

**GREAT LAKES
HISTORIC AUTOMOBILE CLUB, Inc.**

EXHAUST NOTES

June 2022



Chrysler VH Charger R/T E38

Story Inside

10 Greatest Touring Cars

Story Inside



Also in this issue:

- **Motorfest 2022 Sponsors**
- **VFACTS April 2022**
- **What are NFT's**
- **EV Charging and Connectors**
- **What is ADBLUE ?**

EXHAUST NOTES

The magazine of the Great Lakes Historic Automobile Club, Inc.
BOX 53, TUNCURRY. 2428 glhac@outlook.com

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Magazines LINK <https://jmp.sh/jYkEZhG>

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Peter Darbin

Disclaimer

Articles appearing on our website & in our magazine reflect the views of the contributor and not necessarily The Club or the Editor.
The Great Lakes Historic Automobile Club Inc. and its committee accept no liability for transactions resulting from

MEETINGS & BANKING

1st Wednesday of month at Tuncurry Beach Bowling Club, Tuncurry , starting at 7pm.

Club Bank ; BSB 062-669 Account 2801-1055Ref ; Your Name & reason for payment
Example ; R Pulling, M/Ship 2021

**Club Vehicle Display
Boards on Sale \$60 + GST
+ freight if req' urgently**



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1947
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Club Regalia.

Brian Payne; 0422 307 120

Car Badges	\$ 25
Club caps	\$ 20
Key Rings	\$ 7.50
Cloth Badges	\$ 7.50
Windscreen Banners	\$15
Vehicle Display Boards	— Call Brian

Great Lakes Historic Automobile Club Inc.

PO Box 53. Tuncurry. 2428

glhac@outlook.com



All Events start at Rockpool carpark to depart 9.30am, unless notified

GLHAC EVENTS TO JULY 2022

Please advise if going direct: to Brian Mills 0427 311 823, Keith Simmons 0409 316 794, Kevin Barnard 0422 188 442, or Albert Waldoock 0407 291 124

To promote our Club we would like you to display the Club Banner on your car when parked in a group.

June

- Wed 1 7.00pm Meeting at Tuncurry Beach Bowling Club Auditorium.
Sat 4 10.00am Go direct to Kafe Biru for a coffee and chat.
Fri 10 Depart rockpool at 9.30am for morning tea at Andy's Cherry Pie then onto Krambach Hotel for lunch
Sun 12 OUR MOTORFEST- HELPERS NEEDED
Sun 19 Depart rockpool at 9.30am for a BYO morning tea at Crowdy Head then lunch at Harrington Hotel
Thurs 23 Depart rockpool at 9.30am for morning tea at Flow Cafe Old Bar

A new calendar of events is being put together and will be sent to members and posted on our repository in the next several days.



Curtis Watson

B. Med Sci. (UTS) M. Pharm (USYD)

Pharmacist and Owner

6555 4645

Shop 4, 21 Boundary St.,
Forster, 2428

watsonfriendlypharmacy@outlook.com

MONTHLY MEETING OF GREAT LABES HISTORIC AUTOMOBILE CLUB INC
Held at Tuncurry Beach Bowling Club on 4th May 2022

Meeting opened: 7.00pm

Chairman: Ron Pulling: Acting Secretary: Brian Mills Treasurer: Hilton Tripp.

Attendance: 39 Members: 4 Visitors:

Apologies: Kevin Jones, Harold Rowe, Max & Judy Smith, Dianne Tipping & Kevin Barnard.

Visitors Names: Peter Templeton, Rob Bryant, Brian McKinnon, John Dalamar.

Minutes from Previous meeting: as per magazine. Moved to accept as a true & correct record;

Proposed: Ron Pulling Seconded: Victor Nadjarian Carried

Business Arising: Nil.

Treasurers Report: Presented by Hilton Tripp Balance \$ 25,728.00.

Moved by Ron Pulling that the Treasurer's report be accepted. Seconded: John Amato Carried.

Correspondence In: Various club magazines by mail & email, Motorfest emails, email to Fair trading re Public Officer,

Correspond Out: emails re our events, application to Midcoast Council, email to Fair trading re Public Officer,

Moved by Ron Pulling that the correspondence be accepted. Seconded: Brian Mills Carried.

Events Report: As printed in magazine. Harvey Haworth gave a report on Hat Head Rally was a good event 69 cars.

Ron gave notice of the Hub Rally 8th & 9th October 2022 at Taree.

Laurie Curtin reported on the progress of Motorfest. Lots of interest 42 clubs invited – negotiations ongoing with Council over their requirements for the use of JWPark and permission to hold the event. There will be a trophy for the best Club display, our cars will be in one group – please fit windscreen banners.

General Business: Brian Payne announced that on the internet you can buy two Gogomobil Darts plus 20 tons of spare parts for only \$50,000.00. Laurie Curtin reported on a chap who owns 4 cars one of which was written off due to flood damage, he had the salvage rights so he dismantled and rebuilt the car and is now running perfectly. Council requires a First Aid Kit and Fire Extinguisher and Laurie has arranged a First Aid Officer to attend Motorfest. Cost approx: \$450.00. Ron moved that these expenses be met, Seconded by Warren Brown Carried. Brian mills advised that work on the Club Caravan is progressing and will be ready for Motorfest. Ron made an appeal to members to come forward to take on the Secretary's position also his 3 year term as President is up at the end of the year, and we will need a new President.

Regalia: as per magazine, see Brian Payne

Members Spot: Victor Nadjarian attended the Mercedes National Rally – nearly 100 cars were there one of only 16 in the world AMG cars attended 5.2 litre twin turbo 3.4 seconds 0 to 100. Victor travelled 4,655 kms used 787 litres of fuel returned 8.3 ltrs per 100 kms and won the award for the most distance travelled.

Brian Mills reported on the wiring problems of his 1984 BMW K100 outfit.

Welfare: Max Smith is recovering.

Ron Pulling showed some videos including Kevin Jones winning a major prize in a competition at CAOS 4WD Camping store.

Raffle: Albert Waldock was the lucky winner of the \$50.00 voucher donated by Tuncurry Beach Bowling Club, other lucky winners were Sharon Berry, Mark Codling, John Dalamar, Ross Humphries, Mark Codling.

Meeting Closed: 8.25 pm

Tuncurry Beach Bowling Club greatly supports our Club with the \$50.00 meal vouchers and allowing us to use the Auditorium for meetings, please support them in return.

