Submission No 4

ELECTRIC AND HYBRID VEHICLE BATTERIES

Organisation: Australasian New Car Assessment Program (ANCAP) Safety

Date Received: 17 November 2023

Joint Standing Committee on Road Safety
Parliament of New South Wales
6 Macquarie Street
Sydney NSW 2000

Dear Committee Members,

ANCAP SAFETY welcomes the opportunity to provide a submission to the NSW Parliament's Joint Standing Committee on Road Safety inquiry into electric and hybrid vehicle batteries.

Background

ANCAP is Australasia's independent vehicle safety authority. It exists to reduce road trauma through the testing and promotion of safer vehicles and provides consumers with transparent advice through a rating system between 0 and 5 stars. ANCAP is complementary to, and supports, the Australian Government's regulatory requirements for new motor vehicles (the Australian Design Rules).

ANCAP's role is to encourage vehicle brands to design and build, and consumers to purchase and use, the safest vehicles possible. We set the benchmark to encourage vehicle brands to strive for the highest level of safety. We acknowledge those that meet or exceed top performance, and bring awareness to those that can improve.

ANCAP's work on hybrid and battery electric vehicles

ANCAP has tested and rated over 1,000 vehicle models currently on Australian roads, including more than 100 vehicle models with electric or hybrid drivetrains. In August 2022, ANCAP published *Safe & Green: ANCAP Safety Ratings for Alternative-Powered Models*, a quick-reference consumer guide to assist Australian new car consumers and fleet buyers to easily identify the ANCAP safety rating for low or zero-emission vehicles. A copy of this guide is attached.

Vehicles that have achieved an ANCAP safety rating have been subjected to a full suite of independent crash tests and collision avoidance performance assessments, including a review of post-crash safety.

When a vehicle has an alternative powertrain, such as an electric or hydrogen fuel cell system, ANCAP's testing process includes additional measures to ensure that the alternative powertrain remains safe both for testing personnel and for first responders in the event of a real-world crash. These additional measures are similar to those included in the proposed ADRs:

- **The output of the high-voltage battery is monitored.** The 'safety cut-out' of high voltage batteries is monitored and the output recorded to confirm if and when this cut-out operates.
- **The vehicle body is checked safely for any high voltage immediately after the crash**. 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.

These elements have formed part of ANCAP's testing requirements since 2018.

From 2020, ANCAP has also encouraged manufacturers to provide **Rescue Cards** 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 to help safely free occupants from the vehicle following a crash. ANCAP makes the rescue cards available to rescue services and first responders via the "ANCAP Rescue" phone app that is made available free of charge. The Rescue Card also covers other potential sources of injury, such as airbags, and provides other essential information to first responders.

Outcomes of ANCAP testing

Of the 124 hybrid and battery electric models currently rated by ANCAP, none have failed the additional tests required by ANCAP for battery electric and hybrid electric vehicles. 118 vehicle models currently hold a 5-star ANCAP rating, and six hold a 4-star ANCAP rating. No electric or hybrid vehicle has been rated at less than 4 stars.

In terms of the additional testing required by ANCAP in relation to battery electric and hybrid models, no vehicle has been deducted points due to a failure of the battery system.

Proposed Australian Design Rules

The Australian Government is currently considering proposed new Australian Design Rules (ADRs) that would address safety issues relating to high voltage systems in electric powertrain vehicles (EVs), and high-pressure storage systems in hydrogen fuel cell vehicles (HFCVs). Consultation on these draft ADRs closed on 29 March 2023.

ANCAP strongly supports the implementation of both the draft ADR 109/00 – Electric Powertrain Safety Requirements and the draft ADR 110/00 – Hydrogen-Fuelled Vehicle Safety Related Performance. These proposals would establish national standards for road vehicles that are aligned with existing international standards.

ADR 109/00 would require vehicles equipped with an electric power train and a rechargeable electric energy storage system to ensure that vehicles have safety protection for occupants and first responders from electric shock, fire, explosion and electrolyte leakage during and after a collision.

ADR 110/00 would require hydrogen-fuelled vehicles to meet specific standards for compressed hydrogen storage systems, providing vehicle occupants and first responders protection from leakage or explosion during and after a collision.

These draft ADRs set out basic protections for vehicle occupants and first responders against significant potential harms that could occur during or after a collision involving an EV or an HFCV.

As these draft ADRs largely implement existing international standards, ANCAP expects that all manufacturers of EVs and HFCVs operating in the Australian market are already complying with the measures contained in these draft ADRs.

Our team would be happy to assist the Committee with any further technical inquiries in relation to these issues.

Yours sincerely

[redacted]

Carla Hoorweg
Chief Executive Officer

17 November 2023

Safe & Green

ANCAP SAFETY

ANCAP SAFETY RATINGS FOR
ALTERNATIVE-POWERED MODELS

AUGUST 2023
v1.8

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 seventy 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

Information contained in this document pertains to safety performance only, as assessed against ANCAP protocols. Vehicle emission performance does not form part of ANCAP assessments.

