ANCAP SUBMISSION TO THE NATIONAL ELECTRIC VEHICLE STRATEGY

The Australasian New Car Assessment Program (ANCAP) welcomes the opportunity to provide a submission to the National Electric Vehicle Strategy Consultation Paper.

ANCAP is Australasia's independent voice on vehicle safety. Our role is to encourage vehicle brands to design and build, and consumers to purchase and use, the safest vehicles possible. Our objective is to create an environment where vehicle brands continually strive for the highest level of safety. ANCAP acknowledges brands when their vehicles meet or exceed top performance, whilst bringing awareness to those vehicle models that can improve, in an effort to reduce road trauma.

ANCAP's overarching public message is twofold:

- **For vehicle owners:** *Purchase the safest vehicle you can afford, and one which suits your needs*
- **For vehicle users**: *Travel in the safest vehicle possible*

ANCAP has been a major contributor to improving the safety of light vehicles in Australia for nearly 30 years with continual improvements in ANCAP testing and assessment standards. Improvements in safety of vehicles over this time period has been due to the recognition of the need to better protect the vehicle occupants with improved vehicle structures and occupant protection technology (e.g. seatbelts and airbags) and more recently active safety technology to prevent a crash or reduce the severity of a crash when it occurs. Analysis conducted by ANCAP clearly shows that this non-regulatory approach has seen the safety of light vehicles improve year-on-year. More than 215 current vehicle models hold an ANCAP safety rating with 93% of all new light vehicles sold in 2022 covered by an ANCAP safety rating and 88% achieving a 5 star ANCAP safety rating.

ANCAP recognises the Australian Government's intention to increase the rate of introduction of electric vehicles and other alternatively powered vehicles (EVs) and to deliver the environmental benefits through de-carbonisation of the transport sector. However, this should not be done at the expense of those safety improvements already delivered, or continued safety improvements expected from improving vehicle safety technology.

The *National Electric Vehicle Strategy* must be consistent with the outcomes of other Australian Government strategies including the *National Road Safety Strategy 2021-2030* (NRSS) and the *National Land Transport Action Plan*. One of the objectives of the NRSS is to reduce the average age of the vehicle fleet, in recognition that newer vehicles are safer. A reduction in fleet age will contribute to meeting the strategy's targets of a 50 per cent reduction in fatalities and 30 per cent reduction in serious injuries by 2030.

ANCAP supports the objectives of the National EV Strategy to increase the uptake of EVs and notes this represents a 'once in a lifetime opportunity' to turn over Australia's vehicle fleet and reduce its average age. Mechanisms to increase EV uptake must not be at the expense of safety, and the high level of vehicle safety that Australians expect of new cars. Existing 5 star government and corporate fleet policies must be maintained, and ANCAP recommends that government incentives and discounts are only offered to EVs that reach the expected 5 star safety standard.

ANCAP provides safety ratings for a range of models that are pure electric vehicles or have electric and hybrid variants and has safety ratings available for 45 current alternative-powered models – all of which have achieved 5 star ANCAP safety ratings. With the increasing availability of EVs and electrified variants, ANCAP intends to continue to provide safety ratings for new EVs and the electrified variants of existing petrol or diesel models.

ANCAP does not support any relaxation in standards to allow the importation of used EVs from overseas markets. The safety specifications of a vehicles delivered in an overseas market can be substantially different to the Australian model with the same name, and there is no practical way to be able to evaluate their safety or provide an ANCAP safety rating.

BACKGROUND

ANCAP has been a major contributor to improving the safety of light vehicles in Australia for 30 years with continual improvements in ANCAP testing and assessment standards. Analysis conducted by ANCAP clearly shows that this non-regulatory approach has seen the safety of light vehicles improve year-on-year.

ANCAP's contribution to vehicle safety is recognised in the *National Road Safety Strategy 2021-30*, which identifies that one of the key changes by 2030 is

> *"At least 25 per cent of the light vehicle fleet is 5-star Australasian New Car Assessment Program (ANCAP) rated with a datestamp 6-years-old at maximum."*[1]

More than 215 vehicle models hold a current ANCAP safety rating with 93% of all new light vehicles sold in 2021 covered by an ANCAP safety rating and 88% holding a 5 star ANCAP safety rating. This high level of market penetration, combined with high levels of consumer awareness, positions ANCAP to hold a unique ability to accelerate the provision and market uptake of new vehicle safety features and technologies.

Safety and environmental performance are top-of-mind considerations for new car buyers, and especially government fleet buyers as many state and territory governments have introduced fleet targets for EVs. ANCAP encourages all consumers and fleet buyers to consider the safest green vehicle they can afford.

Attached is a detailed document, *ANCAP Background Information*, providing additional information on ANCAP, the current state of the art of vehicle safety and what vehicle safety technology is expected to be introduced out to 2030.

SAFETY RATINGS FOR ELECTRIC AND HYBRID VEHICLES

ANCAP provides safety ratings for a range of models that are pure electric vehicles or have electric and hybrid variants and has published safety ratings for 43 current models that have achieved 5 star ANCAP safety ratings. ANCAP recently released a "Safe and Green Guide" to provide private, business and fleet buyers with a quick reference to the safety performance of a range of battery electric, plug-in hybrid, hybrid and hydrogen powered models.[2]

Electrified vehicles (including battery electric, fuel cell and hybrid-electric vehicles) are subjected to the same ANCAP crash protection and crash avoidance tests as any other vehicle rated by ANCAP. Additional elements are monitored by ANCAP as part of the testing process:

- The output of the high-voltage battery is monitored. High voltage batteries are fitted with a 'safety cut-out' that will rapidly disconnect the battery in the event of a crash. The battery output is monitored to record if and when this cut-out operates.

- The vehicle body is checked safely for any high-voltage immediately after the crash. If the safety cut-out were to fail and a damaged high-voltage wire was to be in contact with the vehicle body, then a person touching the vehicle could be injured. Test technicians use insulated gloves and stand on a rubber mat to ensure that the vehicle has no high voltages and is safe to touch.

- The battery is examined for any sign of damage, such as intrusion into the battery unit, leakage of fluids, fire or abnormal heat.

ANCAP also requires Rescue Cards from vehicle manufacturers each time a vehicle is rated. Rescue Cards are designed to assist emergency services personnel in quickly identifying in-vehicle hazards – including high-voltage batteries - to minimise risk to first responders, and safely free occupants from the vehicle following a crash and are available free of charge via ANCAP's digital app, 'ANCAP RESCUE'.

ANSWERS TO CONSULTATION QUESTIONS

Following are responses to those consultation questions of relevance to ANCAP.

1. Do you agree with the objectives, and do you think they will achieve our proposed goals? Are there other objectives we should consider?

ANCAP agrees with the goals but notes that safety has been omitted from both the goals and objectives and should be a key consideration. Improving the safety of Australia's electric vehicle fleet should be a goal of the strategy, and the objectives adjusted as follows:

- Increase supply of affordable, **safe,** and accessible EVs to meet demand across all segments.

[1] Australian Government, Office of Road Safety, National Road Safety Strategy 2021-30

[2] Safe and Green, ANCAP Safety Ratings for Alternative-Powered Models, www.ancap.com.au/safeandgreen

6. What information could help increase demand and is Government or industry best placed to inform Australians about EVs?

The Australian Government already provides information on the environmental (both CO_2 and noxious emissions) performance of vehicles via the Green Vehicles Guide. For EVs, the Green Vehicle Guide provides information on the energy consumption (Wh/km) and electric range (km).

Additional information to assist consumers would be the ANCAP safety rating for those EVs that have been rated by ANCAP. This will allow consumers to find information on both the environmental performance and safety performance in the one place.

8. Would vehicle fuel efficiency standards incentivise global manufacturers to send EVs and lower emission vehicles to Australia?

Many other developed economies are incentivising the uptake of EVs through both financial and non-financial incentives complemented by penalties or limits on ICE vehicles through fuel consumption or CO_2 standards. These measures have influenced the vehicle manufacturers to priorities those markets for sales of EVs.

Introduction of fuel efficiency standards, along with other incentives will provide market signals to vehicle brands who can then respond and provide new current generation EVs with state of the art safety features.

10. What design features should the Government consider in more detail for vehicle fuel efficiency standards, including level of ambition, who they should apply to, commencement date, penalties and enforcement?

Vehicle safety must be part of the design of a vehicle fuel efficiency standard and the simplest approach is for the Government to ensure that only new EVs are imported under a Type Approval under the *Road Vehicle Standards Act 2018*.

Design features often used in vehicle fuel efficiency standards to accelerate the adoption of EVs (including the FCAI's voluntary scheme) include:

- Use of multiplier for EVs and other low emission vehicles, and
- Banking and trading of CO_2 credits, within a single company/brand and between companies/brands.

Any EV imported under concessional arrangements, such as the Specialists and Enthusiasts Vehicle Scheme (SEVS) (see below), should not be allowed to be included in any part of any fuel efficiency standard as it may encourage the importation of used EVs (that do not meet the same vehicle safety standards as new vehicles) to assist a brand with meeting their fuel efficiency target.

13. How could we best increase the number of affordable second hand EVs?

Role of corporate and government fleets

Corporate and government fleets are the greatest contributor to the second hand vehicle market in Australia. Fleet purchases of new vehicles account for around 50% each year and many fleets keep their passenger vehicles (cars and SUVs) for only 3 years. These vehicles then enter the second hand car market.

It is critical for fleets to maintain their focus on safety while increasing their uptake of EVs. Fleets should be encouraged to take up new, safe EVs whilst maintaining their existing 5 star safety rated fleet policies.

As mentioned earlier, ANCAP has produced a guide to assist fleets, and private customers, to assess the safety of EVs that they are considering purchasing. Currently, all EVs (including BEV, PHEV, HEV and FHEV) on sale and assessed by ANCAP hold a 5 star safety rating (see ANCAP's Safe and Green Guide in Attachment 1).

Success of existing FBT exemption for vehicles above one tonne

Government financial incentives include Fringe Benefit Tax (FBT) exemptions have proven to be successful in impacting the market. For example, FBT exemption for dual cab Light Commercial Vehicle (LCVs) with a carrying capacity of more than 1 tonne[3] is one of the factors that has influenced the market to the point now where LCVs are dominant models in Australia.

The Government has already announced a proposal to remove FBT for EVs under the Luxury Car Tax threshold, to apply from the FBT year beginning on 1 April 2022.[4] The Senate Economics Legislation Committee conducted an

[3] Australian Government, Australian Taxation Office, Fringe Benefits Tax – Exempt Motor Vehicles, www.ato.gov.au [accessed 27 October 2022]
[4] Australian Government, Australian Taxation Office, Fringe Benefits Tax and Electric Cars, www.ato.gov.au [accessed 27 October 2022]

inquiry into the proposal and reached the view that exempting the relevant EVs would incentivise employers and fleet managers to purchase more EVs.[5]

ANCAP would support this initiative provided the eligibility criteria also includes that the vehicle holds a 5 star ANCAP safety rating.

14. Should the Government consider ways to increase the supply of second hand EVs independently imported to the Australian market? Could the safety and consumer risks of this approach be mitigated?

The consultation paper identified that limited supply of affordable EVs remains a barrier to higher uptake, and that many stakeholders are calling for supply measures to improve the supply of affordable EVs. Some stakeholders have called for relaxation in current regulations to allow for a wider range of used EVs to be imported. The consultation paper acknowledges that while a relaxation in regulation (e.g. Australian Design Rules) is likely to enable a wider range of used EVs to be imported, leading to an increase in number of used EVs in the market, this has the potential to compromise vehicle standards across the fleet and road safety outcomes.