GLHAC
Treasurers Report May 2022

Balance c/f		<u>\$24,798.00</u>
o/s cheques (0)		0
o/s deposit (4) motorfest		\$900.00
Opening Bal		<u>\$25,698.00</u>
Income		\$1745.87
Bank Int	\$9.07	
Memberships (1)	\$40.00	
Motorfest sponsorships	\$1530.00	
Raffles (Apl \$126.00)	\$96.80	
Regalia	\$70.00	
Expenses		-\$1263.95
Dept Fair Trading late fee	\$37.00	
Apl Mag printing Sunni	\$397.00	
First Aid Motorfest	\$428.00	
Members Benefits	\$268.10	
Caravan	\$75.00	
Last Year's trophy engrave	\$20.00	
Stationary	<u>\$38.85</u>	
Closing Bal		<u>\$26,179.92</u>
o/s Cheques		0
o/s deposits (11)		<u>-\$900.00</u>
Bank Bal		<u>\$25,279.92</u>
Member's benefit allocation open bal.		\$869.76
Bulahdelah Soup Day		<u>-\$132.70</u>
Bal.		\$737.06

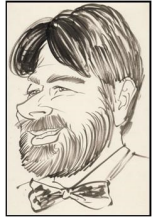


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THE PRESIDENT'S PRATTLE

June 2022



Welcome to the June 2022 edition. This month is Motorfest, our biggest display day of the year. We again are appreciative of Great Lakes Nissan for their continued support of our Motorfest. Our planning team of Laurie Curtin, Duncan MacDiarmid, Brian Mills and Hilton Tripp have done a great job putting together the many aspects and logistics needed to make (I believe) our 2022 Motorfest an even more successful day than we had in 2021. Hilton has again secured a significant group of local businesses as sponsors. A full list is presented later in this magazine along with their relative advertisements. Thank you Hilton. This year we are again also able to provide a professional loudspeaker system for communication on the day. We have also contracted a medical service to provide health related issues coverage on the day. Also, our life member, Chris Goodsell, has agreed to to interview car owners about their cars. Chris as you know is closely associated with motoring through his Road Ramblings program. And, for the first time ... a band ... yes, music as we take in the motoring splendour. To complete the great work done by the team we need plenty of volunteers, early (7am) on the Sunday(12th June).

Windscreen banners are a must for our members at Motorfest. Our club will participate in the 'Best Club Presentation' trophy, and the banners will help best present our members cars.

Our 'mobile shed', the caravan, now contains all of our club material and it will be parked near our control tent at Motorfest. In it we have our banners, BBQ's, club paperwork and copies of issued magazines. It also contains our medical kit.

Supporting our sponsors should be a focus for all our members. Two of our sponsor are offering incentives to use their services. Tuncurry Auto Spares is offering club members a 10% discount and ORACLE Advisory Group is offering a free one hour financial advice.

Our magazine is for US ... always interesting to read about our club activities and see some of the pictures taken at the events, but, who writes these reports ??? Generally just Brian. Well this month several of our members have taken to print and given the editor (me) good reports on events they have been on ... thank you. YOU need to keep this up You enjoyed the event .. tell others how much you enjoyed it.

We are still looking for someone to be a minute secretary, and maybe even secretary. Are you that person ?? Talk to me if you have an interest in helping out.

I am unaware of any of our members on the sick list. Good sign.

Take care, Ron.

Experience is something you don't get until just after you need it.

GLHAC Events Report May 2022

Sat 7th Kafe Biru Coffee & Chat.

31 members and 2 visitors enjoyed a great autumn morning by the riverside at Dara-wank, good coffee plenty of chat.

In concessional registered cars,

Arthur Broadley Triumph 29663H, Peter & Kathy Eaton Mg 66398H, Harvey & Ros Haworth Holden 29676H Bernie & Carol King MGB 75013H, Tony O'Rourke & Karin Warbrick Mini 51847H, Ron Pulling BMW 95355H, Keith & Mary Simmons Capri 87756H, Hilton & Carol Tripp VW Kombi 08544J, Albert Waldock & Sharon Berry Chev 27785J, Peter & Serena Tempelton Pontiac 35847H.

Tues 10th Fighter World Williamstown. 12 club members and 1 visitor enjoyed morning tea in the sun at Medowie rest area then continued onto Fighter World. Very interesting display, some of us had lunch in the adjoining cafe and just as we got in our cars to return home it bucketed down.

In concessional registered cars,

Ros & Harvey Haworth Holden 29676H, Kevin Barnard & Dianne Tipping 87747H, Arthur Broadley, Barb livermore & Brian Mckinnon Triumph 29663H.

Wed 18th Hillview Herb Farm.

The 15 members who had advised us they were going to this event grew to 21 plus 2 visitors by the time we arrived there. All were accommodated by owner Kerrie after a swift rearrangement of the seating, everyone enjoyed a nice devonshire morning tea, followed by a tour of the Herb Farm. A great experience.

In concessional registered cars,

Keith & Mary Simmons Capri 87756H, Ros & Harvey Haworth Holden 29676H, Albert Waldock & Sharon Berry & Tom Carson Chev 27785J,

Hillview Herb Farm. Gloucester. 18/05/2022

On a sunny but cool day we left home, roof down, to meet members at the Tuncurry Rock Pool. In the meeting spot was a very nice Red Merc Hard Top, Graham Roylett, Fiat resting at home. 8 cars got under way at 9.30am. Roof UP. We picked up Kevin & Dianne in their MG at the Fairford Rd intersection. We had a non-eventful drive through Nabiac, Kendell, to Gloucester. Dodging potholes, with no car dirty roadworks. Arriving at the Herb Farm 10.45am to be greeted by Karen who made us very welcome. The aromas from the herbs were amazing, It is a very homely place. We were ushered into the Rotunda for tea scones jam & cream. At this time 8 more members arrived. Making the 15 catered for up to 23. Taking all in her stride our host rearranged the furniture to accommodate us all. After morning tea our host took those who wished on a tour of the farm. Very capably explaining the various plants and giving tasting samples. Albert and I roamed the gardens photographing old farm equipment. The well with running water, an Axeman with 1 leg in a pot, homemade ploughs, and a very old lawn mower. We gathered back at the Rotunda to purchase various herbs, salts, jams, & honey. Soaps were also available. Before making our way home. Sharon Berry.

GLHAC Events Report May 2022 (Cont.)

Heritage Day 21st May 2022 .. Taree

To mark National Heritage Motoring Day a large group of historic cars gathered in River St, Taree on May 15. The show included cars from Port Macquarie and Laurieton under the auspices of Taree Antique and Classic Car Club.

The Morgan group attracted a lot of attention. Hand built in England the traditional wooden frame and aluminium body forms the olde-worlde style people are drawn to.

