New Vehicle Efficiency Standard – Have your say Organisation Submission

How can I have my say?

We are inviting the Australian community to consider the proposed design and implementation of Australia's New Vehicle Efficiency Standard (NVES), so that we can incentivise global vehicle manufacturers to supply cleaner, cheaper-to-run cars to Australia.

The Government has published the *Cleaner, Cheaper-to-Run Cars: An Australian New Vehicle Efficiency Standard Consultation Impact Analysis* which sets out the options we have considered, as well as the Government's preferred design.

This paper is available on the New Vehicle Efficiency Standard - Cleaner and Cheaper-to-run Cars for Australia consultation page **here**.

You are invited to provide feedback through this short, 10-minute questionnaire. Please complete your submission by **4 March 2024, 23:59 AEDT**.

If you require assistance to complete this questionnaire, please contact the Cleaner Cars team at CleanerCars@infrastructure.gov.au or 1800 075 001.

Privacy Policy

All responses will be published unless you indicate otherwise. You may choose for your name and position to be withheld.

By agreeing, you are agreeing for your data to be collected and processed in accordance with the Australian Privacy Principles. You can find out more information **here**.

All questions marked with * are required.

*1. Please select from the below options (required):

- (•) I agree for my response to be published with my name and position.
- ( ) I agree for my response to be published with my name and position withheld.
- ( ) I do not agree for any of my response to be published.

* 2. What is your name? (required)

Robin Smit

* 3. What organisation do you represent? (required)

Transport Energy/Emission Research (TER)

* 4. What is your position at the organisation? (required)

Director and Principal Resarch Consultant

Australian New Vehicle Efficiency Standard (NVES) Proposed Options

Please read below a brief overview of the three options and a benefit-cost analysis.

- **Option A**
  Provides the slowest start, will not catch Australia up to other jurisdictions globally in terms of emissions reductions and latest fuel efficiency technology. This option causes the least disruption of all the options but has the least benefits to the Australian community.

- **Option B (Government's preferred option)**
  Provides a strong, ambitious and achievable policy. The policy settings provide enough flexibility to avoid extremely high costs, with an opportunity for suppliers to adjust and invest in infrastructure to support the transition, and delivers considerable abatement and fuel cost savings to Australians.

- **Option C**
  Provides the fastest transition, with an accelerated trajectory to beat CO_2 targets for 2030/32 in EU and US in 2028/29. This results in both a high net benefit and greater abatement, but also higher costs.

You can read more detail on the features of these options **here**.

The Government has undertaken a benefit-cost analysis of the options to estimate how the costs and benefits of each option compare. The key indicators of a proposed option are its net benefits and the benefit cost ratio (BCR). If the net benefits are positive, the BCR will be greater than one.

Your feedback and comments on the three options is important.

Please review the below BCR analysis before selecting your preferred option below.

	Option A *slow start*	Option B *fast but flexible*	Option C *fast start*
Benefits cost ratio	**1.42**	**3.08**	**2.96**
Net benefits	$0.17 billion	$96.46 billion	$114.90 billion
Benefits ($ billion)			
Fuel savings	$0.50	$107.6	$129.96
Health benefits	$0.02	$5.53	$6.75
Greenhouse gas emissions	$0.05	$14.38	$17.29
Reduced vehicle maintenance	$0.01	$15.46	$19.65
Total benefits	**$0.58**	**$142.95**	**$173.65**
Costs ($ billion)			
Government and compliance	$0.21	$0.18	$0.17
Vehicle technology costs	$0.19	$7.69	$9.49
Electricity costs	$0.04	$29.38	$37.37
Battery replacement costs	$0.0	$9.23	$11.72
Total costs	**$0.41**	**$46.49**	**$58.75**