ANCAP does not support any relaxation in current vehicle safety standards to enable a wider range of used EVs to be imported. Our reasons are outlined below.

Second hand imports avoid safety regulations

Used vehicles are imported under the Australian Government's Specialist and Enthusiast Vehicles Scheme (SEVS). The intention of the SEVS was to allow individuals to import specialist and enthusiast vehicles, it was not intended for mainstream importation of mass-market vehicles.

Under SEVS, exemptions are provided for national vehicle safety and emission standards set out in the Australian Design Rules (ADRs), with vehicles only required to meet those ADRs applicable at the date of manufacture of the vehicle, rather than all current ADRs in place at the time the vehicle is imported. Importantly, safety assessments and ANCAP ratings are not undertaken on used vehicles entering the market. Certification under the ADRs is effectively a declaration by the manufacturer that they meet the relevant regulatory standards. Verification of these claims through examination of a vehicle is only undertaken by the Department in rare circumstances.

ANCAP holds significant concerns that usage of SEVS to import EVs is undermining the important safety framework established through the ADRs. Further, these vehicles will not be fitted with more recent safety features commonly available in new vehicles, such as Autonomous Emergency Braking (AEB) and Lane Keeping Assist (LKA) systems, both of which will be mandatory for all new vehicle entering the Australian market from 2024. This means that from 2024, a second hand vehicle imported under the SEVS will not be required to be fitted with AEB and LKA which will be mandatory for all new vehicles sold in Australia.

ANCAP does not support using the SEVS, or any other concessional arrangements, to allow importation of used EVs in commercial quantities as this will clearly and quickly lead to a reduction in vehicle safety.

Second hand imports increase the age of the fleet

The National Road Safety Strategy identifies the age of the in-service light vehicle fleet as a concern and that research and development is needed to underpin policy development to achieve an uptake and increase the saturation of safety features available across the national fleet. The aim is to cease any consumer-driven demand to import any star rated vehicles that do not meet the voluntary 5-star ANCAP standard.

Allowing a wider range of second hand EVs to be imported will significantly impact on road safety outcomes such as the National Road Safety Strategy's target of 50% reduction in fatalities and 30% reduction in serious injuries by 2030.[6]

ANCAP research clearly demonstrates that newer vehicles are safer, with 67 per cents of all fatalities occurring in light vehicles aged 10 years or older while these vehicles represent only 45% of all registered vehicles. Further information on this analysis is included in the attached ANCAP Background Information document (Attachment 2, pp.3-4).

ANCAP cannot provide safety information to consumers on second hand imports

There can be significant variations in safety specifications of a model supplied in different markets, despite carrying the same model name and having been manufactured at a similar time. Variations also exist within models, with multiple different 'variants' often offered by manufacturers. Manufacturers offer different options when a vehicle is purchased 'new' and information about the package of options chosen by the original purchaser (and therefore the vehicle's specifications) is not able to be determined without information from the original manufacturer.

[5] Commonwealth of Australia, The Senate - Economics Legislation Committee, Treasury Laws Amendment (Electric Car Discount) Bill 2022 [Provisions], September 2022
[6] Australian Government, Office of Road Safety, National Road Safety Strategy 2021-30

Importantly, second hand vehicles imported under SEVS will not necessarily have the same safety specifications, despite having the same model name and a similar date of manufacture as the model sold in Australia as a new vehicle.

In addition to used import vehicles being exempt from the safety regulations applying to new cars, ANCAP is unable to provide consumer information on the safety performance of used imports. ANCAP does not (and cannot) test and rate used imports, therefore potential purchasers of used EVs are not able to be made aware of the safety performance of these vehicles, which is likely to be lower than most new cars due to the exemptions provided under SEVS.

ANCAP requires five identical vehicles to be destroyed during crash testing to complete its safety rating process. These vehicles undergo a suite of physical tests including destructive crash testing and scenario-based testing of crash avoidance capabilities. ANCAP tests the highest volume selling variant with the lowest safety specifications. For the rating to be extended to additional variants of the same model, technical evidence is required to be provided by the manufacturer. This evidence must demonstrate that the performance of the additional variant is no worse than the original variant tested.

In cases where a vehicle has been tested in Europe, under the affiliate Euro NCAP program, ANCAP will assess whether those results can be applied to the variant sold in Australia. We require information from the manufacturer to validate the safety performance of the Australian variants before we can utilise the European test results. Through this process we often find differences in drivetrain and safety specifications of the variants sold in Australia, compared with that sold in Europe. Similar differences exist when Australian variants of Japanese, Korean or US versions of the vehicle are examined.

Conversely, these differences mean it is not possible for ANCAP ascertain whether an existing rating for an Australian variant can be applied to an imported second hand vehicle with the same model name.

No viable mechanism to mitigate safety concerns of second hand imports

ANCAP does not believe that attempts to mitigate the safety concerns of second hand EVs will be successful.

In theory, special safety criteria could be developed for second hand imports to comply with, however no viable mechanism exists to assess and verify, in order to provide consumer information, on the safety performance of the features fitted to these vehicles.

For this to be successful it would require technical information from the original manufacturer, regarding specifications of the individual vehicle (by VIN). The variability between vehicles sold under the same model name adds significant complexity to the level of information required. In ANCAP's experience, it is very difficult to obtain information from manufacturers regarding the specifications of vehicles sold years before and this task is not one that ANCAP is equipped to undertake.

19. What more needs to be done nationally to ensure we deliver a nationally comprehensive framework for EVs?

The National EV strategy needs to recognise and be consistent with the objectives of other Australian Government strategies and plans, as well as State and Territory Governments EV strategies.

Consistency with relevant Commonwealth Government strategies and plans

The two national strategies and plans that are most relevant to vehicle safety and technology are:

- National Road Safety Strategy 2021-2030
- National Land Transport Technology Action Plan[7]

The *National Road Safety Strategy (NRSS) 2021-30* is Australia's 10-year plan for dramatically reducing road trauma on Australia's roads. Developed together by the Commonwealth, state and territories and the Australian Local Government Association, the Strategy sets out our road safety objectives, key priorities for action, and road trauma reduction targets for the decade to 2030. The NRSS outlines the key priorities and targets to reduce the annual number of fatalities by at least 50 per cent and serious injuries by at least 30 per cent by 2030.

The *National Land Transport Technology Action Plan 2020-2023* and underpinning National Policy Framework, sets out a nationally consistent approach to policy, regulatory and investment decision-making for emerging land transport technologies. The National Land Transport Action Plan is updated every three years and outlines national short- to medium- term priorities, focusing on the five key issues for Government identified in the framework:

1. Safety, Security and Privacy
2. Digital and Physical Infrastructure
3. Data
4. Standards and Interoperability
5. Disruption and Change

[7] Australian Government, Office of Future Transport Technology, National Land Transport Technology Action Plan

Consistency with State and Territory Governments EV strategies

Many state and territory governments have Electric Vehicle strategies, with financial incentives (including direct consumer subsides, registration and stamp duty discounts) and fleet targets that aims to drive uptake of EVs. For example, the NSW Government[8] has introduced both a $3000 subsidy for new EVs, up to a cost of $68,750, for private buyers and small businesses with less than 10 vehicles, and fleet targets that aims to drive sales of EVs to more than 50% of new car sales by 2030-31.

While many government fleet policies, including the Australian Government's, have a requirement for a 5 star ANCAP rating, the current government EV Strategies do not include any safety requirements such as a 5 star ANCAP rating as an entry criterion to access any financial incentives.

ANCAP recommends that any government financial incentive for EVs include a requirement for a 5 star ANCAP safety rating as an eligibility requirement.

RECOMMENDATIONS

ANCAP makes the following recommendations for consideration:

1. No relaxation of current vehicle safety regulations (i.e. ADRs) to allow large scale importation of used EVs.

2. Any government financial incentive for EVs include a requirement for a 5 star ANCAP safety rating.

3. The National Electric Vehicle Strategy needs to recognise and be consistent with the objectives of the *National Road Safety Strategy 2021-2030* and the *National Land Transport Technology Action Plan 2020-2023*.

If you wish to discuss any of ANCAP's views on the safety of EVs and how this could be included in the National Electric Vehicle Strategy, please do not hesitate to contact me directly.

Yours sincerely

Carla Hoorweg
Chief Executive Officer
31 October 2022

Attachments:

1. **ANCAP Safe and Green Guide**
2. **ANCAP Background Information**

[8] NSW Government's Electric Vehicle Strategy | NSW Government [Accessed 8 June 2022]

Safe & Green

ANCAP SAFETY

ANCAP SAFETY RATINGS FOR
ALTERNATIVE-POWERED MODELS

OCTOBER 2022
v1.2

Safe *and* green: Environmental outcomes should not come at the cost of safety.

We can all play our part to ensure the future of the Australian vehicle fleet is both safe *and* green.

Safety and environmental performance are top-of-mind considerations for new car buyers today, and ANCAP encourages all consumers and fleet buyers to consider the safest green vehicle they can afford.

How does ANCAP test green vehicles?

Electrified vehicles (including **battery electric**, **fuel cell** and **hybrid-electric** vehicles) are subjected to the same ANCAP crash protection and crash avoidance tests as any other vehicle rated by ANCAP.

Some additional elements are monitored by ANCAP as part of the testing process:

- **The output of the high-voltage battery is monitored.** High voltage batteries are fitted with a 'safety cut-out' that will rapidly disconnect the battery in the event of a crash. We monitor the output to record if and when this cut-out operates.
- **The vehicle body is checked safely for any high-voltage immediately after the crash.** If the safety cut-out were to fail and a damaged high-voltage wire was to be in contact with the vehicle body, then a person touching the vehicle could be injured. Test technicians use insulated gloves and stand on a rubber mat to ensure that the vehicle has no high voltages and is safe to touch.
- **The battery is examined for any sign of damage**, such as intrusion into the battery unit, leakage of fluids, fire or abnormal heat.

We also seek **Rescue Cards** from vehicle manufacturers each time we rate a vehicle. Rescue Cards are designed to assist emergency services personnel in quickly identifying in-vehicle hazards - such as high-voltage batteries - to minimise risk to first responders, and safely free occupants from the vehicle following a crash.

To date, more than forty battery electric, plug-in hybrid, hybrid and hydrogen powered vehicles available to purchase as new in Australia have been tested and rated by ANCAP SAFETY.

This guide provides private, business and fleet vehicle buyers with a quick reference as to the safety performance of a range of battery electric, plug-in hybrid, hybrid and hydrogen powered models.