Laurie Curtin showed his 1984 model 4/4 in keeping with the theme of the day including a wicker picnic basket, wine and glasses, period crockery and serviettes along with the mandatory tartan picnic rug.

Other very notable vehicles on display included two Concours d'Elegance winners ; Gary Cox's 1981 Delorean and Trevor Hudson's 1929 Stutz Black Hawk.



Heritage Day is conducted by member clubs of the 'Bush Council' and GLHAC was invited by both Taree based classic car clubs to attend. Originally one club was to use John Wright Park, but due to weather this was moved to The Big Oyster in Taree. I am unaware of any GLHAC members attending this event. Laurie Curtin

Invitation Events

Stroud Annual Car Show

Hosted by United Ford Owners Club
Saturday 9th July 2022.
At Showground by 9.30 am.
Street Parade 10.00 am

Euro Motorfest 19th June
Contact Brian re details



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GLHAC Events Report May 2022 (Cont.)

Hat Head Rally

Hat Head was this year called The Valley Rally because it was not the usual routine due to Covid. We set up our old caravan on Friday afternoon & met up with various club members from HARS members at the Bowling club & had dinner (enough for 2 nights). Saturday was registration day at the shelter shed in the CVP & morning tea. 10-30am a variety of 59 cars left Hat Head though back roads south to Crescent Head the westward towards Kempsey South then out to Dongdingalong, Sherwood, Green Hills, West Kempsey to the racecourse. Such a beautiful drive through the rolling greenhills. All cars were parked under cover in various year



groups & categories for judging. Lunch was then served a variety of sandwiches, drink, cup cake a choice of fruit. At 2-30 most people had left the venue to return to wherever. Sunday was Brunch at the weather shed steak, sausage, bacon, egg, coleslaw potatoe salad & a bread roll. Then the judging results & awards were made & the drawing of the raffle. Good bye speech from the KHARC president & invitation to return back to a normal rally next year 6th 7th 8th May 2023.
Ros Howarth



Elvis Festival — April 2022

Mary & Lyn. To PARKES. Elvis Festival. 20th till 26th April 2022

We left Forster on Wednesday 20th of April and travelled to Sydney, we stayed at the Mercure Central Motel which is a 5 minute walk from Central Station.

Thursday the 21st April. We arrived at central station 6.30am to book luggage in and see the Elvis Concert at the station. Some of the Elvis performers were there and sang about 1-2 song each before boarding the Elvis Express at 7.00am for departure.

Once aboard the party started, we had Elvis's everywhere, the entertainment went from carriage to carriage throughout the 6hr train trip. Our jaws were so

sore from the singing and laughing by the time we got to Parkes.

Most of the people from Parkes are on the platform to welcome the Elvis Express.

The carpark was full of entertainment & buses to take everyone from the Train to their accommodation. We stayed at the Coachman

Hotel in the

middle of town. The street parade on the Saturday is a must. If you wanted to not spend a cent on entertainment you can. Free street concerts, Concerts in the park are all free, & some club entertainment are also free.



April 25th we made our way back to Station to leave Parkes at 2pm. You have the same seats as you did on the way over. We had entertainment on the way home, a lot of people were very tired but kept going. We bid farewell to all our new found friends at Parramatta station at 9pm, to whom we are now all in contact with.

This trip should be on everyone's bucket list even if not a fan.

Mary Simmons



The Great Lakes Historic Automobile Club, Inc. wishes to thank the many local sponsors who are supporting our club in hosting **The 2022 Nissan Motorfest, being held on Sunday of the June Long Weekend.**

Below is a full list of our sponsors supporting Nissan Motorfest 2022.

Advertisements and contact details of each of our sponsors are included in the following pages and throughout the magazine. A number of our long term sponsors are also supporting Motorfest 2022. We thank you all for your continued support.

Key Sponsor ;

Great Lakes Nissan, Tuncurry

Main Sponsors ;

Mix Mechanicals Repairs

Dorvik Steel Suppliers, Tuncurry

HMM Accountants, Forster

Gutter-Vac, Forster

Forster Solar and Lighting

Lumpy's Nursery And Landscaping Yard, Tuncurry

Oracle Advisory Group, Taree

Watson's Friendly Pharmacy, Forster

Manning Rubber and Foam, Taree

Great Lakes Radiators, Tuncurry

AA Automotive Repairs, Forster

Shannons Insurance, Taree

First National Real Estate, Tuncurry

Supporting Sponsors;

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MARX Forster tyres, Forster

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Kafe Biru, Darawank

13Cabs Mid North Coast, Forster

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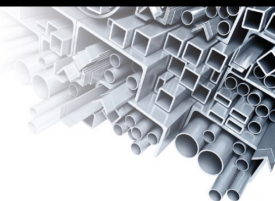
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\$70,000 (no offers)

Ron Gallagher 0407 607 487

CAR RAMPS

\$80



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**Duncan
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CAR STANDS \$35



Do I need 'run-flat' tyres?

Here's another automotive irony – so-called run-flat tyres never actually run flat. These special tyres have been designed with a stronger construction, particularly in the side walls.

If the tyre is punctured and the air inside escapes, the structure of the tyre will not immediately collapse (go flat) like a normal version.

Run-flats can only be fitted to a vehicle equipped with a tyre pressure monitoring system to alert the driver if there is a puncture because there's very little way of telling otherwise.

The key advantage with these special tyres is that they allow the car to be driven to the tyre repair shop and the driver is not exposed to danger trying to fit the spare.

It also removes the need to carry around a spare unless there is more significant damage to the tyre. Under these circumstances, run-flats can be a disadvantage.

Contrary to popular belief, a punctured run-flat can be repaired. As long as the owner can guarantee that the tyre has not been driven unpressurised further than the manufacturer recommends, there is no reason a run-flat tyre cannot be patched just like a normal tyre.

If the tyre has exceeded the safe distance under the minimum inflation pressure, the structure will have been weakened and it must be replaced.

If the warning light comes on, investigate it immediately.

Daniel GARDNER



JR Richards & Sons

Head Office: 92-94 Manning Street, Tuncurry NSW 2428

Phone: (02) 6555 7007 Fax: (02) 6555 7888

Email: info@jrrichards.com.au

The advertisement for Forster MarX Tyres & Mechanical is set against a dark background. At the top, the word "FORSTER" is written in large, white, bold, sans-serif capital letters on a red rectangular background. Below this, the tagline "Professional, quality & reliable service..." is written in a smaller, white, italicized font. The phone number "6555 3300" is displayed in large, red, bold digits. Below the phone number, the word "MARX" is written in a stylized, blue, italicized font with a yellow outline. At the bottom, "FORSTER TYRES & MECHANICAL" is written in a small, white, sans-serif font. On the right side of the advertisement, there is a stack of three tires, with the top one being a full view of a tire on a silver rim. The text "All Quality Brands Available" is written vertically in a small, white font to the right of the tires.