5. Please rank the proposed options in order of preference (optional):

If you do not support any of the proposed options, please proceed to question 6

	1st	2nd	3rd
Option A	○	○	◉
Option B	○	◉	○
Option C	◉	○	○

6. Briefly, what are your reasons for your choice? (optional, 3000 character limit)

Please see TER's accompanying letter (NVES Consultation Impact Analysis TER letter 230224.PDF) for a detailed response and feedback on the Consultation Impact Paper. The choice for Option C is made from an emission reduction and climate perspective, although it is acknowledged that the Government needs to weigh a wider range of factors. With decades of discussions and consultations, but no real action, Australia has manoevred itself into a position where the emissions performance of new LDVs is particularly poor when compared internationally, and increasingly so. More details and analysis are provided in a recent TER-ICCT report that was published on 20 February 2024 (https://theicct.org/publication/australian-ldv-co2-emissions-compare-to-the-rest-of-the-world-feb24/). We therefore need to catch up to the rest of the world and a strong NVES (Option C) is a first but critical step in this direction.

7. Do you support the Government's preferred option (Option B)? (optional)

Yes (●) No ( )

8. Do you have any feedback on the analysis approach and key assumptions used? (optional, 3000 character limit)

Please refer to TER's accompanying letter for a detailed response.

9. Briefly, describe how the NVES might impact your organisation (optional, 3000 character limit)

A strong NVES would have several benefits for the Australian community (costs, health, energy security) and the environment (climate change, air quality), but no particular benefits or disbenefits were identified for my organisation.

10. Who should the regulated entity be? (optional, 3000 character limit)

See section 7.2 of the impact analysis

The type approval holder seems appropriate and implementation of further measures to detere avoidance and undermining of the NVES is recommended.

Transport Emission Energy Research

Australian Government
Department of Infrastructure, Transport,
Regional Development, Communications and the Arts
Cleaner Cars Policy Section
Reducing Surface Transport Emissions Branch

23 February 2024

Dear Sir, Madam,

Transport Energy/Emission Research (TER) has reviewed the consultation paper 'Cleaner, Cheaper to Run Cars: The Australian New Vehicle Efficiency Standard, Consultation Impact Analysis', dated February 2024.[1]

In addition to the questionnaire, this letter provides more detailed feedback on the Consultation Impact Analysis.

If there are any further questions, please do not hesitate to contact me.

Kind regards,

Transport Energy/Emission Research (TER)
Dr Robin Smit
Director and Principal Research Consultant
https://www.transport-e-research.com/

Adjunct Professor
University of Technology Sydney, Australia
Faculty of Engineering and Information Technology
School of Civil & Environmental Engineering

[1] https://www.infrastructure.gov.au/department/media/publications/cleaner-cheaper-run-cars-australian-new-vehicle-efficiency-standard-consultation-impact-analysis.

- General: Option C is the preferred option. The choice for Option C is made from an emission reduction and climate perspective, although it is acknowledged that the Government needs to weigh a wider range of factors. Option B, the Government's preferred option, is still a strong and well thought through option, provided that its effectiveness is not significantly diminished in the final design phase.
  The devil will be in the detail.
- General: We would like to draw your attention to a recent collaborative and independent study by TER and the ICCT (International Council on Clean Transportation) that was published on 20 February 2024.[2] The study provides a brief history of GHG emission and fuel efficiency standards in Australia and analyses the emissions performance of Australian light-duty vehicles (LDVs) from an international perspective. The results of this study[3] support a strong NVES (i.e. Option C preferred), as part of an overall strategy to catch up with major jurisdictions (EU, USA, Japan, China) and reach net zero in 2050.
- General: TER's review[4] of the Government's previous consultation paper (19 April 2023) discussed a number of risks and information gaps that could potentially undermine an effective NEVS. Not all of them seem to be explicitly addressed in the latest consultation paper, so we would like to take the opportunity to re-iterate some of them here, whenever relevant.
- Page 15 - "*Australia's fleet-average CO2 emissions for new vehicles in 2020 on the New European Driving Cycle (NEDC) are higher than the US by 31% for cars and 24% for LCVs (utes, light trucks and vans).*" The TER/ICCT study[2,3] found a slightly higher difference of 33% for cars. Note that the comparison cannot be made for LCVs, as the vehicle class definition is different: the NVES defines LCVs effectively as goods vehicles ≤ 4.5 t (NA + NB1), whereas the EU regulates LCVs defined as ≤ 3.5t (N1).
- Page 15 - *Figure 5*: it is unclear which year this chart refers to and it does not seem to align with the numbers discussed in the preceding paragraphs.
- Page 20 - "*While the incremental rate of technological improvements and business as usual increases to EV uptake is modestly reducing emissions intensity in the passenger vehicle category, it is also not providing sufficient abatement to support the Government's economy wide emissions reduction targets*."
    - As shown in the recent TER/ICCT briefing paper[2,3] and previous TER work, this statement is not correct when actual on-road emissions are considered.
    - Whereas the official (NEDC) figures suggest newly sold Australian passenger vehicles have relatively high emissions, at least they appear to have improved each year.
    - The picture is very different when we look at on-road emissions. The TER/ICCT study[2,3] suggests that emissions from newly sold Australian passenger vehicles have actually been rising since 2015. This trend is likely the result of increasing