Further details are available at
ancap.com.au

ANCAP
SAFETY

ALTERNATIVE-POWERED MODELS
BY SAFETY RATING & POWERTRAIN

MAKE & MODEL	VEHICLE TYPE	ADULT OCCUPANT PROTECTION	CHILD OCCUPANT PROTECTION	VULNERABLE ROAD USER PROTECTION	SAFETY ASSIST	ANCAP SAFETY RATING	POWERTRAIN
Audi e-tron	Medium SUV	91%	88%	71%	78%	★★★★★ 2019	BEV
BMW 3 Series	Medium Car	97%	87%	87%	77%	★★★★★ 2019	PHEV
BMW iX	Medium SUV	91%	88%	73%	78%	★★★★★ 2021	BEV
BMW iX3	Medium SUV	93%	84%	70%	58%	★★★★★ 2017	BEV
BYD Atto 3 (NZ only)	Small SUV	91%	84%	69%	80%	★★★★★ 2022	BEV
Ford Escape	Medium SUV	92%	89%	82%	77%	★★★★★ 2019	PHEV
Genesis GV60	Small SUV	89%	89%	63%	88%	★★★★★ 2022	BEV
GWM Haval H6	Medium SUV	90%	88%	73%	81%	★★★★★ 2022	PHEV
Hyundai IONIQ	Small Car	90%	80%	70%	70%	★★★★★ 2016	BEV, PHEV
Hyundai IONIQ 5	Medium SUV	88%	87%	63%	89%	★★★★★ 2021	BEV
Hyundai Kona	Small SUV	N/A	N/A	N/A	N/A	★★★★★ 2017	BEV
Hyundai Nexo	Medium SUV	94%	89%	67%	80%	★★★★★ 2018	H_2
Jaguar i-PACE	Medium SUV	91%	81%	73%	77%	★★★★★ 2018	BEV
Kia EV6	Large SUV	90%	87%	64%	88%	★★★★★ 2022	BEV
Kia Niro [NEW]	Small SUV	88%	84%	76%	87%	★★★★★ 2022	BEV, PHEV
Kia Sorento	Large SUV	82%	85%	63%	89%	★★★★★ 2020	PHEV
Lexus ES	Medium Car	91%	86%	90%	76%	★★★★★ 2018	PHEV
Lexus NX	Medium SUV	91%	89%	83%	92%	★★★★★ 2022	PHEV
Lexus UX	Small SUV	96%	88%	82%	83%	★★★★★ 2019	BEV, PHEV
Mazda MX-30	Small SUV	93%	87%	68%	74%	★★★★★ 2020	BEV

BATTERY ELECTRIC HYBRID OR PHEV HYDROGEN FUEL CELL ELECTRIC

MAKE & MODEL	VEHICLE TYPE	ADULT OCCUPANT PROTECTION	CHILD OCCUPANT PROTECTION	VULNERABLE ROAD USER PROTECTION	SAFETY ASSIST	ANCAP SAFETY RATING	POWERTRAIN
Mercedes-Benz EQA	Small SUV	97%	92%	81%	77%	★★★★★ 2019	
Mercedes-Benz EQB	Medium SUV	95%	91%	78%	76%	★★★★★ 2019	
Mercedes-Benz EQC	Medium SUV	96%	92%	75%	76%	★★★★★ 2019	
MG ZS EV	Small SUV	90%	84%	64%	71%	★★★★★ 2019	
Mitsubishi Eclipse Cross	Small SUV	97%	78%	80%	58%	★★★★★ 2017	
Mitsubishi Outlander	Medium SUV	83%	92%	81%	83%	★★★★★ 2022	
Nissan Leaf	Small Car	93%	85%	71%	70%	★★★★★ 2018	
Peugeot 508	Large Car	96%	87%	71%	76%	★★★★★ 2018	
Peugeot 3008	Small SUV	86%	85%	67%	58%	★★★★★ 2016	
Polestar 2	Medium Car	92%	87%	80%	82%	★★★★★ 2021	
Subaru Forester	Medium SUV	94%	86%	80%	78%	★★★★★ 2019	
Subaru XV	Small SUV	N/A	N/A	N/A	N/A	★★★★★ 2017	
Tesla Model 3	Medium Car	96%	87%	74%	94%	★★★★★ 2019	
Tesla Model X	Large SUV	98%	86%	72%	94%	★★★★★ 2019	
Tesla Model Y	Small SUV	97%	89%	82%	98%	★★★★★ 2022	
Toyota Camry	Large Car	N/A	N/A	N/A	N/A	★★★★★ 2017	
Toyota C-HR	Small SUV	87%	77%	65%	68%	★★★★★ 2017	
Toyota Corolla	Small Car	96%	83%	86%	76%	★★★★★ 2018	
Toyota Kluger	Large SUV	90%	88%	76%	82%	★★★★★ 2021	
Toyota Mirai	Large Car	88%	87%	80%	83%	★★★★★ 2021	
Toyota RAV4	Medium SUV	93%	89%	85%	83%	★★★★★ 2019	
Toyota Yaris	Light Car	86%	87%	78%	87%	★★★★★ 2020	
Toyota Yaris Cross	Small SUV	86%	86%	78%	82%	★★★★★ 2021	
Volvo C40 Recharge	Small SUV	92%	89%	70%	91%	★★★★★ 2022	
Volvo XC40	Small SUV	97%	84%	71%	78%	★★★★★ 2018	

ANCAP safety ratings apply to vehicles sold in Australia as new and do not apply to used imported vehicles.
Complete rating information, including details on variant applicability is available at
ancap.com.au

ANCAP BACKGROUND

OCTOBER 2022

SUMMARY

As Australasia's leading independent vehicle safety advocate, ANCAP has been successful in driving improvements in vehicle safety in Australia for close to 30 years. ANCAP's role is to encourage vehicle brands to design and build, and consumers to purchase and use, the safest vehicles possible. Our objective is to create an environment where vehicle brands continually strive for the highest level of safety. ANCAP acknowledges brands when they meet or exceed top performance, whilst bringing awareness to those that can improve, to reduce road trauma through safer vehicles.

More than 215 current vehicle models hold an ANCAP safety rating with 93% of all new light vehicles sold in 2022 covered by an ANCAP safety rating and 88% achieving a 5 star ANCAP safety rating. This high level of market penetration, combined with high levels of consumer awareness, positions ANCAP to hold a unique ability to accelerate the provision and market uptake of new vehicle safety features and technologies.

ANCAP has been a major contributor to improvements in the safety of light vehicles in Australia through independent testing to provide consumers with an independent assessment of vehicle safety and to validate manufacturer claims of functionality and safety performance to established protocols covering both the Australasian and European markets.

ANCAP has been at the forefront of encouraging new vehicle safety technology to be introduced into Australia, ahead of regulation, since publication of its first ratings in 1993. ANCAP continues its work to encourage industry development, performance and market supply of these new and emerging vehicle safety technologies to increasingly stringent thresholds.

ANCAP complements regulation, with the ability to encourage the fitting of new safety features and technologies ahead of any regulatory requirement. Through rewarding vehicle brands and educating consumers, ANCAP is able to encourage the early adoption of new safety systems that exceed any minimum regulatory standard. It is important that ANCAP exists in parallel to regulation, as influencing consumer choice to drive market uptake will influence vehicle brands' decisions quicker than the regulatory process. Also, ANCAP is not able to test and rate all new models entering the market, and regulation (Australian Design Rules, or ADRs) play an important role in closing the gap to ensure 100% fitting rate of important vehicle safety technology.

There are a range of new UN Regulations that the Australian Government needs to consider mandating as ADRs, especially in the area of automated vehicle technologies.

In 2020, ANCAP introduced post-crash safety requirements to improve the survivability and injury outcomes for those involved in a crash by providing emergency services with necessary information to improve their post-crash response. Unfortunately, ANCAP was not able to introduce the assessment of eCall as the communications infrastructure for the emergency Triple Zero (000) operator does not currently exist within Australia. The inclusion of eCall into the rollout of the new generation of Triple Zero (000) services currently being introduced should be prioritised.

Fleets, businesses and governments purchase around 50% of new vehicles and as such have the ability to influence the rate of introduction of new vehicle safety technology through their fleet purchasing and use requirements and many of these organisations have policies of purchasing and using 5 star ANCAP rated vehicles. This requirement should be extended to all vehicles purchased by employees through novated leases and employee use of their private vehicle for work purposes – both comprise the 'grey fleet'.

1. ANCAP'S ROLE AND SUCCESS

ANCAP SAFETY (ANCAP) is Australasia's independent voice on vehicle safety, with its independent testing and assessment of vehicle safety.

Figure 1 – ANCAP Safety Rating

ANCAP safety ratings show the level of safety a vehicle provides for occupants and pedestrians in the event of a crash, as well as its ability to avoid or minimise the effects of a crash. ANCAP safety ratings are published for a range of new light vehicles, including passenger cars, SUVs and light commercial vehicles up to 3.5 tonnes GVM. In 2020, ANCAP expanded its scope and provided information on the safety of vehicles in the "lighter" end of commercial vehicles (up to 8 tonnes GVM) with the evaluation of the availability and performance of collision avoidance technologies on light, medium and heavy commercial vans.

ANCAP complements regulation, with its key focus to eliminate road trauma through independent assessment, market influence and consumer advocacy – empowering consumers with information to make safer vehicle choices and encouraging vehicle brands to improve continually their vehicle designs.

ANCAP Vision
Zero deaths and serious injuries on Australian and New Zealand roads.

ANCAP Mission
To protect road users in Australian and New Zealand by improving new vehicle safety.

Since 1993, ANCAP has published independent safety ratings for thousands of new vehicle makes, models and variants. These independent safety ratings are used to compare the relative safety between vehicles of similar size, and have become a critical factor in vehicle selection for private and fleet buyers.

ANCAP MARKET COVERAGE

ANCAP is committed to encouraging improvements in vehicle safety by rating vehicles, providing consumer information and consequently influencing vehicle brands. ANCAP safety ratings are published for a range of new passenger, sports utility (SUV) and light commercial vehicles (LCV) entering the Australian and New Zealand markets, using a rating system of 0 to 5 stars. ANCAP ratings are available for 93% of light vehicles sold in Australia in 2021 with 88% of vehicles sold in this period holding a 5 star rating.

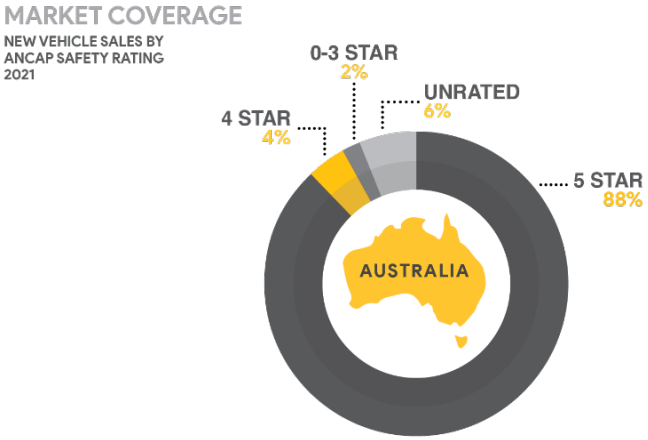

Figure 2 – ANCAP Market Coverage 2021

ANCAP star ratings indicate the level of safety a vehicle provides for occupants, pedestrians and cyclists in the event of a crash, as well as its ability — through technology — to avoid or minimise the effects of a crash. These independent safety ratings are used to compare the relative safety between vehicles of similar size in the same market category, and have become a critical factor in vehicle selection for private consumers and business fleet buyers and operators.

ANCAP's safety rating criteria influence vehicle design and specification, and ANCAP has a key role in educating the community, and in particular vehicle fleet managers about new and emerging vehicle technologies; promoting the benefits of new safety technologies; and building confidence and demand.

ANCAP safety ratings are based on a series of internationally recognised, independent crash tests and safety assessments – involving a range of destructive physical crash tests, an assessment of on-board safety features and equipment, and performance testing of automated collision avoidance technologies. ANCAP continuously updates its safety rating criteria to influence and promote new and emerging vehicle safety features as well as to target new and emerging aspects of vehicle safety.