What are NFTs

and why more of them are appearing in the automotive world

By Amy Stevenson

No doubt by now you have heard the term NFT. And if you're anything like me, you still might be trying to get your head around them. Here's what you need to know.

Character with Laptop in Hands Use Non-Fungible Token Cryptocurrency for Making Digital Transaction or Buying Masterpieces and Antiquities in Cyber Space.

What is an NFT?

NFT stands for "non-fungible token" and at the most basic level, an NFT is a digital asset that links ownership to a unique physical or digital item, such as works of art, real estate, music or videos. Once upon a time, you'd collect coins, baseball cards, or Tazos, now NFTs can be considered more like the modern-day collectible.

But what do NFTs have to do with the car industry?

Whether it's a massive surprise or not, the worlds of NFTs and cars are colliding. People are starting to pay big money for a car that isn't even real, which is wild! Especially in a time where the prices of real cars are on the rise.

Earlier this year, American auction house Barrett-Jackson, auctioned the world's very first collector car NFTs at the 2021 Las Vegas Auction. A pioneer in the collector car industry, Barrett-Jackson auctioned four NFTs, the first of the series of VIN 001 back in June and featured a select group of vehicles that had previously sold for charity.

The four vehicles included the 2021 Ford Mustang Mach 1 VIN 001, the 2021 Ram 1500 TRX Launch Edition VIN 001, the 2021 Ford Bronco 2-Door VIN 001, and the 2022 GMC Hummer EV Edition 1 VIN 001.

At the time, the company said they were excited to bring the NFT platform to the collector car world, but much like any collectible, it comes with a hefty price tag. The Ford Mustang Mach 1 sold for US\$30,000, while the other 3 NFTs went from between US\$5000 to US\$22,000.

Closer to home, Blockstars Technology created a world first in September



2021 with digital NFT Ford Falcon GTHO Phase III 'Yellow Glo' Artwork and once again prices got wild, for over \$50,000 exceeding the original showroom price from when the original car was released in 1971. The real version of the car was also sold at the same auction, finding a new owner for \$1,300,000.

And most recently in November 2021, Alpine launched the GTA Concept, a virtual car design that offered five different liveries exclusively as collectible NFTs. Starting as the personal project of designer Arseny Kostromin, who previously worked for Renault, GTA Concept is based on the A110 sports car. The Alpine worked with Nfast, an NFT hyper-car designer, and Animoca Brands, which runs Revv Racing, a blockchain-based racing game for this concept, meaning the five owners of the GTA Concept models will be able to virtually drive their machines exclusively in the Revv Racing game.



Are there any benefits to owning an NFT?

While you might be scratching your head as to why these NFTs are going for such big bucks, it's likely these auctions will become increasingly more popular in the years to come and this collectable trend is unlikely to stop anytime soon.

Keeping in mind that in 2020 the average cost of a new car in Australia was \$40,128, there are some benefits of owning NFTs, compared to owning a physical car.

Most places will give you a certificate of authenticity, and in the case of the Blockstars Technology auction, the highest bidder also received a 3D model of the car, shopping benefits with the auction house and a framed picture of the digital NFT. Plus owning a digital car collection means you don't have to pay for car rego, maintenance or building a large garage to house all of the vehicles.

Tuncurry Smash Repairs

Panel Beaters & Painters

29 Pine Ave, Tuncurry, 2428

6554 7837

tuncurrysmash@outlook.com



Chrysler VH Charger R/T E38 retro throwback

At Bathurst, it didn't win on Sunday, yet still sold on Monday

2 APR 2022 Michael STAHL



The story of the Valiant Charger R/T E38 is, like the Valiant Pacers before it, forever that of a great car hobbled by a three-speed gearbox and missing Bathurst glory – but one of a great car nonetheless.

The E49 of the following year should have made amends, with its four-speed helping the six-cylinder Charger to even quicker acceleration times than the fabled Falcon GTHO Phase III. But it couldn't run from Chrysler Australia's problems; the company would be sold to Mitsubishi by the end of the decade.

In August 1971 came the Charger. On a 150mm shortened VH wheelbase and around 150kg lighter (despite pillarless chassis reinforcing), the Charger was curvy and Kamm-tailed and textbook '70s sexy.

At the heart of the headline, homologation E38 version was a stonking 4.3-litre (265c.i.) six-pack engine, developed from an axed Chrysler US light-truck design into 'E38 Six Pack' guise with 10:1 compression, tuned extractors and triple Weber carbs. A detuned E37 'Street Six Pack' had lower compression and a milder cam.

The hands-on, hot-rod feel was real: chief engineer Mike Stacy had ignored calls to use an in-house four-barrel carb, and purchased the first trio of 45-DCOE Webers from a local speed shop. An E38-engined VG Pacer was later shipped to Weber in Italy for final tuning.



An E38 optional Track Pack brought a quicker (16:1) steering ratio, front anti-roll bar, Sure-Grip limited-slip diff, ROH alloy wheels and 160-litre fuel tank. Local content requirements forced Chrysler to stick with its existing three-speed (the local four-speed Borg Warner D20 was still almost a year away) and unassisted, barely adequate braking package.



The E38s dominated their September race debut at Oran Park in Sydney's south-west, and a couple of weeks later were lapping Bathurst up to 10 seconds faster than the previous year's VG Valiant Pacers ... but still more than six seconds from the fastest Ford. On Sunday, the first Charger came home seventh.

For all that, in 2007 Peter Robinson remembered an epic 1972 overnight sprint from Adelaide to Sydney in an E38 with fellow *Wheels* scribe, Mel Nichols. "The mighty engine sang as we upped the pace, went in harder, clipped apexes, grabbing second, revs soaring, engine quivering ... we didn't care that it was crude."

The limit of threes

The non-crossflow 'Hemi Six' (actually, only semi-hemispherical heads) had seven main bearings, making it rev-happy and reliable. The 4340cc E38 Six-Pack copped triple Webers, high-overlap cam, bigger valves and tuned-length extractors. It made 209kW at 5000rpm and 431Nm at 3700rpm which, despite the three-speed manual, propelled the 1327kg coupe to 14.8-second quarter miles – matching a contemporary 2.4-litre Porsche 911S.