[2] TER/ICCT, 2014. *How Australian Light-Duty Vehicle CO_2 Emissions Compare with the Rest of the World*, 20 February 2024, Transport Energy/Emission Research (TER) and the International Council on Clean Transporation (ICCT), https://theicct.org/publication/australian-ldv-co2-emissions-compare-to-the-rest-of-the-world-feb24/.
[3] https://theconversation.com/australian-passenger-vehicle-emission-rates-are-50-higher-than-the-rest-of-the-world-and-its-getting-worse-222398.
[4] TER, 2023. *A Fuel Efficiency Standard for Light-Duty Vehicles in Australia*, Transport Energy/Emission Research (TER), 30 May 2023, https://www.transport-e-research.com/publications (publication 2023b).

vehicle size and weight, a shift towards more four-wheel-drive SUVs and large utes, and a lack of mandatory standards or targets.[5]

- Page 26 - "*For example, in Option A below, there is consideration of a super credit (which counts as multiple credits) for every EV supplied (three times multiplier), plug in hybrid (two times multiplier) and efficient ICE (likely hybrid) (1.5 times multiplier).*"
  If these credits are actually used in the NVES, it will be critical that they also reflect the technology- specific risks that are already clear from international research.[4] For instance, plug-in hybrid electric vehicles (PHEVs) have the potential to reduce greenhouse gas emissions, but only if they drive mainly on electricity. Recent studies into the actual use of PHEVs have shown that electric drive is often only used for a small portion of total travel, in the order of 20% to 40%, which is significantly lower than what is expected in the official tests.[4,6] Indeed, the relative gap (%) between real-world fuel consumption and the official figures is significantly larger for PHEVs, which is also confirmed in a current and ongoing collaborative research project between TER and the European Commission's Joint Research Centre (JRC).[7] Therefore it is recommended that the Australian NVES should critically review and adjust any credits to reflect realistic fuel efficiency improvements for each vehicle technology.
- Page 26 - "*Concessions are made to heavier cars: A NVES gives heavier cars a relatively higher CO2 target because it is recognised that some consumers (such as small businesses and trades people) legitimately need a bigger car for their work.*"
  The latest EU emission regulation applies approximately flat or even negative slopes to the limit curves. This reflects increased sales of low or zero emission electric vehicles into the EU market, which tend to be heavier than the average ICEV (LDV) in the EU. It effectively means that larger and heavier vehicle fleets will incur stronger financial penalties. For Australia, with its relatively high fleet-average passenger (ICE) vehicle mass, the effect on the slope may not be as pronounced as in the EU. However, assuming that the slope of the limit curve will always be positive is likely incorrect.
- Page 30 - *Figure 9*: it is unclear what type of GHG emissions are presented, and this would need clarification. I assume it refers to exhaust (direct, Scope 1, tank-to-wheel or TTW) emissions from ICEV, HEV and PHEV, assuming zero emissions for BEV.
  TER has some concerns about the large reduction modelled for this BAU scenario (and therefore also alternative scenarios), which appears to be around 80% and may be too optimistic.
  - There is only limited information provided on the Government's modelling, but review of the information provided in Appendix B, raises some concerns. For instance, it is unclear why survival rate functions were adopted from US models and then calibrated, since these functions were recently developed and updated for the Federal Government using Australian data.[5] It seems unlikely