NEWER CARS ARE SAFER

ANCAP has been a major contributor to improving the safety of light vehicles in Australia for nearly 30 years with continual improvements in ANCAP testing and assessment standards. Analysis conducted by ANCAP clearly shows that this non-regulatory approach has seen the safety of light passenger vehicles improve year-on-year.

ANCAP has analysed detailed Australian fatal crash data over the period 2014-2020 which focused on the age of passenger vehicles (cars and SUVs) involved in fatal crashes where the fatality was an occupant (**Figure 3**). [1,2]

From 2014 to 2020, the average age of all registered passenger cars and SUVs increased from 9.8 years to 10.4 years, an increase of 0.6 years. The average age of the passenger cars and SUVs involved in fatal crashes in 2014 was 12.5 years (2.7 years higher than the average age) and 14.6 years in 2020 (4.2 years higher than the average age).

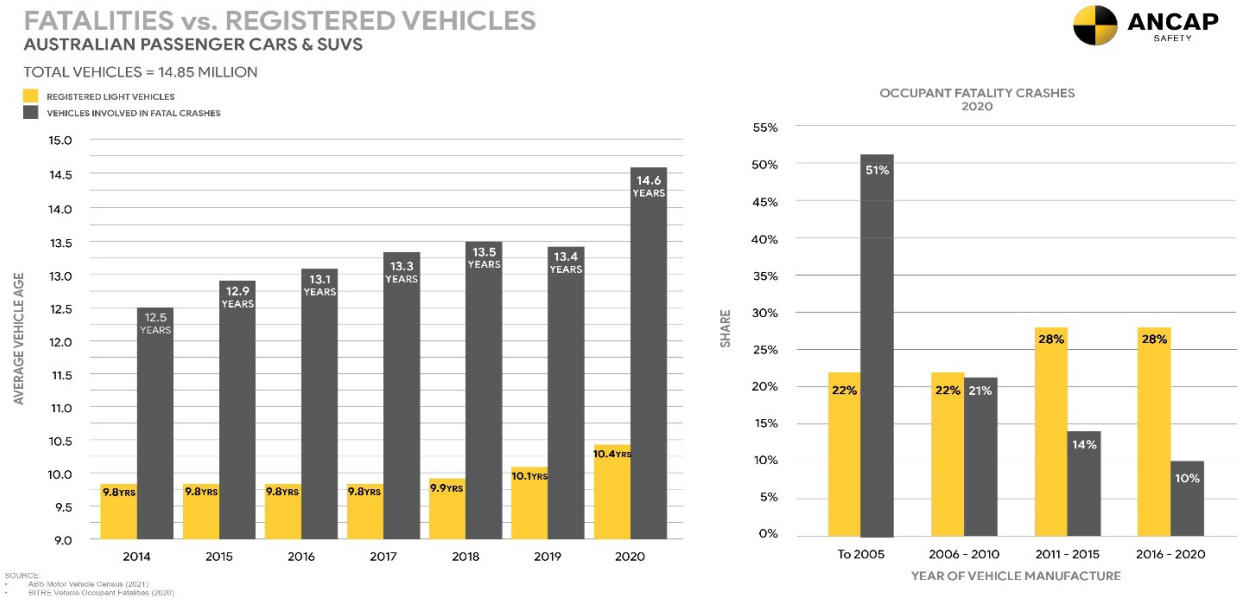

Figure 3 – Fatalities vs. Registered Vehicles

When comparing the age and number of registered vehicles, the 2020 data revealed that older vehicles were over-represented in fatal crashes, with rate of fatal crashes per registered vehicle for the oldest vehicle group (15 years or older or manufactured to 2005) five times higher than that of the newest vehicles (up to five years old – manufactured between 2016 and 2020).

A separate analysis of 2021 road fatalities undertaken by ANCAP examined road fatalities in light vehicles (passenger cars, SUVs and light commercial vehicles) reported in 2021 across all Australian jurisdictions. The data revealed that 67% of fatalities occurred in light vehicles aged 10 years or older while only 45% of registered vehicles were aged 10 years or older. This is a consistent picture across all Australian jurisdictions (**Figure 4).**

For example, this analysis highlighted that 64% of light vehicle fatalities in NSW are in vehicles 10 years or older while 56% of registered light vehicles were 10 years or older. While NSW has one of the youngest in-service vehicle fleets of

[1] Australian Government, Bureau of Infrastructure and Transport Economics, National Crash Database, 2019 Vehicle Occupant Fatalities
[2] Australian Bureau of Statistics, Motor Vehicle Census, 31 January 2020

any Australian State or Territory, at 9.9 years compared to the national average age of 10.6 years[3], any action to reduce the average age of the New South Wales in-service fleet will have a positive impact on road safety.

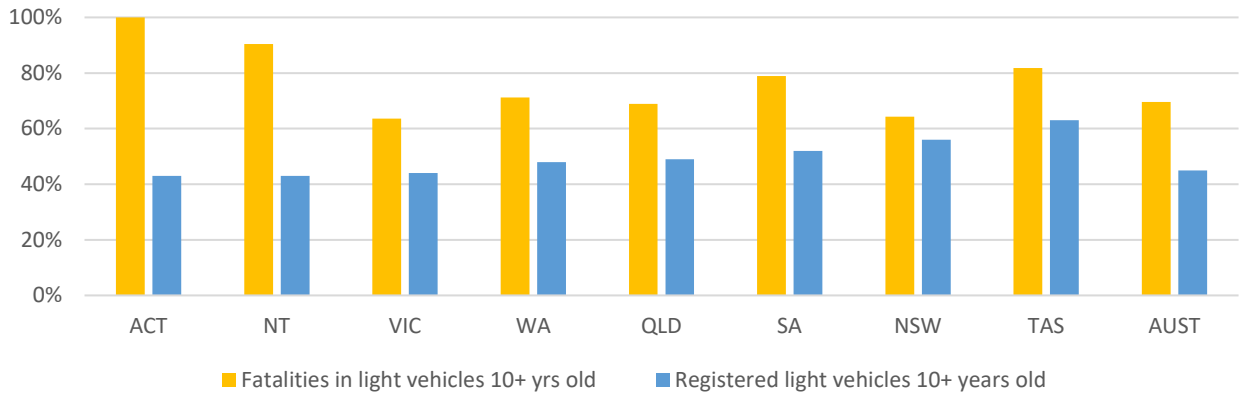

Figure 4 – Fatalities and Registered Vehicles 10+ years old[4,5]

NATIONAL ROAD SAFETY STRATEGY 2021-2030[6]

The National Road Safety Strategy (NRSS) 2021-30 is Australia's 10-year plan for dramatically reducing road trauma on Australia's roads.

Developed together by the Commonwealth, state and territories and the Australian Local Government Association, the Strategy sets out our road safety objectives, key priorities for action, and road trauma reduction targets for the decade to 2030. It adopts a Social Model approach to foster a road safety culture across society and make road safety business as usual, laying the groundwork towards the goal of zero deaths and serious injuries by 2050 (Vision Zero).

The NRSS sets out Australia's road safety objectives out to 2030 and includes key priorities and targets to reduce the annual number of fatalities by at least 50 per cent and serious injuries by at least 30 per cent by 2030.

The NRSS recognises the important role that ANCAP plays in improving vehicle safety including:

- A key change expected by 2030 is that at least 25 per cent of the light vehicle fleet is 5-star ANCAP rated with a date stamp 6-years-old at maximum.
- One of the safety performance indicators to be measured during the NRSS is the share of light vehicle fleet that has an ANCAP 5-star rating within a 6-year date stamp.
- One of nine priority areas were identified on how best to respond to the greatest road safety challenges is vehicle safety where it is expected that new vehicle safety systems will continue to reduce serious injuries to vehicle occupants and prevent fatal and serious injuries to vulnerable road users in urban areas. An enabling action in the vehicle safety priority area is to:
    - *Encourage and promote the voluntary uptake of vehicle safety technologies ahead of regulation, including through ongoing support of ANCAP and through fleet purchasing policies to ensure vehicles are the safest available*

The NRSS identifies the age of the in-service light vehicle fleet as a concern and that research and development is needed to underpin policy development to achieve an uptake and increase the saturation of safety features available across the national fleet with an aim to cease any consumer-driven demand to import any star rated vehicles that do not meet the voluntary 5-star ANCAP standard.

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[3] Australian Bureau of Statistics, Motor Vehicle Census, 31 January 2021
[4] Fatality data supplied by State and Territory Governments, 2022
[5] Australian Bureau of Statistics, Motor Vehicle Census, 31 January 2020
[6] Australian Government, Office of Road Safety, National Road Safety Strategy 2021-2030, www.officeofroadsafety.gov.au

2. ANCAP EVOLUTION

ANCAP has been at the forefront of encouraging new vehicle safety technology to be introduced in Australia since publication of its first ratings in 1993.

ANCAP's testing and assessment criteria have consistently been in advance of regulation. ANCAP has always used test methods that have been internationally recognised and used by other global NCAP partners. Initially ANCAP used test methods adopted by US NCAP (established by the US Government) and since 1999 ANCAP has used the test methods used by Euro NCAP (comprising a number of European governments and motoring clubs).

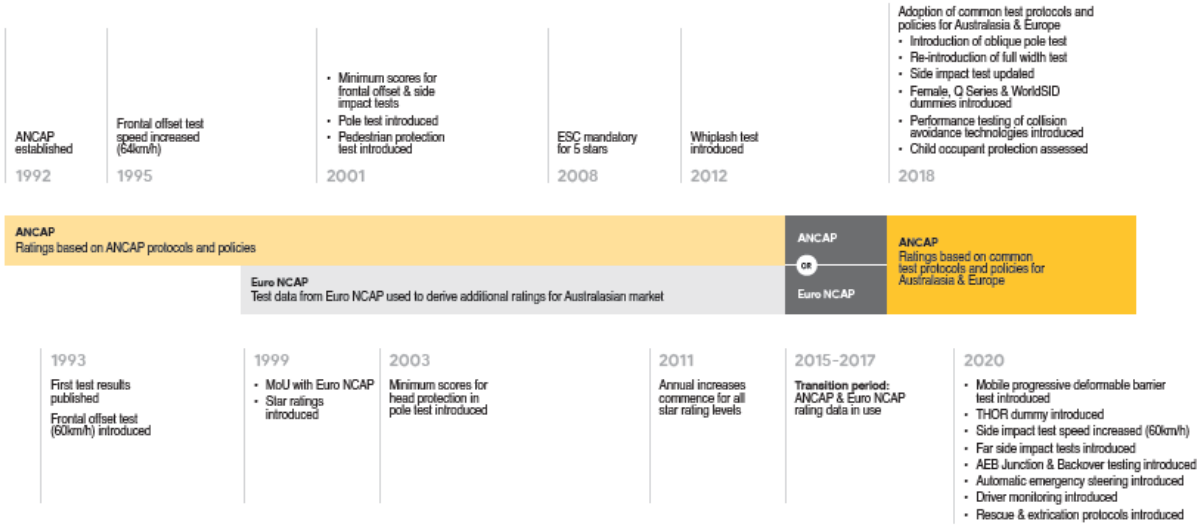

Figure 5 – ANCAP Evolution Timeline

ANCAP's testing and assessment protocols are regularly reviewed and updated as new vehicle safety technology is developed and introduced. Since 2018, ANCAP has adopted common test and assessment protocols with its European counterpart organisation, Euro NCAP.