Space race

At 4564mm overall length, on a 2667mm wheelbase, the Charger was closer in external dimensions to a Torana than to a GTHO. Front body panels were shared with VH sedans and the doors with the VH hardtop. The front cabin's spaciousness was emphasised by the reverse-sloping dashboard and a full-width footwell, uninterrupted by a centre console. Reclining buckets, full instrumentation (with tacho) and front driving lamps were standard for all R/Ts.



SHARE A RECIPE

A Versatile Slice

Base

125g butter/marg 1/2 cup sugar
1 cup SR flour 1 cup coconut

Topping

2 eggs 1 tsp vanilla
3/4 cup brown sugar 1/2 cup coconut
2 level tbsp plain flour 1/2 tsp baking powder

Add 2 or 3 of the following:

1/2 cup chopped pecans 1/2 cup sultanas
1/2 cup choc chips 1/2 cup chopped ginger[naked]

Cooking the Base

Melt butter in the microwave, add the dry ingredients and stir well. Press into lined base of slice tin and bake for 15 mins in a mod oven.

For the topping

Mix all ingredients and spread over the base, return to oven and bake for 20 mins more. Should give 24 generous slices. It will freeze well.

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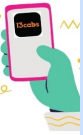
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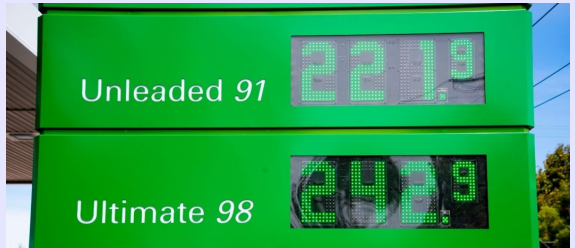
Does my car need pricier 98 RON fuel?

25 MAR 2022 Daniel GARDNER

Cars and the automotive world can be a baffling place to navigate even when we're not stressed out about how much the next visit to the petrol station will cost.

WhichCar's Daniel Gardner spoke with Brent Bultitude of 2HD Radio Newcastle about whether it's worth spending extra on high-

octane petrol, if diesel is more economical than petrol. Want to know more? Read-on.



Does my car need 98 octane fuel?

Let's start with what that little number on the pump at the servo means.

Octane is a chemical and one of the substances that gives petrol its distinctive smell, but it should not be confused with the octane rating (RON) of fuel.

While octane is an ingredient in pump petrol, it is not directly linked to its RON number, and you might be surprised to learn that pure octane isn't rated as high on the RON scale as petrol – a blend of many.

The confusion most likely originates in the USA where fuel was and still is marketed as 'high octane'.

Many assume this relates to a higher octane content in the fuel but, in fact, it means the fuel has a higher octane rating. The octane rating (Research Octane Number) refers to how resistant the fuel is to 'detonation' – a damaging event when the fuel spontaneously combusts rather than a more gentle and intentional ignition.

Therefore, higher octane rated fuel allows high-performance and modern engines to manage the process of using petrol to produce power more efficiently and effectively but is wasted in less advanced or older engines.

Put simply then, if your car asks for 'high-octane' petrol such as 95 or 98 RON on the inside of the filler cap or owner's manual, it will function as close to the way the manufacturer designed when fuelled by it.

Filling it up with a lower 91RON fuel won't necessarily damage your engine, but there could be a perceptible reduction in performance or even efficiency.

Conversely, you won't get better performance or mileage out of an old engine that accepts 91RON by filling up with higher grade petrol. Stick to what the manufacturer advises and if in doubt, run a tank of different fuel during your normal driving routine and see if the power or efficiency is impacted.

There's nothing especially bad about putting in a grade higher than the manufacturer recommends, but why would you with record-high petrol prices? That said, we don't advise going lower than the minimum recommended RON.

Petrol or diesel?

There is no definitive answer to this often encountered decision since the driving and transport needs of drivers vary significantly, but there are a few guidelines at least and it mostly comes down to the type of driving.

Diesel engines like to be worked hard and that includes, long freeway trips, towing and heavy loads of people or things.

If you aren't frequently giving these types of duties to your car you won't get the full advantages

of a diesel engine nor will it remain in peak performance for long. That's because modern diesel engines are designed to be the workhorses of the road and their sophisticated emissions control systems require the heat generated by hard work to function correctly.



It's also worth considering that a diesel's advantage is in low-revs torque and lots of pulling power, which is not exploited by light duties.

While petrol engines certainly aren't work-shy and also benefit from a good blast, they are far better suited to lighter load and infrequent or shorter trips. If you only hop in the car once a week to pick up some groceries, petrol is probably the way.

That said, modern turbocharging and clever electronics are making petrol engines almost as torquey as diesels with similar fuel efficiency advantages.

In other words, the performance divide between petrol and diesel is much narrower than it used to be.

Of course, if neither scenario quite fits your purposes, maybe it's time to consider going hybrid or electric?

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Courtesy of VFACTS - April 2022

The new car market is recording higher sales than pre-pandemic levels, but last year's April hasn't been beaten

4 MAY 2022 Kathryn FISK

Key Points

- ✦ April sales only just eclipse 80,000 units
- ✦ Year-on-year monthly new car sales drop by 12 per cent
- ✦ Year-to-date figures slide below last year's

New car sales in Australia suffered a fall last month, with almost every main-stream brand in the top 10 struggling.

According to monthly results provided by the Federal Chamber of Automotive Industries (FCAI), it was a worse April than last year, with 81,065 units registered compared to 92,347 this time in 2021 – which was boosted off the back of a COVID-19 decimated 2020.

It leaves the market down 12 per cent, or 11,282 vehicles, compared with April 2021, and also down 3.5 per cent year-to-date.

Though most brands suffered losses – with Nissan, Ford and Mazda the worst affected of the main players – though Kia, Isuzu and MG managed to swing things in the other direction.

As expected, New South Wales sold the most vehicles with 25,432 units shifted, followed by Victoria with 21,339 and Queensland on 17,424.

The Federal Chamber of Automotive Industries (FCAI) said supply was far outstripped by demand, with ongoing production and delivery issues not providing a true indicator of the industry's strengths.

“We know this is not a reflection on the demand for new vehicles in the marketplace,” said FCAI chief executive Tony Weber.

“This is a reflection on the global automotive industry’s ability to supply vehicles to not only the Australian market, but all markets throughout the world.

“Automotive manufacturers continue to suffer from a shortage of microprocessor units, which is impacting their ability to ramp up production to pre-pandemic levels.

“COVID-19 continues to impact manufacturing and supply, particularly where factories have been forced to close and shipping operations are yet to fully recover. This is being reflected in the extended delivery times for new vehicles.”