[5] TER, 2019. *Real-World CO_2 Emissions Performance of the Australian New Passenger Vehicle Fleet 2008-2018 – Impacts of Trends in Vehicle/Engine Design*, Transport Energy/Emission Research (TER), 14 September 2019, https://www.transport-e-research.com/publications (Publication 2019a).

[6] DISER, 2022, *Light-Duty Vehicle CO_2 Emission Factors, Energy Intensities and Survival Curves for Australia's Emissions Projections*, Department of Industry, Science, Energy and Resources, 30 June 2022, https://www.dcceew.gov.au/sites/default/files/documents/light-duty-vehicle-co2-emission-factors-energy-intensities-survival-curves-australias-emissions-projections.pdf.

[7] It is expected that a number of joint journal papers will be published about this research in 2024.

that US based algorithms would perform better than those based on Australian data, even if calibrated.

- To align with the Government's guiding principles of transparency, credibility and robustness (Table 2), it is recommended that the modelling conducted for the Federal Government is reviewed by (an) independent subject-matter expert(s) and that the results of such a review are reported and made publicly available.
- In a recent detailed modelling study[8,9], TER estimated a reduction of total well-to-wheel GHG emissions (CO_2-e) from Australian transport in 2050 of 35% to 45%, compared with 2019, depending on the dominant hydrogen production pathway. This study reflected an ambitious but 10 year delayed EU EV penetration scenario (see figure below) using detailed and Australia-specific software, i.e. the Australian Fleet Model (AFM) and the net zero vehicle emission model (n0vem).

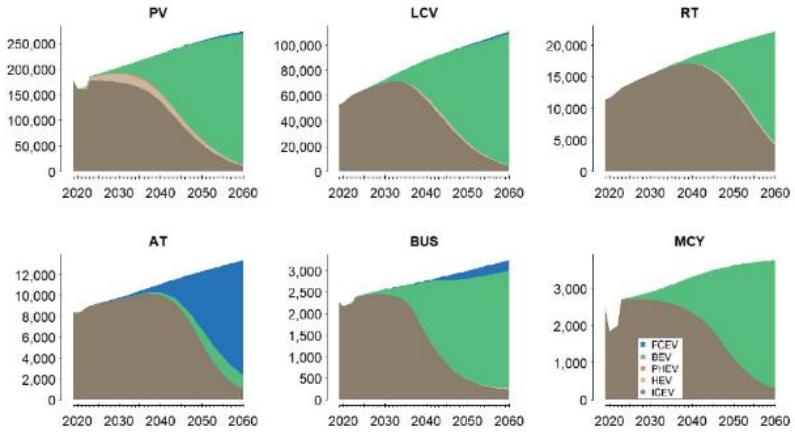

Figure 3. Annual VKT (million km) forecasts for the Australian on-road fleet by main vehicle type and fundamental vehicle technology for the time period 2019 – 2060, using the TER plausible trajectory method and assuming a ten year delay compared with the EU.

The study estimated real-world emissions, accounted for expected continued growth in total travel and reflected important trends such as the shift towards heavier passenger vehicles.[9] The TER study estimated total direct TTW CO_2 and CO_2-e emissions of 38.2 and 38.5 Mt, respectively, in 2050, for the entire Australian road transport sector, i.e. including cars, SUVs, motorcycles, LCVs, buses and trucks, i.e. a 53% reduction compared to 2019. Although there are some clear differences (e.g. on-road fleet versus LDV fleet), without further details regarding the Government's modelling, it is difficult to understand the reasons for the significant difference in predicted emissions reduction (80% by the Federal Government versus 50% by TER). TER suggests it is important to

[8] https://theconversation.com/too-big-too-heavy-and-too-slow-to-change-road-transport-is-way-off-track-for-net-zero-208655.