In 2020, ANCAP (and Euro NCAP) introduced new tests and assessments including:

- Primary (active) safety (crash avoidance):
  - Driver monitoring – to address driver impairment though fatigue.
  - Autonomous Emergency Steering – in-lane steering support.
  - AEB - Further developments in AEB to include crash scenarios for some turning and reversing scenarios.

- Secondary (passive) safety:
  - New mobile progressive deformable barrier (MPDB) test introduced to improve occupant protection and test vehicle to vehicle compatibility in frontal crashes.
  - New assessment of protection in far-side impact crashes (where the vehicle is struck on the opposite side to the occupant).

- Tertiary safety:
  - Rescue information – the availability of standardised rescue sheets to assist emergency services.
  - Multi-collision braking – the vehicle applies brakes after a collision, to minimise the risk of a second collision.

ANCAP test and assessments continue to evolve, with the next updates to be introduced from the beginning of 2023 which will include:

- Primary (active) safety (crash avoidance):
  - Direct driver monitoring – to address driver distraction and impairment through alcohol, fatigue and medical incidents.
  - AEB – new developments to include car to car crash scenarios in intersections and head-on accidents.
  - AEB and LSS – introduce car-to-motorcycle scenarios,
  - AEB – introduce additional pedestrian and cyclists' scenarios.

- Child presence detection – where a vehicle can detect a child left alone in a car and alert the driver and/or emergency services or where the vehicle can automatically take action such as opening windows or activating air conditioning.

- Secondary (passive) safety:
  - New injury criteria in crash tests to reduce occupant injury risk.
  - Pedestrian protection – new test tools to yield more realistic test results.

- Tertiary safety:
  - Rescue information – the availability of standardised rescue sheets to assist emergency services has been extended to "back-fill" data with rescue sheets required for all new models introduced since 2020.
  - Submergence assessment – assessment of whether vehicle doors can be opened without battery power, and electric window operability after the vehicle is submerged.

Figure 6 provides a timeline for the implementation of tests and assessment protocols from 2018 to 2025.

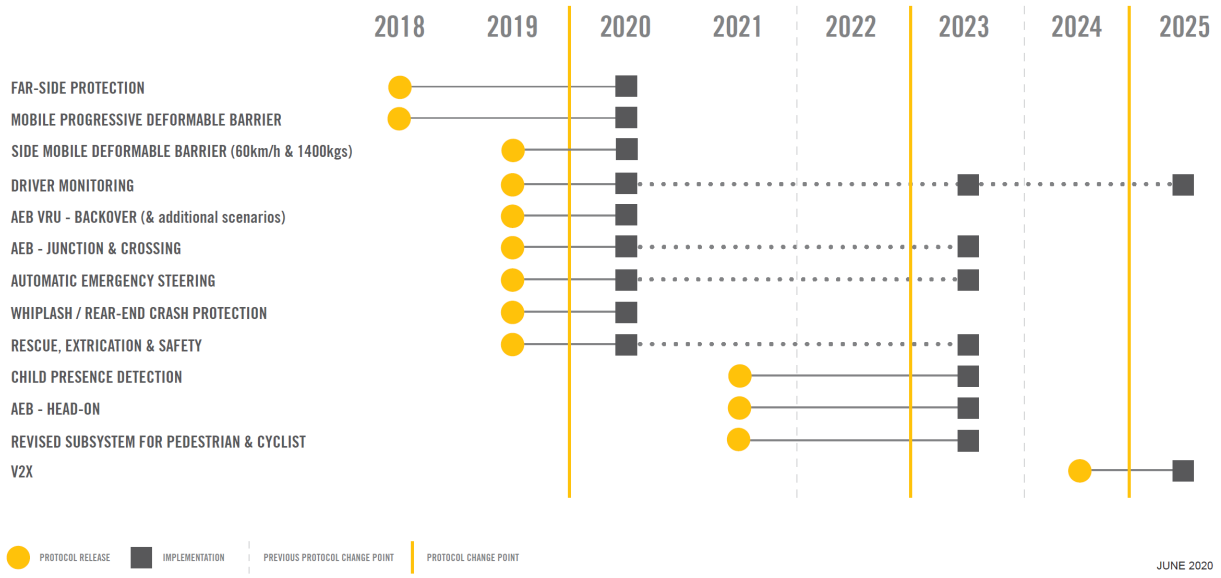

Figure 6 - Implementation timeline for ANCAP testing to 2025

2025-2030 ROADMAP

In 2025, ANCAP will again update tests and assessment protocols and are likely to begin assessing automated and connected vehicle technology aimed at encouraging new vehicles to be fitted with Vehicle-to-Other (V2X) technology. In 2025, ANCAP is likely to encourage fitting of systems that comply with the international United Nations Regulations and the European standards that form the "building blocks" for connected and automated vehicles such as:

- UN R155 for cyber security,
- UN R156 for software updates, and
- European standard for driver distraction.

ANCAP is working with our European colleagues in Euro NCAP to develop a roadmap for testing out to 2030 to continue to encourage improvements in vehicle safety. The next generation of vehicle safety technology likely to be assessed by ANCAP from 2025 to 2030 includes:

- Assisted driving for both highway and urban environments.
- Further enhancements in active safety aimed at protecting vulnerable road users
- In-cabin monitoring for driver detection and drowsiness warnings
- Post-crash safety.

3. ANCAP COMPLEMENTS REGULATION

One of ANCAP's key advantages is the flexibility to introduce comparative testing and assessment of vehicle safety features and technologies ahead of development and implementation of a regulation. ANCAP (and our European counterpart organisation, Euro NCAP) are able to use early research to identify and encourage technologies that are potentially beneficial without the necessary time constraints of the regulatory processes.

ANCAP works in partnership with 22 member organisations including the Australian Government, Australian automobile clubs, State and Territory governments, the New Zealand Government, the Victorian Transport Accident Commission, Insurance Australia Group and the FIA Foundation.

The New South Wales Government, currently represented by Transport for New South Wales (TfNSW), was one of ANCAP's founding members in 1992. TfNSW continues to be an important member of ANCAP and provides two important test facilities used by ANCAP. ANCAP conducts dynamic crash tests at Crashlab and undertakes active safety testing at the Future Mobility Test and Research Centre (FMTRC).

ANCAP acts as a key conduit between ANCAP members and governments on policy development, community engagement and advocacy activities relating to the safety of light passenger vehicles.

ANCAP is not able to test and rate all new models entering the market, and consequently, there will always be a gap in voluntary fitting of new safety technology. Regulation (i.e. Australian Design Rules) plays an important role in closing the gap to a 100% fitting rate across the market. ANCAP's non-regulatory program exists in parallel and complementary to the Australian Government's regulatory vehicle standards, the ADRs. See **Attachment A**.

For example, with ANCAP non-regulatory influence the voluntary fitting of autonomous emergency braking (AEB) is now more than 80% of the market. The new ADR 98/01 (harmonised with the UN Regulation) to mandate fitting of AEB will enable 100% fitting by 2026 (**Figure 7**).

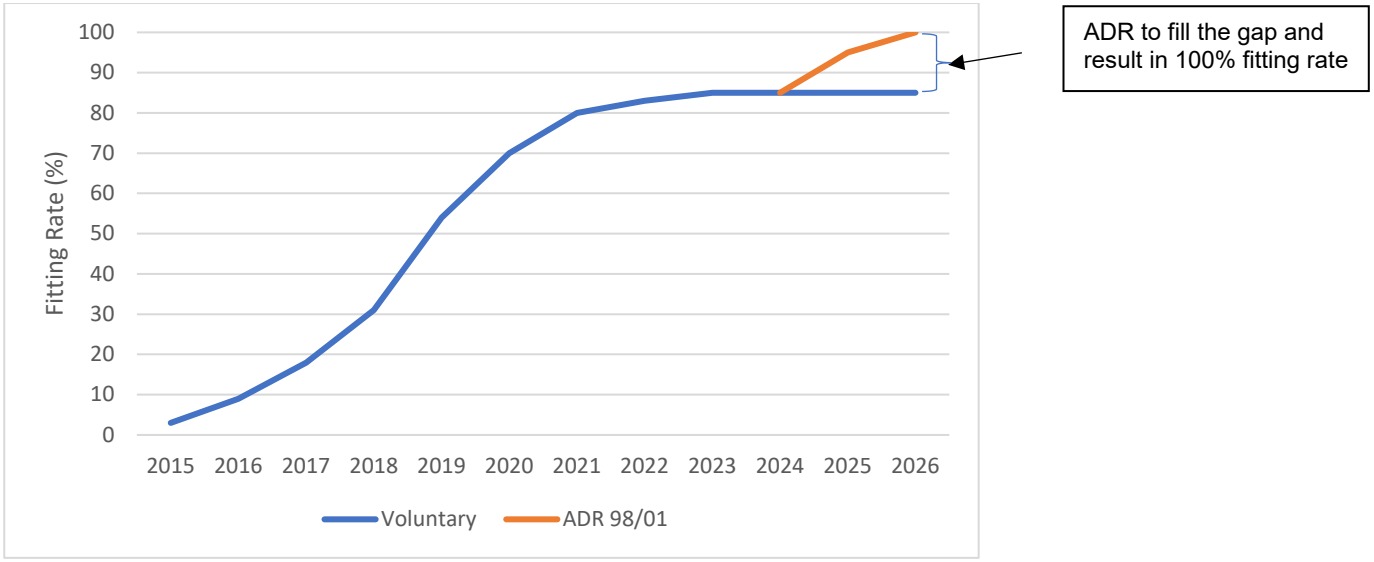

Figure 7 - AEB with mandatory fitting under an ADR[7]

ANCAP TESTING

In 1993, ANCAP began by assessing the level of occupant protection offered in the event of a crash by testing vehicles to the 'state of the art' crash test standards available at that time – adopting the frontal crash test used by the US NCAP. Throughout the 1990s ANCAP's test program evolved and introduced new crash tests as the tests were developed and shown to address fatal and serious injury crashes. These tests were introduced ahead of regulation and in some cases supported the Australian Government process to mandate these protection measures via the ADRs.

Table 1 (following) shows the timetable for when the tests were introduced and when the corresponding ADR was also introduced.

[7] Voluntary fitting rates for 2015-2020 based on ANCAP estimates of AEB fitting, and 2021-2024 based on fitting rates of ESC prior to mandating via an ADR. Mandatory fitting rates via an ADR based on EU proposed mandated timing.

Table 1 – Introduction Timing of Crash Tests

Crash test	ANCAP introduction	Regulation
Frontal crash test	1993	ADR 69 – introduced from 1995
Offset frontal crash test	1993	ADR 73 – introduced from 2000
Side impact crash test	1999	ADR 72 – introduced from 1999
Pole side impact crash test	2001	ADR 85 – introduced from 2017

Note: The ANCAP crash tests and regulations are different in certain areas, (e.g. test speed), however they are both intended to deliver improved occupant protection in high severity crashes.

In the mid-2000s active vehicle safety technology, systems that could help avoid or minimise the effects of a crash, evolved and ANCAP's testing and rating regime expanded to include these emerging safety technology. ANCAP introduced the technologies into the rating scheme ahead of regulation, such as the introduction of electronic stability control (ESC) required for 5 stars in 2008, again supporting the Australian Government to mandate ESC from 2011.