Toyota continued to hold top spot among all the carmakers, followed by Mazda and Mitsubishi rounding out the top three, while sister companies Kia and Hyundai kept their positions in fourth and fifth respectively.

With electric brand Tesla now posting monthly results, the true picture of its sales pattern was clearer and it fell from its one-month top 10 placement with just 52 Model 3s flogged Down Under during the period – which meant it was outsold by new rival the Polestar 2, of which 93 were shifted.

Outside the top 10, Subaru (down 52 per cent), Honda (down 37 per cent), Skoda (down 36 per cent), Alfa Romeo (down 38 per cent), Volkswagen (down 45 per cent), Lexus (down 39 per cent), Peugeot (down 44 per cent) and Jeep (down 42 per cent) were the biggest strugglers among mainstream brands.

Successes came for other household names though, with Fiat (up 50 per cent), Citroën (up 667 per cent), Porsche (up 36 per cent), Ram (up 86 per cent), Renault (up 103 per cent), Chevrolet (up 63 per cent) and Suzuki (up 37 per cent) all posting large increases in April.

Utes were the country's most popular vehicle type again last month when combining 4x4 and 4x2 variants, with the former accounting for 15,047 units of a 18,662 total.

There were 16,274 medium SUVs that left showrooms compared to 16,686 in April 2021.

All SUV categories posted losses last month, with upper large SUVs worst affected with a 56 per cent drop – though the overall SUV share of the market barely changed, down by just one per cent for the month and down 0.2 per cent YTD.

Total SUV sales sat at 42,370 for April and 177,795 for 2022 so far (versus 49,176 in 2021 and 185,076 by this point the year before). For the year so far, medium SUVs and large SUVs however grew by two and four per cent.

Light-commercial vehicles increased its share by 0.7 per cent in April and 1.4 per cent YTD, again at the expense of passenger cars that were down 0.5 per cent of the market last month and 1.6 per cent YTD.

Micro cars, small cars, medium cars, sports cars and people movers all suffered falls of 13 per cent, 21 per cent, 15 per cent, 44 per cent and 37 per cent respectively.

Light, large and upper large car sales, however, grew seven per cent, 19 per cent and two per cent for the month.

Comparatively, year-to-date all these categories experienced losses – with the exception of medium cars, which were up 45 per cent.

In April, there were 866 electric vehicles sold compared to 286 in April 2021 and 7618 for 2022 so far – increases of 203 and 507 per cent.

Although the number of hybrids dropped from 7585 in April 2021 to 6277 last month, a decrease of 17 per cent for the month, things were still looking positive with a 13 per cent hike for the year-to-date.

Plug-in hybrid numbers were up 153 per cent with 628 sold in April and 1675 for 2022 (compared to 248 in April last year and 877 by this time in 2021).

Unstable petrol prices are partly responsible for the electric boom, though state-based incentives, such as those in NSW, VIC and recently announced in QLD, have also played a part.

Top 10 models

The Toyota HiLux ute kept the top spot with 4493 for April and 18,671 YTD, compared to 3581 for its regular rival, the Ford Ranger, which came in second place for the month – but came in third year-to-date with 13,241 sales. Coming in third was Australia’s most popular SUV, the Toyota RAV4, with 3373 units registered – though for the year so far it bested the Ranger, swapping into second YTD with 13,862 sales, despite having a rocky start to the year when it left the top 10 entirely in January.

After a bad month in February for the Mazda CX-5, its successes continued off the back of March with another solid period in April, selling 2701 cars thanks to the recent launch of the new model coming in fourth place – though that figure is down on March’s 3772 units. Looking at the year-to-date results, the CX-5 was fifth with 10,951 cars sold, an equal result to this time last year.

Top 10 spots also continued to be taken up by more utes, with Isuzu’s D-Max and Mitsubishi’s Triton occupying fifth and sixth places respectively with 2374 and 2357 sales in April. For the year so far, Isuzu shifted 8646 units of its D-Max, taking seventh overall, while Mitsi sold 12,852 Tritons to take fourth spot. Representing passenger cars in the top 10 were the ever-popular Hyundai i30, with 2071 finding homes last month (7924 YTD), coming in eighth for April and for the year to this point, and the Toyota Corolla – which, despite falling out of the top 10 multiple times since December last year – achieved 2202 sales in April making it seventh, but ninth YTD with 7239. Meanwhile, its Prado sibling came in 10th spot last month with 1031 units shifted, but did much better YTD taking sixth position with 9205 sold.

Rounding out the top models so far for 2022 was the MG ZS, remaining a popular choice with Australian buyers, with 7220 examples leaving showrooms. For the month the ZS took ninth, selling 1923 cars. Narrowly missing out on a spot were the Kia Sportage with 1327 sold, besting its Cerato sibling, which no longer enjoys a top 10 spot regularly, the Toyota Kluger with 1381, and the MG 3 with 1615 – the second time the latter has done well in 2022 with it posting a strong start and making the best-sellers list earlier this year.



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What is Adblue diesel exhaust fluid?

Adblue is an additive used in many newer diesel cars and has lately made news for being in short supply. So what is it and what does it do?

14 DEC 2021 by David BONNICI

What is AdBlue?

AdBlue is the marketing term for a fluid used in the catalytic convertor fitted to the exhaust systems of some diesel cars. It is injected into the exhaust gases and burnt at very high temperatures to break down harmful nitrogen oxides.

Some diesel engines need AdBlue to help them meet tough Euro 6 emissions standards that regulate what level of harmful emissions can come out of a car's exhaust.

January 25, 2022: A large AdBlue delivery begins across Australia

Which cars use it?

AdBlue is common in trucks and is now used in a number of late-model diesel cars and SUVs produced by a growing number of manufacturers including Renault, Citroen, BMW, Audi, Volkswagen, Ford, Mazda, and Toyota. Mercedes-Benz calls its AdBlue systems "BluTec".

What is AdBlue made from?

AdBlue is composed of deionised water and urea, an organic compound that is also used as a fertiliser, although the finished product is much purer.

Urea is in Urine... can you use that instead?

With the current AdBlue shortage, we'd (sorta kinda) love to say yes, but no, you can't. Your pee is only about 3.0 percent urea – the other bit is mostly water – which is well short of the 32.5 percent needed for AdBlue to do its thing.

How does AdBlue work?

AdBlue isn't mixed with the diesel fuel. Instead, it works with the exhaust gasses after they come out of the engine. It is stored in a separate storage tank with its own inlet, and is sprayed into the exhaust stream in measured doses. It then reacts with the nitrogen oxide in the exhaust gasses and, via the catalytic converter, is transformed into nitrogen and water.