[9] Smit, R., 2023. An independent and detailed assessment of greenhouse gas emissions, fuel use, electricity and energy consumption from Australian road transport in 2019 and 2050, *Air Quality and Climate Change*, 57 (2), June 2023, ISSN 1836-5876, https://www.transport-e-research.com/publications (publication 2023c).

understand the reasons for these differences, as the predicted impacts directly relate to the ability of Australia to meet net zero emissions in 2050.

- As an additional suggestion, the Government may want to consider a probabilistic modelling approach to scenario modelling in the future. This method has been successfully used by TER in recent years to estimate the GHG emission impacts of different technology options for road transport.[10,11] It provides an estimate of not only the most likely outcomes, but also their associated variability and uncertainty (plausible range in outcomes). It provides another layer of information for policy-makers where the uncertainty and the robustness (risks) of different NVES options can be assessed.

- Page 21 - "*The Government's key objective is to reduce CO2 emissions from new cars.*"
  The consultation paper also defines five guiding principles (Table 2).
  TER would like to provide some further input in relation to these principles, and in particular "*Effective*" and "*Credible and Robust*":
  - To reach the net zero emission target in 2050, it is critical that the NVES - as closely as possible - is based on real-world fuel consumption and emissions.
    - A clear example how this should not be done is the continued use of an outdated legislative emission test procedure in a new NVES – the NEDC (New European Drive Cycle).[4] The NEDC laboratory emissions test is out of date and no longer used overseas due to known problems.
    - A fundamental problem is that real-world fuel consumption and emissions are increasingly higher than official NEDC figures on which the standard is based. This issue is well known, and often referred to as the 'gap'. For instance, the gap has increased over time from about 10% in 2005 to over 45% in 2021 for Australian passenger vehicles.[3]
    - Continued use of NEDC emissions data confuses the debate and undermines effective emission reduction policy and regulation. The NEDC should therefore (as a minimum) be dropped and replaced with the most recent EU or US test protocols.
  - However, there are various aspects to NVES design and standard setting that may be less clear, but will influence the above principles. Examples are the slope of the limit curve and vehicle class allocation (e.g. splitting SUVs into two classes), but also less obvious ones. An example of a perhaps less obvious aspect is the specific use of *measured* WLTP values in the EU emission standards, rather than *manufacturer declared* values[12]. This was done specifically as *manufacturer declared* values were found to artificially inflate the targets (by about 5% on average).

[10] Smit, R. Helmers, E., Schwingshackl, M., Opetnik, M., Kennedy, D., 2024. Greenhouse gas emissions performance of electric, hydrogen and fossil-fuelled freight trucks with uncertainty estimates using a probabilistic life-cycle assessment (pLCA), Sustainability, 16 (2), 762, https://doi.org/10.3390/su16020762, https://www.mdpi.com/2071-1050/16/2/762.

[11] Smit, R., Kennedy, D.W., 2022, Greenhouse gas emissions performance of electric and fossil-fueled passenger vehicles with uncertainty estimates using a probabilistic life-cycle assessment, Sustainability, 14 (6), 3444, 1-29, https://doi.org/10.3390/su14063444, https://www.mdpi.com/2071-1050/14/6/3444.

[12] Manufacturers may do this for good reasons, e.g. to build in a safety margin for conformity of production testing of new vehicles.