With the adoption of common protocols with Euro NCAP in 2018 ANCAP's testing and rating regime expanded further into active safety technology including:

- autonomous emergency breaking (AEB) — where the vehicle can apply braking if the driver doesn't respond to certain potential crash scenarios;
- lane support systems (LSS) — where the vehicle warns of impending lane departure, or supports the driver to maintain the current lane, avoiding potential impacts with oncoming traffic or roadside objects;
- speed assistance systems (SAS) — through intelligent speed sign recognition or GPS mapping to assist with maintaining the correct vehicle speed to ensure the safety of motorists and other road users; and
- reversing (back over) aids – where an adult pedestrian dummy is both stationary and moving across the vehicle path when the vehicle is reversing.

Table 2 (following) shows the timetable for when the requirements and tests for active safety technology were introduced and when a corresponding ADR was also introduced.

Table 2 – Introduction Timing of Active Safety Requirements and Tests

Active safety test	ANCAP introduction	Regulation
ESC	2008	ADR 31 – introduced from 2011
AEB test	2018	ADR 98/01 – introduced from 2024
LSS test	2018	(draft) ADR 107 – introduced from 2024*

Note: In 2022, the Australian Government issued a Regulation Impact Statement to mandate LSS from 2024.

4. ANCAP ACTIVE SAFETY TESTING

As part of the ANCAP safety rating process, vehicles are assessed for the presence and effectiveness of active safety systems that can help avoid or reduce the effects of a crash. The active safety technologies currently assessed include autonomous emergency braking (AEB), lane support systems (LSS), automatic emergency steering (AES) and speed assistance systems (SAS).

Since 2020 it has not been possible for a new passenger car, SUV or LCV to achieve a 5 star ANCAP safety rating without at least an effective AEB or LSS system (or both). From 2020good performing AEB and LSS are needed to achieve 5 stars.

AUTONOMOUS EMERGENCY BRAKING (AEB) – LIGHT VEHICLES

AEB systems use camera, radar and/or lidar technology to detect the speed and distance of objects in the vehicle's path and automatically brake, if the driver does not respond, to avoid or minimise the severity of a crash.

Analysis conducted for the Australian Government concluded that AEB will reduce vehicle occupant trauma in Australia by 28%.[8] This is consistent with many international studies that also show a substantial reduction in crashes in light vehicles fitted with AEB systems:

- 55% reduction in police-reported crashes[9]
- 38% reduction in real world rear end crashes[10]
- 54-57% risk reduction of real-world rear-end crashes in metro areas (35-41% risk reduction in all areas)[11]
- An estimated 46% reduction in rear-end striking crashes[12]

ANCAP has been testing and evaluating AEB systems for light vehicles in a broad range of daytime and night-time scenarios since 2018 to assess the vehicle's ability to autonomously brake at city and highway speeds to avoid collisions with stationary vehicles, moving vehicles (braking), pedestrians and cyclists. The test scenarios from 2020 include:

- Car to car rear with stationary, moving and braking target car.
- Car to car (approaching head-on) with test car turning across target car path (i.e. a typical right hand turn across approaching traffic on a two-lane road.
- Car to adult pedestrian crossing vehicle path.
- Car to child pedestrian crossing vehicle path.
- Car to adult pedestrian walking away from the car (i.e. to replicate pedestrian walking along the side of the road where there is no separated footpath).
- Car to adult pedestrian where the car is turning at an intersection and a pedestrian is crossing the road
- Reversing car to pedestrian.
- Car to bicyclist (cyclists crossing and travelling along the road).

Figure 9 - AEB Scenarios: Car-to-Car rear, Car-to-Cyclist and Car-to-Pedestrian

ANCAP has been advocating the fast uptake of new active vehicle safety technology, such as AEB, for a number of years. ANCAP's encouragement of AEB has resulted in the availability of AEB increasing very quickly (from approx. 35% in 2015 to approx. 88% of the Australian new car market in June 2021) with 76% of vehicles now fitted with AEB as standard (**Figure 10**).

[8] Monash University Accident Research Centre (MUARC) Report on the effectiveness of crash reductions associated with light vehicle AEB
[9] Insurance Institute for Highway Safety (IIHS) & Highway Loss Data Institute (HLDI), USA, 2018
[10] ANCAP, Euro NCAP, DoIRD research by B. Fildes, 2015
[11] ICROBI study by M. Rizzi, A. Kullgren, C. Tingvall, 2014
[12] UMTRI and GM, A. Leslie, R. Kiefer, M. Meitzner, C. Flannagan, 2019

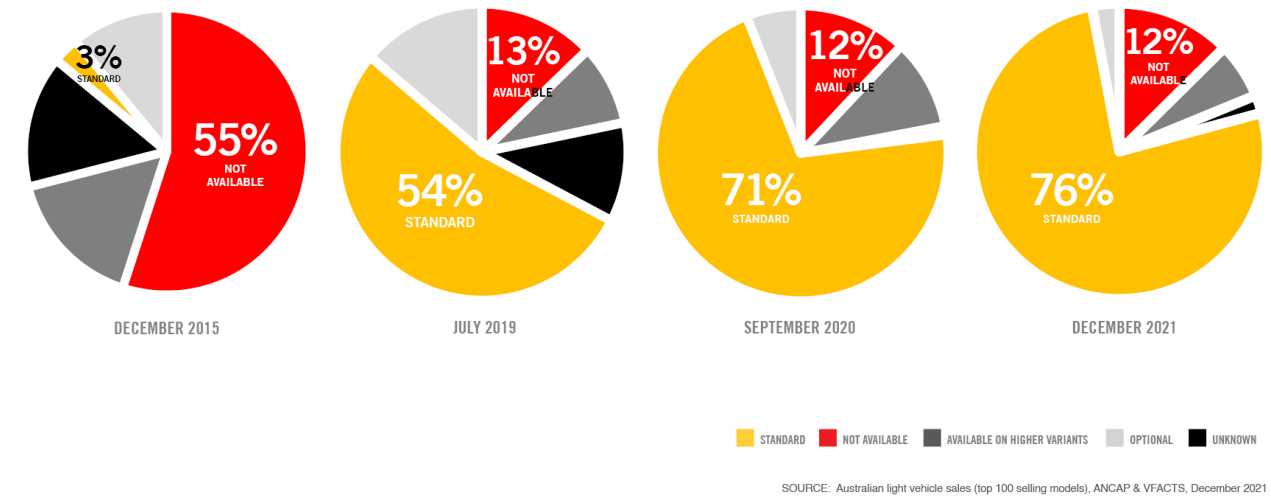

Figure 10 - Availability of AEB Australia (December 2021)

The new ADR 98/01 will ensure 100% fitting of AEB in passenger cars, SUVs and light commercial vehicles by 2026.

LANE SUPPORT SYSTEMS (LSS) – LIGHT VEHICLES

Lane support systems (LSS) such as lane departure warning (LDW), lane keep assist (LKA) and emergency lane keeping (ELK) recognise lane markings and alert the driver through audible, visual or haptic warnings if the vehicle is leaving the lane without indicating. Some systems have the ability to autonomously hold the vehicle within its intended lane if the driver fails to respond.

LSS are assessed on an outdoor test track with the vehicle intentionally and unintentionally leaving the lane in order to determine how the vehicle's systems react and activate to prevent a collision with an adjacent vehicle or obstacle, or a resulting run-off-road crash (**Figure 11**). The vehicle's capability to 'read' solid and broken lane markings as well as non-marked road edges is assessed. Advanced systems can also detect a vehicle overtaking in the adjacent lane, and prevent collisions, even when the change of lane is intended (i.e. when the direction indictor is activated).

ANCAP has been independently testing and evaluating the performance of LSS for light vehicles in a broad range of day and night-time scenarios since 2018.

Figure 11 - LSS Testing Scenario

The current ANCAP test scenarios for LSS include:

- Emergency Lane Keeping (ELK) with road edge, solid lane marking, oncoming vehicles and an overtaking vehicle.
- Lane Keep Assist tests (LKA) with both dashed and solid lane marking.
- Land Departure Warning (LDW) tests for both dashed and solid lane marking (often performed as part of the LKA tests).

It is not possible for a passenger car, SUV or LCV to achieve a 5 star ANCAP safety rating without an effective LSS.

ANCAP advocacy activities have helped increase the voluntary fitting rates of LSS in new vehicles to the point where approximately 83% of all new light vehicles sold in June 2021 had LSS available. However, LSS was fitted as standard on a lower 66% of light vehicles sold (**Figure 12**).

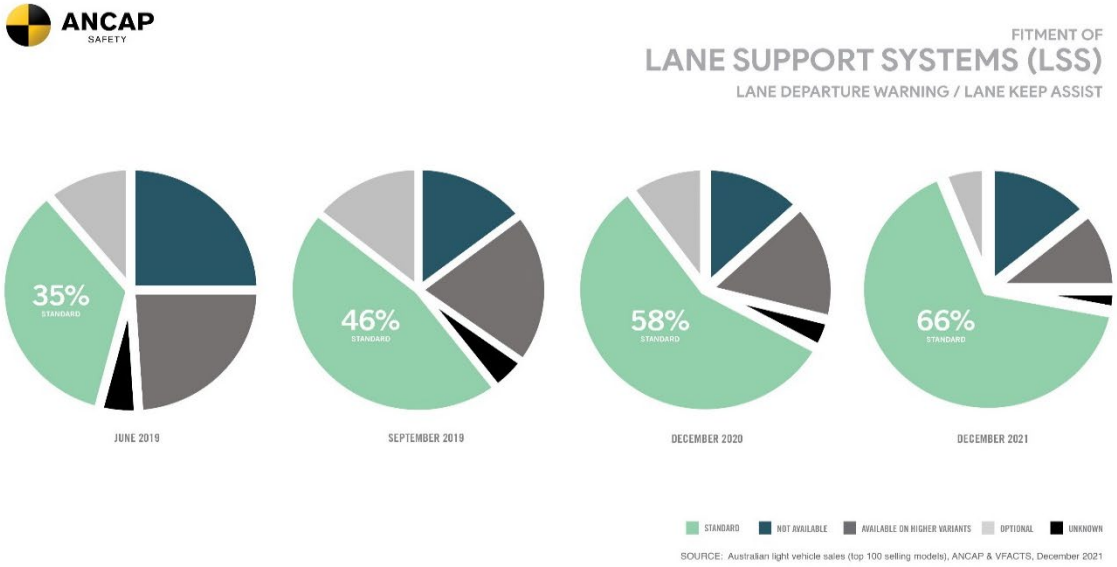

Figure 12 - Availability of LSS in Australia (December 2021)

ANCAP expects that vehicle brands will continue to respond to ANCAP's non-regulatory influence and fit this important safety feature, with the introduction of new models. However regulatory action, via an ADR, will be required to ensure 100% fitting of LSS on all new light vehicles entering the market, as has been the experience with a range of other vehicle safety technology including side-curtain airbags, electronic stability control (ESC) and Advanced Emergency Braking (AEB) systems.

In 2022, the Australian Government released a Regulation Impact Statement (RIS) that proposes to mandate LKS on all light vehicles (passenger cars, SUVs and Light Commercial Vehicles) by introducing a new Australian Design Rule 107/00 (ADR 107) that is based on the relevant UN regulation, *UN R79 – Uniform provisions concerning the approval of vehicles with regard to steering equipment* and the European regulation*, EU 2021/646 – Emergency Lane Keeping System.*

The RIS advises the introduction timing needs to be finalised in consultation with industry, and has proposed implementation timing of:

- 1 March 2024 for new models.
- 1 March 2026 for all new vehicles.