MORE AdBlue shortage highlights fuel insecurity, but there is a solution

What Happens if I add AdBlue to the fuel tank?

If you accidentally pour AdBlue into the fuel tank, don't start the car. The fuel tank will need to be drained as it could damage the engine and corrode fuel lines.

Despite the harm caused by pouring AdBlue in the fuel tank, most cars have the two inlets next to each other – though you can clearly tell them apart as the AdBlue cap is generally blue and the pipe is too small for a fuel filler.

Do I need AdBlue for the car to run?

AdBlue isn't required for the engine to work. However, because it keeps emissions within legal requirements, the car's engine is programmed to stop

working if there is insufficient AdBlue, or another liquid in the tank. You should get sufficient warning via your car's multi-function display before this occurs.

What is AdBlue consumption like?

The average car uses about 5 percent of AdBlue as it does diesel fuel, which is about a litre for every 1000km travelled. The storage tank is designed to be big enough so the AdBlue lasts within scheduled service intervals. If you run low before your next service, you can top it up yourself.

Is it easy to top it up?

Topping up is as simple as refilling your window washer reservoir. However, while AdBlue is considered a non-hazardous liquid it is corrosive –be sure to wash any part of your body and the car paintwork affected by a spill. And don't forget the above warning about getting it in your fuel tank.



How much does AdBlue cost?

It's relatively inexpensive when compared with something like motor oil. That said, the price can fluctuate based on the cost of urea production, which requires plenty of energy, mostly in the form of natural gas. Prices can vary but for a ballpark figure a 2.0-litre bottle costs up to \$30 from a car dealership while for just \$2.50 more you can get a 10-litre bottle.

It's also available at auto-accessories stores from a range of brands, some which you'll recognise from their engine oils. Be sure to check if they're suitable for your vehicle. If in doubt buy it from your car manufacturer.

AdBlue has a shelf life of at least 12 months so you could get a couple of top ups out of it.



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The 10 greatest touring cars of all time (Part 1)

Door banging, fire spitting, kerb hopping monsters. These are the best tin-top race cars ever to grace circuits around the world.

18 JAN 2022

The definition of what constitutes a touring car has been muddled in recent times. If you take a classical view, a tin-top needs to start life as a road-going chassis before being promptly remodelled into a racing car. Modern rulesets have almost universally eradicated that distinction, with various homologation and spec-chassis requirements being dictated for top-flight touring car categories around the world.

Some context for how the decision for this list was made should be explained. First off, it was decided that any given manufacturer will only be able to muster one vehicle for the list, otherwise it would have just become an Audi, BMW, and Ford love-in. To compensate, those manufacturers with multiple contenders get the privilege of having an honour roll.

1988 Audi 200 Quattro Trans-Am

Let's start with arguably the most controversial choice. Not because it isn't a great touring car – quite the opposite – but because it isn't as revered culturally as what followed it.

Many people may not be aware the Audi 200 Quattro Trans-Am exists, such is the all-conquering legend of the 90 IMSA GTO that Ingolstadt unleashed as a follow-up. The 200 Quattro Trans-Am is everything we want from a touring car in a single package. It has genuine road-going connection, was used to successfully market a similar-looking and identically badged model to the public,



brought genuine innovation to a category, and looked wicked while doing it. Trans-Am racing was a relatively primitive thing in 1988. Big V8s stuffed into a tube frame body with the relative likeness of a road-going vehicle draped over the top. It was good ol' American boys doing good ol' American things. Problem was, with the Yanks becoming complacent,

they'd left the rulebook to stagnate. Then Audi, in typically German fashion, took one look at the ruleset and drove a turbocharged quattro bus through it.

You see, Audi's motorsport squad had a bunch of rally-bred drivetrains looking for a home, and the North American road business was in dire need of some much needed positive PR. A touring car match made in heaven.

Unlike its hand-built competition, the Audi Trans-Am competitor started life as a road car chassis – adding credence to its spot on this list. Powering the 200 was a 2.1-litre turbocharged five-cylinder, which on paper would have seemed entirely outgunned by the current crop of Trans-Am 5.0-litre atmo V8s. This wasn't any old five-pot though, it was the howling demon that had rocketed Audi's factory rally aces through the world's forests in the final years of Group B.

The nail in the competition's coffin was Audi's use of all-wheel drive. With a centre and rear differential, the 200 Quattro was able to utterly dominate the season, winning eight of 13 events. It may not be as loved as the 90, but ultimately the 200 was more road-relevant and more successful. While popular mythology dictates that it was the GTO that had the Americans changing the rules to ban it from competition in a strop, it was actually the 200 that received that honour – prompting the creation of the 90.

Morris Cooper

You've all seen the videos. A David versus Goliath battle where something big, powerful, and likely American dices for several laps with the diminutive and agile Morris Cooper.

Motorsport in the '60s was a playground for Mini drivers, who were able to use their vehicle's light weight and superior dynamics to harass and harangue the competition to great effect.

Across an 18 year period the Mini won seven British Saloon Car Championship titles, and a pair of European Touring Car Championship crowns.

It's not just Europe that had to fend off the Mini swarm. At the 1966 Gallaher 500 Minis claimed the first nine outright finishing positions in dominant fashion. No other car – Australian-built or not – has been able to repeat such a feat. Proving the car's versatility was its domination of rallying during the same period.



Holden VT Commodore

Forgive our parochialism for a brief moment, but you simply cannot have a list of greatest touring cars without a V8 Supercar-era Australian Touring Car Championship Ford Falcon or Holden Commodore.



Choosing the Commodore over the Falcon is no doubt a controversial one for 50 per cent of the population, but the Blue Oval's exploits internationally meant the Falcon was going to be

a hard sell.

Why the VT? Two simple reasons. It is the most successful car in ATCC history on a per-race basis, crossing the line in first place in 63 races in just three seasons. While other models have larger win tallies, they did so over a larger window of opportunity.

The second, and perhaps most important reason, is that the VT went on to become the most popular Commodore ever sold. In excess of 300,000 units were sold between 1997-2000. Now, we aren't saying the on-track success of the V8 Supercar was the sole reason for the commercial boon. However, having the likes of Mark Skaife, Craig Lowndes, Garth Tander, Larry Perkins and Greg Murphy using your product to thrash the competition no doubt helped the Win on Sunday, Sell on Monday pipeline. Bathurst 1000 victories in 1999 and 2000 seals the deal.



Ford Sierra Cosworth RS 500

Hark the V8 killer, Ford's indomitable RS 500. Powered by a 2.0-litre turbo-charged four-cylinder engine, the forced induction did most – nay, all – of the heavy lifting when it came to propelling the boxy two-door around the world's circuits.