- General: a NVES alone is unlikely to be sufficient to achieve significant reductions in fuel consumption and emissions and meet the net zero 2050 target.
    - Even when the Australian NVES is based on the WLTP and not the NEDC test protocol – whilst a definite improvement – there is still a fuel consumption gap, compared to real-world driving. This gap is expected to be in the order of about 20%.[4,6] This means that official WLTP based fuel consumption and CO_2 figures for new vehicle sales in Australia, underpinning the NVES and national climate policies, will still significantly underestimate actual on-road fuel use and GHG emissions with about 20%, moving us away from achieving net zero emissions in 2050.
    - So additional measures will be required to address this issue. The EU has already considered this issue and has taken action. To ensure CO_2 emissions from road transport are actually reduced in line with EU policies and regulations and to prevent the fuel consumption gap from increasing again, separate EU regulation now requires monitoring of actual in-use fuel consumption. This means that new vehicles registered in the EU from 2021 onwards require the installation of onboard fuel consumption monitoring (OBFCM) devices.
    - EU Regulation 2019/631 relevantly states "*Furthermore, the Commission shall regularly collect data on the* real-world CO_2 emissions *and fuel or energy consumption of passenger cars and light commercial vehicles using on-board fuel and/or energy consumption monitoring devices, starting with new passenger cars and new light commercial vehicles registered in 2021. The Commission shall ensure that the public is informed of how that real-world representativeness evolves over time.*" This aligns with almost all of the Government's guiding principles listed in Table 2: Effective, Transparent, Enabling, Credible and Robust.
    - A current collaborative research project[7] between TER and the EU's Joint Research Centre (JRC) is analysing the first round of EU OBFCM data and - although this needs to be confirmed - the initial findings indicate higher than expected on-road fuel consumption and CO_2 emissions for certain types of powertrains.
    - OBFCM is not mentioned in the latest consultation document, but it is an essential component of an effective NVES. It will be required to track, monitor and report the effectiveness of the Australian NVES over the coming years and to reduce the opportunity for car manufacturers to exploit legislative loopholes.
    - It is unlikely that the the current on-road emissions testing program that is being administered by the AAA, and will run for the coming years, will provide the empirical data and independent checks that the NVES requires. For instance, there are issues related to the relatively small sample size (compared to the on-road fleet and in consideration of inter-vehicle and regional variability in emissions that OBFCM will capture) and the (Melbourne-based) test protocol (RDE), which deviates from actual real-world driving (country-wide differences in ambient temperature and humidity, driving style, road gradient, fuel quality, etc.).

- General: it will be critical that the NVES incorporates a robust evaluation and correction mechanism, which will allow the Federal Government to act if the measured real-world fuel efficiency and associated GHG emissions show that actual improvements turn out to underperform or even be absent – something that is not beyond the realm of possibilities
- General: there are, of course, further and future potential improvements that the Government may consider. One example is a focus on GHG emissions: fuel efficiency and CO_2 emissions are not exactly the same as greenhouse gas (GHG) emissions. Greenhouse gases include CO_2 but other substances as well, such as methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs) and hydrofluorocarbons (HFCs). They also include less obvious greenhouse gases such as hydrogen (e.g. leakage from hydrogen infrastructure), which has an indirect adverse effect on climate change. The standard could, in principle, include all GHGs that are relevant for road transport. This would help prevent adverse and undesirable policy outcomes. For instance, omission of methane emission reduction policies and regulation, could indirectly promote CNG (compressed natural gas) vehicles without taking into account the issue of 'methane slip' from this type of vehicles. Although EU regulation only considers CO_2 emissions, US regulation includes additional emission standards for methane and nitrous oxide for light and heavy-duty vehicles. EU emissions regulation does include a methane emission limit for natural gas engines (heavy-duty vehicles).[4]

Organisation questionnaire response

Privacy Setting: I agree for my response to be published with my name and position.

What organisation do you represent? (required)	The International Council on Clean Transportation (ICCT)
What is your name? (required)	Zifei Yang
What is your position at the organisation? (required)	Passenger Vehicle Program lead
Please rank the proposed options in order of preference. (optional)	Option A - 0th, Option B - 0th, Option C - 0th
Briefly, what are your reasons for your choice? (optional, 3000 character limit)	NULL
Do you support the Government's preferred option (Option B)? (optional)	NULL
Do you have any feedback on the analysis approach and key assumptions used? (optional, 3000 character limit)	NULL
Briefly, describe how the NVES might impact your organisation (optional, 3000 character limit)	NULL
Who should the regulated entity be? (optional, 3000 character limit)	NULL