ANCAP supports the Australian Government's proposal and timeline for introduction.

REVERSING AIDS

Since 2020, AEB reversing (back over) tests have been included in ANCAP's protocols using an adult pedestrian dummy; with the dummy both stationary behind the vehicle and moving across the vehicle path with the vehicle reversing at both 4km/hr and 8 km/hr (**Figure 13**). From 2023, ANCAP will expand this test to include a child dummy in the same reversing (back over) test scenarios.

Figure 13 – Reversing (back over) Testing

ANCAP's advocacy activities, and test and rating protocols, have helped increase the voluntary fitting rates of reversing aids in new light vehicles to the point where approximately 97% of all new light vehicles sold in March 2022 had reversing aids available. However, reversing aids were fitted as 'standard' on a lower number - 83% of light vehicles sold (**Figure 14**). The reversing aids available on current light vehicle models include both rear cameras and sensors with a

range of performance. ANCAP expects that vehicle brands will continue to respond to ANCAP's non-regulatory influence and fit active reversing collision avoidance, as new models are introduced.

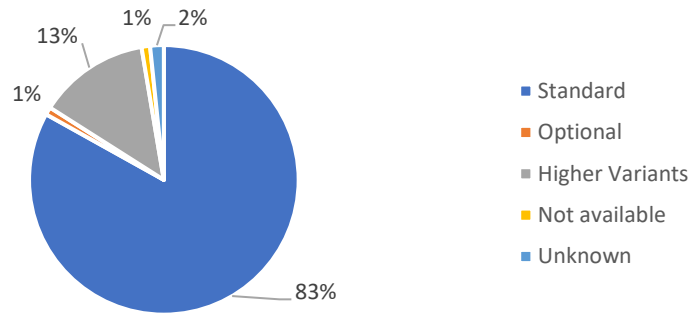

Figure 14 - Availability of Reversing Aids in Australia (March 2022)

In 2022, the Australian Government released a Regulation Impact Statement (RIS) proposing to mandate reversing aids on all passenger vehicles (cars and SUVs), buses, and all goods vehicles (light, medium and heavy duty goods vehicles) by introducing a new Australian Design Rule 108/00 aligned with the international United Nations Regulation 158 (UN R158).

The RIS advises the introduction timing needs to be finalised in consultation with industry, and has proposed implementation timing of:

- 1 March 2024 for new models.
- 1 March 2026 for all new vehicles.

5. CONNECTED & AUTOMATED VEHICLES (CAV)

Vehicle technology is at the beginning of a significant change with the introduction of Connected and Automated Vehicle (CAV) technologies.

There are automated vehicle technologies already available in new model vehicles being delivered to the market that assist with some of the driving tasks such as Speed Assist Systems (SAS), Adaptive Cruise Control (ACC) and Lane Keep Assist (LKA). These systems are defined as SAE Level 1 or 2 automated systems.[13] It is expected that vehicles with even more automated systems will be delivered to the market out to the 2030s and beyond.

It is important to recognise that the automated technologies fitted to today's vehicles are not designed to replace the driver. These technologies are designed to **assist** the driver with the driving task, to reduce the risk of a crash and, in the event of a crash, to reduce the severity of the crash.

Figure 15 below provides an overview of the different SAE levels for automated driving systems and the timeframe for expected introduction to market in mainstream vehicle models.

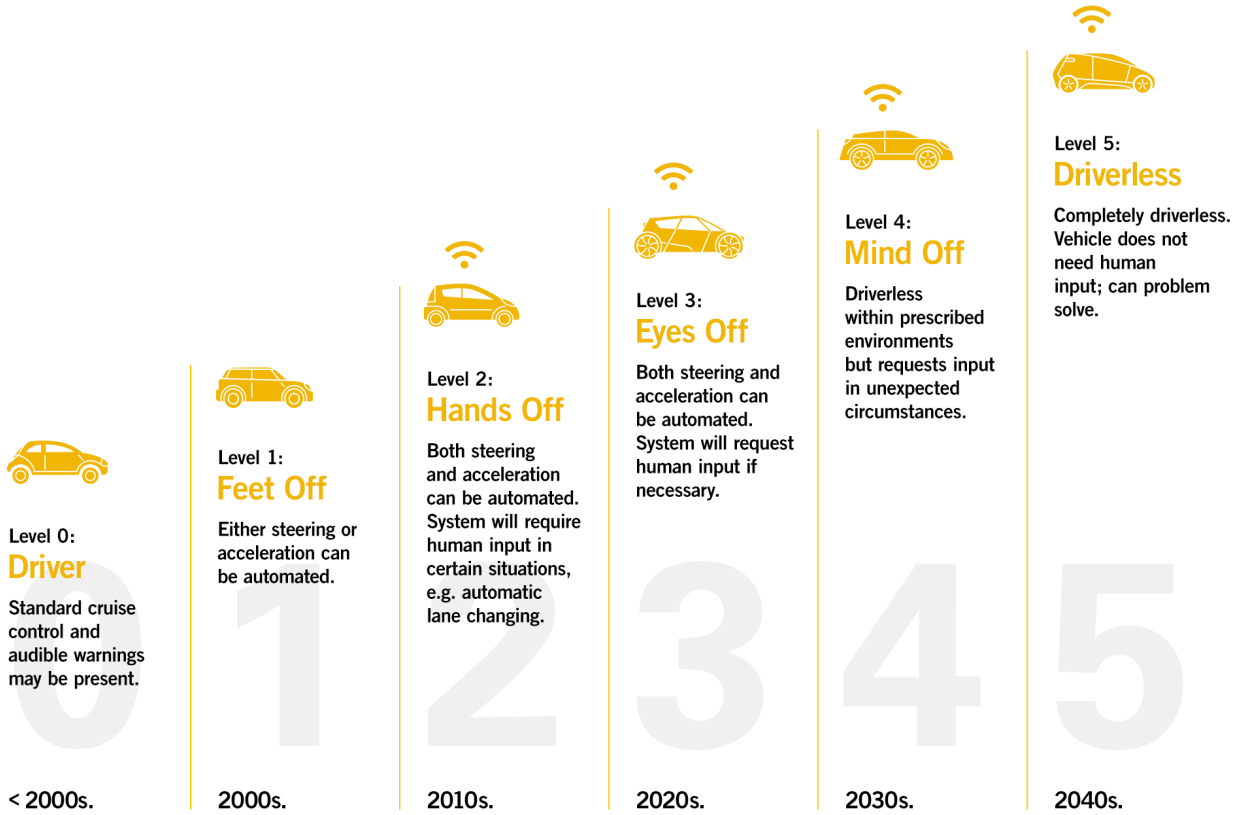

Figure 15 – SAE Automated Driving Levels and Expected Implementation Timeframes)

Along with increasing levels of automation, vehicles are becoming more connected. There will be many highly automated driving systems (SAE Levels 3, 4 or 5) that will require vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and/or vehicle-to-other (V2X) communications to deliver the full safety, environmental and community benefits.

A study on the safety benefit of CAV technology for Austroads estimated that with 100% fitting of V2X technology across the in-service vehicle fleet, CAV collision avoidance systems have the potential to reduce serious injury crashes in Australia;[14]

- Cooperative Forward Collision Warning (V2V) – reduce same direction crashes by 20-30%
- Curve Speed Warning (V2I) – could reduce run-off-road and head-on crashes by 20-30%.
- Intersection Movement Assist (V2V) – could reduce adjacent direction crashes by 35-50%.
- Right Turn Assist (V2) – could reduce right turn against crashes by 25-40%.

In addition to the level of fitting within the in-service fleet, CAV technology is heavily dependent on supporting infrastructure. ANCAP testing has shown the importance of the physical road infrastructure – signs and lines – to the

[13] Society of Automotive Engineers J3016, Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems
[14] Austroads Research Report AP-R551-17, Safety Benefits of Cooperative ITS and Automated Driving in Australia and New Zealand, October 2017

successful operation of current active safety systems such as SAS with traffic sign recognition and intelligent speed assistance. The emerging V2X technology will be reliant on digital infrastructure to deliver the full benefits.

ANCAP ASSESSMENT OF AUTOMATED VEHICLE TECHNOLOGY

ANCAP began testing and assessing automated vehicle technology through testing of AEB and LSS from 2018 and plans to continue to expand with new protocols in 2023 and 2025 as outlined earlier.

ANCAP recognises that public (and government) interest in automated driving is high, however, the understanding of automated driver technology is low and often misunderstood. This includes a lack of information on the automated driving systems currently available - their operational capabilities and limitations.[15]

ANCAP is working closely with our Euro NCAP counterpart to develop the plan to include assessment of assisted (or automated) driving systems into our overall star rating, likely from 2025.

Assisted Driving program

During 2020, Euro NCAP introduced an '**Assisted Driving'** program that tested a range of vehicles fitted with 'Highway Assist' systems, technologies designed to make motorway/highway driving safer by reducing fatigue and encouraging safe driving. Highway Assist systems help the driver to maintain a steady speed, to keep a safe distance from the car in front and to keep the vehicle in the centre of the lane by combining (intelligent) Adaptive Cruise Control (ACC) with Lane Centering (LC).

The Assisted Driving program assess the balance between "Assistance Competence" (made up of Driver Engagement and Vehicle Assistance) and "Safety Backup." (**Figure 16**).

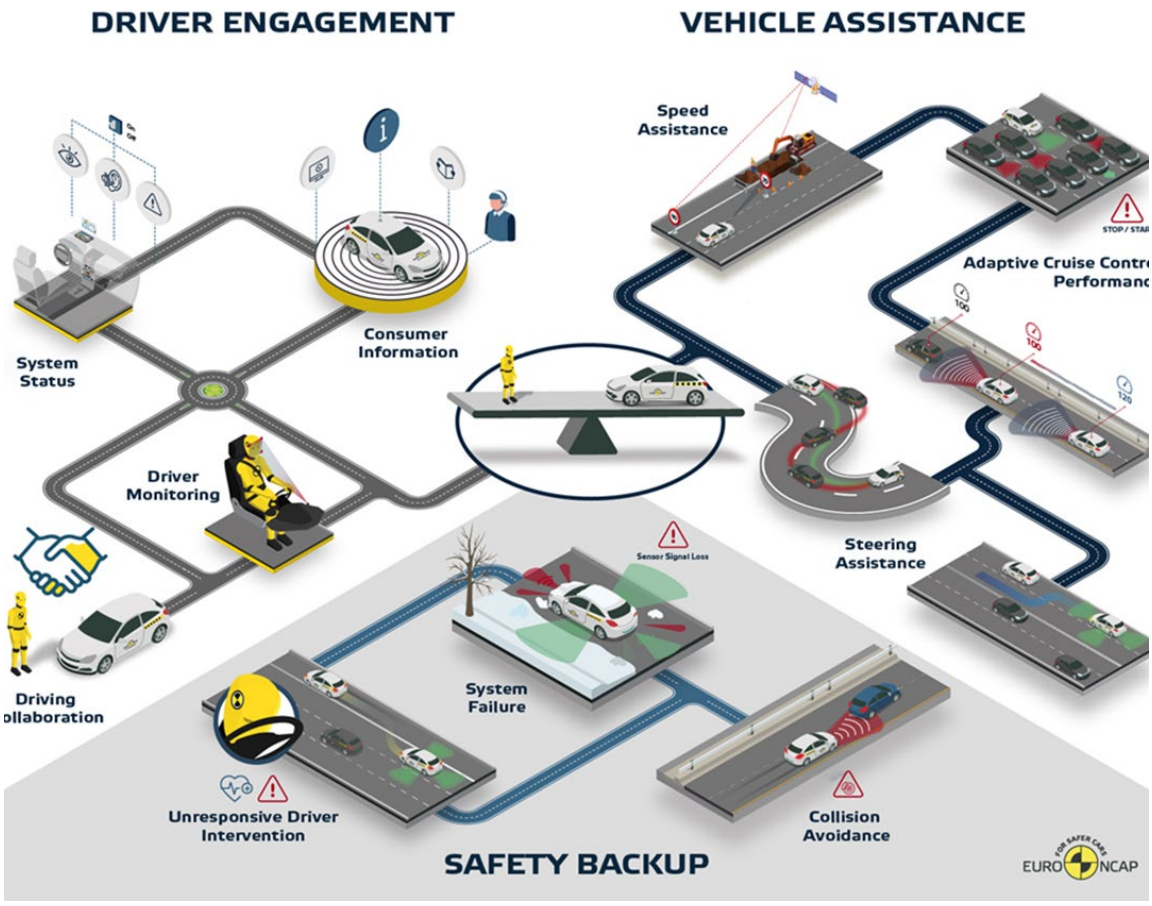

Figure 16 –Assisted Driving Program

- Assistance Competence assesses the level of assistance provided by the vehicle and how it is matched by the perception of the driver and the ability of the system to keep the driver engaged in the driving task. Assistance Competence comprises:

[15] There is also significant regulatory work in Australia, at the UN, within the EU and in the US to develop standards and administrative systems for automated driving systems.