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
Alfa Romeo Tonale	Small SUV	84%	87%	67%	85%	★★★★★ 2022	
Audi e-tron	Medium SUV	91%	88%	71%	78%	★★★★★ 2019	
Audi Q8 e-tron	Medium SUV	91%	88%	71%	78%	★★★★★ 2019	
BMW 3 Series	Medium Car	97%	87%	87%	77%	★★★★★ 2019	
BMW i4	Medium Car	87%	89%	71%	62%	★★★★ 2022	
BMW iX	Medium SUV	91%	88%	73%	78%	★★★★★ 2021	
BMW iX3	Medium SUV	93%	84%	70%	58%	★★★★★ 2017	
BYD Atto 3	Small SUV	91%	84%	69%	80%	★★★★★ 2022	
Citroen C4	Small Car	76%	81%	57%	62%	★★★★ 2021	
Cupra Born	Small Car	93%	89%	73%	80%	★★★★★ 2022	
Cupra Formentor	Small SUV	93%	88%	68%	80%	★★★★★ 2021	
Cupra Leon	Small Car	91%	88%	71%	80%	★★★★★ 2020	
Fiat 500e	Light Car	78%	79%	67%	67%	★★★★ 2021	
Ford Escape	Medium SUV	92%	89%	82%	77%	★★★★★ 2019	
Ford Mustang Mach-E	Small SUV	92%	88%	69%	82%	★★★★★ 2021	
Genesis G80	Large Car	91%	86%	77%	80%	★★★★★ 2021	
Genesis GV60	Small SUV	89%	89%	63%	88%	★★★★★ 2022	
Genesis GV70	Medium SUV	89%	89%	64%	87%	★★★★★ 2021	
GWM Haval H6	Medium SUV	90%	88%	73%	81%	★★★★★ 2022	

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
GWM Haval Jolion	Small SUV	90%	84%	64%	92%	★★★★★ 2022	
GWM Ora	Small Car	92%	84%	74%	93%	★★★★★ 2022	
GWM Tank 300	Large SUV	88%	89%	81%	85%	★★★★★ 2022	
Honda HR-V	Small SUV	82%	77%	72%	69%	★★★★ 2022	
Hyundai IONIQ 5	Medium SUV	88%	87%	63%	89%	★★★★★ 2021	
Hyundai IONIQ 6	Medium Car	97%	88%	66%	90%	★★★★★ 2022	
Hyundai Kona	Small SUV	N/A	N/A	N/A	N/A	★★★★★ 2017	
Hyundai Nexo	Medium SUV	94%	89%	67%	80%	★★★★★ 2018	
Jaguar i-PACE	Medium SUV	91%	81%	73%	77%	★★★★★ 2018	
Jeep Grand Cherokee	Large SUV	83%	93%	81%	84%	★★★★★ 2022	
Kia EV6	Large SUV	90%	87%	64%	88%	★★★★★ 2022	
Kia Niro	Small SUV	88%	84%	76%	87%	★★★★★ 2022	
Kia Sorento	Large SUV	82%	85%	63%	89%	★★★★★ 2020	
Land Rover Defender	Large SUV	85%	88%	71%	76%	★★★★★ 2020	
Land Rover Range Rover	Large SUV	84%	86%	72%	84%	★★★★★ 2022	
Land Rover Range Rover Evoque	Small SUV	94%	89%	72%	73%	★★★★★ 2019	
Land Rover Range Rover Sport	Large SUV	85%	86%	69%	84%	★★★★★ 2022	
LDV MIFA 9	People Mover	93%	88%	73%	90%	★★★★★ 2022	
Lexus ES	Medium Car	91%	86%	90%	76%	★★★★★ 2018	
Lexus NX	Medium SUV	91%	89%	83%	92%	★★★★★ 2022	
Lexus RX	Large SUV	90%	89%	89%	93%	★★★★★ 2022	
Lexus UX	Small SUV	96%	88%	82%	83%	★★★★★ 2019	
Mazda CX-60	Medium SUV	91%	93%	89%	77%	★★★★★ 2022	

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
Mazda MX-30	Small SUV	93%	87%	68%	74%	★★★★★ 2020	
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	
Mercedes-Benz EQE	Large Car	95%	92%	83%	82%	★★★★★ 2022	
Mercedes-Benz EQS	Large Car	96%	93%	76%	80%	★★★★★ 2021	
MG 4 Electric	Small Car	83%	86%	75%	81%	★★★★★ 2022	
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	
Nissan X-Trail	Medium SUV	91%	90%	74%	97%	★★★★★ 2021	
Opel Corsa	Small Car	84%	86%	66%	71%	★★★★★ 2019	
Opel Mokka	Small SUV	76%	77%	58%	65%	★★★★ 2021	
Peugeot 308	Small Car	79%	86%	68%	82%	★★★★ 2022	
Peugeot 508	Large Car	96%	87%	71%	76%	★★★★★ 2018	
Polestar 2	Medium Car	92%	87%	80%	82%	★★★★★ 2021	
Subaru Forester	Medium SUV	94%	86%	80%	78%	★★★★★ 2019	
Tesla Model 3	Medium Car	96%	87%	74%	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 Corolla Cross	Small SUV	85%	88%	87%	83%	★★★★★ 2022	

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MAKE & MODEL	VEHICLE TYPE	ADULT OCCUPANT PROTECTION	CHILD OCCUPANT PROTECTION	VULNERABLE ROAD USER PROTECTION	SAFETY ASSIST	ANCAP SAFETY RATING	POWERTRAIN
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	
Volkswagen ID.4	Medium SUV	93%	89%	76%	76%	★★★★★ 2021	
Volkswagen ID.5	Medium SUV	93%	89%	76%	76%	★★★★★ 2021	
Toyota Yaris Cross	Small SUV	86%	86%	78%	82%	★★★★★ 2021	
Volkswagen Multivan	People Mover	90%	89%	69%	79%	★★★★★ 2022	
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