, these include active monitoring of freeways and highways, automated enforcement for speed or alcohol, information systems, automated vehicle control, active warning systems either in-vehicle or on-road and many other systems either already available or being developed for future deployment. Road safety should be a primary objective of road planning and transport planning generally.

Road safety should not be traded off for other objectives such as road capacity, efficiency in design, or the value of time, or vehicle operating costs in microeconomic cost benefits analysis because the cost of a human life is immeasurable. Given the total cost of road trauma[9] in Australia is larger than the total cost of road congestion[10], current crash valuation methodologies appear flawed.

More effort should be applied to in-depth crash assessment that investigates and makes recommendations on all parts of the system that can be improved, as occurs in other transport safety investigations.

Further analysis to better identify the causes for declining improvements in casualty crash rates and possible remedies and greater commitment to traffic modelling and safety modelling to inform transport and road designs. The safest forms of transport should be used wherever possible, such as freight and passenger rail, active and other public transport and the safest trucks.

[6] For example, signalized intersections in speed environments of 70-80 kmph.
[7] For example, lane departure warning systems.
[8] For example, underrun protection bars for trucks.
[9] Australian Automobile Association, *Cost of Road Trauma in Australia* – Summary Report, September 2017, p4. https://www.aaa.asn.au/wp-content/uploads/2018/03/AAA-ECON_Cost-of-road-trauma-summary-report_Sep-2017.pdf
[10] Australian Government Department of Infrastructure, Transport, Cities and Regional Development, *Traffic and congestion cost trends for Australian Capital Cities,* https://www.bitre.gov.au/publications/2015/is_074.aspx

6. Safe drivers

d) The training and career pathways to support, develop and sustain the road transport industry, and e) The economic impact of road-related injury, trauma and death

A framework to support training and development objectives in industry, academia and the community is essential to development and maintenance of road transport infrastructure to maximise safety and efficiency.

6.1 Road user behaviour

Since records began in 1925 road crashes on Australian roads have killed over 189,000 people[11]. Despite doubling the population and a threefold increase in registered motor vehicles, road trauma has decreased substantially since its peak of 3,798 deaths in 1970 to 1,226 in 2017.[12]

The behaviour of road users is an important factor in road safety. Safe system accepts that people are not infallible drivers. The most important behavioural factor in crashes is excessive speed. As speed increases, driver reaction time increases, peripheral vision decreases, braking distance increases, but most importantly the kinetic energy of a crash increases exponentially. The human body has limited tolerance to absorb physical energy, so crash energy needs to be reduced. Specific safe speeds should be used in road design and traffic management to ensure safety.

This is a complex issue involving design, human perception, situational awareness and capability in response to the road environment, vehicle capability and other factors such as the weather or individual trip circumstances. Lowering speed limits where changes to road design cannot remove hazards and designing roads to be self-explanatory to provide sensory guidance to encourage safe driving in tandem with targeted educational programs.

6.2 Training and development

d) The training and career pathways to support, develop and sustain the road transport industry

Government funding to deliver transport specific programs in higher education, industry and across the community to create a pipeline of engineers with transport specific expertise, transport operators and users will assist in realising the objectives of safe systems.

Education providers have a role in providing a greater range of transport specific electives for those studying civil engineering at the tertiary level.
Industry should work to support employees through continuing professional development programs with a focus on technical expertise and safety.

The best road safety management can only occur if professionals have the capability. Many people involved in key agencies start work in road safety with little or no knowledge or experience. Road design is usually carried out by separate groups of professionals to road safety analysis. Opportunities for high quality professional training is scarce.

Training organisations at all levels need to provide for updated continuing professional development training in road safety to all individuals who are responsible for designing elements of the road system. Training must also be provided in complementary fields such as land use planning, public policy, transport economics, occupational safety, and health. Investment is required to train staff at all levels in organisations to ensure awareness of road safety as an occupational safety issue and to complement road safety outcomes.

[11] Australian Medical Association, Road Safety – 2018 Position Statement, https://ama.com.au/position-statement/road-safety-2018
[12] Department of Infrastructure, Transport, Cities and Regional Development, Office of Road Safety, https://www.infrastructure.gov.au/roads/safety/, July 2019.

7. Economic road reform

f) Efficient cost-recovery measures for industry stakeholders, including subcontractors.

Federal and state governments should proactively undertake planning for road pricing in advance of the widespread deployment of emerging technologies such as electric and automated vehicles as these are likely to act as an opportunity for change.
Any proposed road pricing initiative should have clearly defined objectives to clarify purpose.
The development of network pricing schemes should be coordinated through COAG's Transport and Infrastructure Council.