- Driver Engagement: The protocols consider how well the manufacturer explains to consumers how the system works, makes clear its limitations and ensures that there is a clear communication so that the driver and the system can cooperate to control the vehicle safely.
- Vehicle Assistance: This part of the assessment looks at how well the AD system controls the vehicle when it is engaged: whether or not it reacts properly to the huge variety of speed control limitations that may be encountered, for example, or the amount of steering support in highway type curves.

- Safety Backup: The extent to which the system fail-safe is assessed, in cases where the driver has failed to react to a critical event, and how it responds in emergency situations.

In 2022, ANCAP commenced a similar Assisted Driving Program at the two Australian active safety test facilities used by ANCAP, including Transport for NSW's (TfNSW) Future Mobility Test and Research Centre (FMTRC). The project will allow ANCAP, the Australian test facilities and vehicle industry to develop the necessary expertise to undertake the tests as well providing information on the performance and limitations of assisted driving systems currently available in new vehicles, to consumers and policy makers. ANCAP expects to introduce Assisted Driving into its star rating from 2025.

Community Education Activities

As part of its community education and advocacy role, ANCAP conducts regular community engagement activities to promote and explain the availability, function, benefits and limitations of automated driving systems currently available on new vehicles.

'Safety Experience' drive days have been conducted in South Australia and regional NSW to provide general consumers, fleet operators and the media with a first-hand opportunity to safely experience AEB and LSS. Public displays and media events have also been held in Perth, Sydney, Brisbane, Adelaide and Canberra demonstrating the availability of this technology across a broad range of vehicle price points, brands and market segments.

In addition, a national community awareness advertising campaign was produced and rolled out by ANCAP in 2020-21 highlighting the benefits of AEB and LSS and encouraging consumer purchases of vehicles with these technologies.

NATIONAL LEADERSHIP

The Australian Government has established the Office of Future Transport Technology within the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, whose role is to coordinate the Australian Government's work to prepare for CAV. [16]

- Having the necessary national regulatory arrangements in place by 2026.
- Understanding the impacts and prepare for the opportunities to maximise the benefits.
- Protecting Australians in relation to cyber security, data security, consumer rights and personal privacy.
- Ensuring the supporting digital and physical infrastructure needed are in place and working.

The Office of Future Transport Technology leads the Commonwealth's engagement on the National Land Transport Technology Action Plan and underpinning National Policy Framework, which sets out a nationally consistent approach to policy, regulatory and investment decision-making for emerging land transport technologies. The Action Plan is updated every three years and outlines national short- to medium- term priorities, focusing on the five key issues for Government identified in the framework:

1. Safety, Security and Privacy
2. Digital and Physical Infrastructure
3. Data
4. Standards and Interoperability
5. Disruption and Change

NEXT STEPS

Vehicles

Three international UN Regulations have been implemented during 2020 that will lay the foundations for future automated vehicle standards and regulations:

- UN Regulation 157 (UN R155) Cyber Security;
- UN Regulation 156 (UN R156) Software Safety; and.
- UN regulation 157 (UN R157) for Automated Lane Keeping Systems (this is the first regulation for a Level 3 automated driving system).

These regulations are being introduced into Europe from 2022 as part of the new EU General Safety Regulation[17] (known as GSR2).

[16] Australian Government, Office of Future Transport Technology
[17] Regulation (EU) 2019/2144 of The European Parliament and the Council of 27 November 2019.

As part of GSR2, the EU will introduce a regulatory standard for advanced driver distraction warning systems, which is necessary for the successful operation of connected and automated vehicles, from July 2024. An advanced driver distraction warning system is a system that helps the driver to continue to pay attention to the traffic situation and warns the driver when they are distracted.

Infrastructure

Infrastructure owners and funders need to plan for the assessment, maintenance and upgrade (where necessary) of Australia's physical and digital road infrastructure to facilitate effective operation of CAV.

6. POST-CRASH SAFETY

In the new tests and assessments introduced in 2020, ANCAP (and Euro NCAP) included a new aspect focussing on post-crash safety to improve the survivability and injury outcomes for those involved in a crash by providing emergency services with necessary information to improve their post-crash response. This includes:

- Rescue information – the availability of standardised rescue sheets to assist emergency services.
- Multi-collision braking – the vehicle applies brakes after a collision, to minimise the risk of a second collision.

Euro NCAP were also able to introduce eCall (also commonly called Automatic Crash Notification) from 2020 as the communications infrastructure existed in Europe.

RESCUE SHEETS

Extending beyond ANCAP's traditional crash protection and prevention focus, the most recent ANCAP protocol updates implemented from January 2020 introduced a new aspect known as Rescue, Extrication & Post-Crash Safety. This assessment area was introduced to enhance post-crash response and improve the survivability and injury outcomes for those involved in a crash.

To assist Australian and New Zealand first responders with the safe rescue and extrication of occupants involved in vehicle crashes, ANCAP developed and successfully launched a new digital app called 'ANCAP RESCUE'. With assistance from many vehicle brands, the app contains standardised vehicle safety information in the form of PDF rescue sheets for more than 1,000 vehicle models manufactured over the last 15 years. These rescue sheets highlight the location of potential in-vehicle hazards including fuel tanks, high voltage batteries (for electric and hybrid vehicles), airbag inflators and high-strength steel.

From 2020, ANCAP awards points in its rating process for vehicle models that provide a rescue sheet which meets ISO Standard No. ISO 17840-1.

Since its launch in 2020, ANCAP has continued to update the ANCAP RESCUE app with rescue sheets of newly released vehicles, and emergency services across Australia and New Zealand have downloaded and used the app in their operational motor vehicle crash responses and training activities. The app is provided in all NSW, ACT, QLD, TAS and New Zealand fire trucks and data from the ANCAP RESCUE app is utilised by the NSW, QLD and TAS State Emergency Service (SES).

eCALL (AUTOMATIC CRASH NOTIFICATION)

eCall (or Automatic Crash Notification) is a system fitted to a vehicle that sends an automatic message to an emergency call centre in case of a crash of the vehicle.

Europe

The European Union (EU) introduced legislation in 2015 for the deployment of interoperable eCall with Member States having the necessary emergency communications infrastructure deployed by 1 October 2017 and eCall has been mandated on all new light vehicles sold in Europe, since April 2018. The EU has adopted the United Nations Regulation 144 (UN R144) requirements for eCall.

UN R144 requires that in the event of a triggering signal (such as an airbag deployment), the vehicle's eCall system will establish a voice connection with an emergency call centre and send a minimum set of data (MSD).[18] The MSD includes:

- Time stamp of generation of data.
- Position (determined by GPS signal).
- Vehicle direction of travel.
- Vehicle details including type and propulsion type (e.g. gasoline, diesel, EV, etc).

Euro NCAP introduced eCall in its rating scheme from 2020. In addition to the minimum legislative requirements in UN R144, Euro NCAP encourages additional information to be sent on the number of occupants in the vehicle and two recent vehicle locations (before the triggering signal).

From 2023, Euro NCAP will include additional scoring provisions for eCall+ to include:

- Direction of impact, e.g. frontal, lateral driver's side, lateral passenger's side, rear or rollover.
- Change in velocity of vehicle starting from crash time and ending at 0.25 seconds after crash.
- Third Party Service eCall (TPS eCall) shall be free of charge and available for at least first 6 years.

[18] Referred to as a PSAP; Public/private Safety Answering Point in the UN Regulation and defined as "the physical location where emergency calls are first received and can be either a public authority or private organisation recognised by the government or responsible authority."

Australia

Australia does not have any regulatory requirement for vehicles to be fitted with an eCall system. However, under the National Road Safety Action Plan 2021-25, the Australian Government will consider if eCall should be mandated on all new light vehicles via an Australian Design Rule (ADR).

The Australian Government's National Land Transport Technology 2016-2019 Action Plan investigated the costs, benefits and possible deployment models for eCall. The National Land Transport Technology 2020-2023 Action Plan noted this action had been completed and the work will inform possible future deployment arrangements.

The National Emergency Communications Working Group (NECWG)[19] have released national guidelines for autonomous contact with Triple Zero (000), which included a protocol for autonomous vehicle alert escalation:

- National Guidelines for Autonomous Contact with Triple Zero (000).
- National Protocol for Autonomous Vehicle Alert Escalation contact with Triple Zero (000) Services (a supplementary protocol document to the National Guidelines).

Both NECWG documents require an 'autonomous contact' (i.e. eCall) to go via an 'intermediary or third-party monitoring facility'.

Note: Third party suppliers are operating in Australia with some brands including eCall in their vehicles[20]. For example see Itellimatics ASURE product.

ANCAP Introduction of eCall

ANCAP was not able to introduce assessment of eCall or eCall+ as part of its protocols in 2020. The technology, in the form envisaged in the protocol, cannot be supported in Australia currently due to a lack of supporting telecommunications infrastructure. At that time, ANCAP was informed that the existing Triple Zero (000) Operator's systems could not handle automatic crash notifications (eCall), digital location information or other information that would be transmitted following a crash. Similarly, ANCAP has not introduced the eCall requirements in the upcoming 2023 protocols.

ANCAP has engaged with the NECWG and also Telstra - the providers of Australia's Triple Zero (000) Operator - in relation to a suitable timetable to introduce eCall within ANCAP protocols. After consultations with Telstra and the vehicle industry, ANCAP considers that eCall could be introduced into Australia by 2025 as part of the new generation Triple Zero (000) services currently being developed and rolled out.

[19] The NECWG-A/NZ consists of Australia and New Zealand representatives from: Emergency Service Organisations (ESO); Public Safety Organisations (PSO); the Emergency Call Persons (ECP) and Carrier representatives.
[20] eCall is being offered on vehicle models from both premium brands such as Audi, Mercedes-Benz, BMW, Land Rover and Lexus, as well as mainstream brands such as Toyota and Ford.