7.1 Road pricing models

Several alternate road pricing models have been implemented globally. These models are designed to achieve different and occasionally competing objectives, and present unique opportunities and challenges. Some solutions for consideration are presented below.

Congestion/cordon pricing

Cordon charges place a price on motorists entering a specified area, typically a CBD or key activity centre. This model has been implemented in major cities such as London, Stockholm and Singapore.

Corridor specific pricing

Corridor specific pricing applies a charge to drive a specified section of road to manage demand. An example of this is high-occupancy toll (HOT) lanes where vehicles with multiple passengers are exempt from pricing, while other vehicles can pay a charge to access the lanes to avoid congestion.

Network wide schemes

Network wide schemes charge road users for the distance that they drive across the entire road network. This model has been implemented as a trial in the state of Oregon in the USA for commuters, while Switzerland implements a distance based heavy vehicle charge13. Conceptually this model presents the most promising framework to manage the complex and interdependent policy objectives using mechanisms such as variable pricing.

Facility pricing

Facility pricing is a traditional tolling model established to help fund the construction and/or operation of specific sections of motorway. This model has been implemented on several roads in Brisbane, Melbourne and Sydney.

There are several sub-options and flexibility within each of the above pricing models in how and when road users are charged, for example point pricing at gantries, or distance-based pricing, along with variable pricing at different times of day.

7.2 Key considerations

There are four main considerations in developing road pricing policy: revenue, transport outcomes, social equity and implementation. These aspects are strongly interdependent, and it is difficult to optimise one without trade-offs from another.

[13] Federal Customs Administration, 2019. *Lump-sum heavy vehicle charge (PSVA) for Swiss vehicles,* https://www.ezv.admin.ch/ezv/en/home/information-companies/transport--travel-documents--road-taxes/heavy-vehicle-charges--performance-related-and-lump-sum-/lump-sum-heavy-vehicle-charge--psva--for-swiss-vehicles.html

Revenue

The introduction of a road pricing scheme would introduce a new government revenue source, whether it is through the collection of tolls or distance-based charges, or through the sale of pricing concession.

Key considerations for government are whether the scheme should be designed to introduce an additional, stable revenue stream, or whether it should be revenue neutral to enable the removal of more inefficient or unsustainable taxes such as motor vehicle registration at state level, or fuel excise at federal level.

If the scheme is not revenue neutral then another important consideration is whether revenue will be hypothecated for a specific purpose such as investment in road or public transport infrastructure, or whether it will be consolidated revenue.

Transport outcomes

The pricing of road space has the potential to manage travel demand to optimise the movement of people in congested spaces. Traditional toll roads optimise traffic flow on a single link, introducing potentially distorted incentives for drivers by encouraging the use of alternative routes which are less suited to high traffic volumes.

Alternative approaches to road pricing, such as network wide pricing or cordon charges are better suited to effectively managing traffic demand and improving the flow of traffic. This has the potential to defer the need for significant investments in road infrastructure that are often aimed at providing increased road capacity to meet peak period demand. Road pricing can offset the effect of induced travel demand, which sees additional car trips made to take advantage of new road space resulting in reduced time savings.

Road pricing also has the potential to act as a new policy lever through which governments can guide preferred future travel outcomes. With automated vehicle technology on the horizon, road pricing has a role in shaping the use of driverless vehicles based on factors such as empty running, time of travel and route selection.

Social equity

One of the challenges of road pricing is that depending on the model adopted it can disproportionately impact outer-urban and regional commuters who are more car dependent, travel further and have less access to public or active transport alternatives. Road pricing can also be seen to advantage higher income earners as they are more able to pay for convenient travel options.

It should be noted that the status quo is not itself equitable, with licencing and vehicle registration fees typically being flat fees that do not differentiate by income. Owners of newer, more fuel-efficient vehicles pay less fuel excise than other road users, and electric vehicle owners avoid the need to pay fuel excise all together.

The challenge of addressing social equity concerns is not unique to road pricing, and although it is an important consideration it should not necessarily be optimised in isolation of the broader taxation and welfare system.

Implementation

The existing network of toll roads across Brisbane, Sydney and Melbourne present a challenge to implementing cordon or network road pricing within these cities. This toll network and long-term concession agreements that are in place set constraints to policy development. Although this does not prevent a more comprehensive road pricing model from being developed it will require careful negotiation with current operators.

The level of administration effort required to implement road pricing depends upon the complexity of the scheme that is proposed. More detailed pricing initiatives such as including pricing discrimination will require a greater administrative task and budget.

The largest barrier to implementation of more comprehensive road pricing in Australia, particularly in cities that do not currently have road tolls is the lack of social licence. Toll roads in Australia have traditionally been justified as funding new infrastructure that would not otherwise be built, and the transition to charging for use of existing roads will be challenging.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