Homologated under Group A regulations, the RS 500 earned a fearsome reputation for being a laggy, spiky thing. But for those who could tame it, the Sierra was an absolute weapon. Spitting fire and fluttering its turbo from afar as it galloped into the distance.

Australians will be familiar with the RS 500 from the infamous 1987 Bathurst 1000 when the car was first over the line, but ultimately disqualified. Better yet was Dick Johnson, who undeniably built the fastest RS 500's in the world. Forget the Euros, if you wanted a rocketship Sierra, it needed to come from DJR in Queensland.



Honourable mentions

BA Ford Falcon XR8 In terms of light after the dark of the AU years, the BA Falcon is a blazing hot sun. It claimed three V8 Supercars titles at the hands of Marcos Ambrose ('03/'04) and Russell Ingall ('05) as well as an emotional Bathurst 1000 win in 2006 with Lowndes/Whincup.

Ford Mondeo BTCC F1-level budgets, with F1-calibre drivers, being poured into a regional touring car championship was always going to produce spectacular results. Mr Mondeo Man was never cooler (or faster) than this.

Ford Mustang The Blue Oval's iconic pony car has been thrashing the competition in touring car races around the globe for decades. Supercars Gen3 Mustang looks set to be the fastest of the lot.

Ford Capri Ford's German team went all out trying to thrash BMW in the European Touring Car Championship in the '70s, building a poster boy for touring car visuals in the process.

BMW E9 3.0 CSL 'Batmobile'

Aside from having one of the coolest nicknames bestowed upon a race car, BMW's E9 3.0 CSL was a dominant force in global touring car racing from the brand in the '70s. In 1973 the car took out the European Touring Car Championship (ETCC), along with class honours at the 24 Hours of Le Mans the same year. The car would then win every ETCC season from 1975-79. It was the first race car to feature BMW M Division's distinctive red, white and blue colours. Beyond that success though, the 3.0 CSL earns its place on this list through sheer significance. It forged a path for BMW's motorsport future, and looked damn cool while doing it!



Honourable mention

BMW E30 M3 You didn't think we'd forgotten about BMW's ever-popular homologation hero, did you?

Part 2 will continue in the next edition of Exhaust Notes

EV charging levels and plugs explained

Electric vehicles have three levels of charging offering slow to ultra-rapid speeds. Let's have a look at each one

24 DEC 2021 by [David BONNICI](#)

One of the challenges of electrification will be the breaking of old habits. We're all so used to visiting a service station to fill up our petrol or diesel cars, it will take time to adjust to the new normal of topping up our electric ones. While charging an electric vehicle is simple, there are several ways to do it that involve different charging times and costs. One of the first things you'll hear about when it comes to plugging in an [EV](#) is the different levels of charging. This can be broken down into three categories – Levels 1, 2 and 3.

Level 1 – AC trickle charging

This is basic home charging where you plug the car into a standard 240-volt AC (alternating current) socket. While convenient, it is the slowest method, offering about 2.3kW of power through a normal 10-amp socket.

How to work out Level 1 charging time for battery capacity

Calculating this is quite simple – just divide the battery capacity by two to gain an approximate time for a full (0% to 100%) charge.

For example:

The Mitsubishi Outlander PHEV has a 13.8kW battery - divide that by (2.3kW) and you get about six hours.

The Nissan Leaf's 40kW battery takes about 17.5 hours.

The Mercedes EQC 400 80kW battery will take about 34.7 hours.

Of course, these times will be less if the the battery is already partially charged – 50 per cent charge will require half the time, which is why it's a good idea to top up whenever you can.

How to work out EV charging times for distance

If you want to know how long you'll need to charge your car to travel a certain distance, the charging capacity in kW is the same value as the kilometres you'll get from 10 minutes of charging.

For example, if you are using a 2.3kW Level 1 (home type) charger you will get around two kilometres for every 10 minutes of charging.



Level 2 - AC fast charging

While Level 1 charging will usually be convenient for plug-in-hybrids that can be fully topped up overnight, you might need something faster for a full battery-electric vehicle (BEV) with a much bigger battery.

The good news is there is a quicker home option by installing a Level 2 (wall-box) charger, which increases the charging power to 7.5kW from a single phase 32amp connection.

This brings charging times down considerably, with the Mitsubishi Outlander PHEV gaining a full charge from empty in two hours, and the Nissan Leaf and Mercedes-Benz EQ 5.5 and 11 hours respectively.

And you'll get a 7.5km travel range for every 10 minutes, meaning about 45km after an hour's charging – which is enough for the average Aussie commute.

A 7.5kW Level 2 charging unit works off standard 240-volt single-phase 32 amp wiring with the wall-box costing around \$700 to \$1500 dollars.

22kW charger

Level 2 charging can also increase to 22kW capacity if you have 415-volt three-phase power available. With 22kW you can get 22km for every 10 minutes of charging, so just an hour of plug time will get you about 130km.

Level 3 - DC rapid charging

These are the public DC chargers (480-volt/direct current) including Tesla Superchargers, that are crucial in making EVs viable for driving long distances with little downtime for charging.

Charging capacity ranges from 50kW on a rapid charger up to 350kW on an ultra-rapid unit.

It's worth noting that lower capacity EVs, such as plug-in hybrids and the Nissan Leaf, MG ZS EV and Lexus UX300e can use 350kW chargers, but will still only charge at a rate of about 50kW.

Higher-capacity models such as the Tesla Model S, Mercedes-Benz EQC, Ioniq 5 and Audi E-Tron will have a maximum charging capacity of around 110-150kW – which brings more than 100km every 10 minutes. Most PHEV models can only connect to AC chargers, the Mitsubishi Eclipse Cross PHEV being an exception.

0-80 per cent charge time

You may have noticed carmakers often provide a DC charging time based on a battery being charged up to 80 per cent instead of 100 per cent.

This is because the internal resistance of a battery rises as the state of charge increases. In other words, the more the battery is charged the slower and less efficient it is to keep charging it. As a result, charging is quickest when the battery is flat. After an initial burst, the charger settles into a constant rate until the battery reaches about 80 per cent full.



EV charging plugs and sockets

There are different kinds of EV plugs and sockets, which threatened to make the rolling out of charging networks in Australia quite complicated.

The good news for Australian drivers is there is now a standard for AC charging (Type 2) ... but it's a different matter when it comes to DC rapid charging.

Type 1 AC

Also referred to as J1772 or SAE J1772, this is the standard AC-plug in North America and Japan and is found in Australia on some early adopter vehicles and chargers.

It has a five-pin design. The two small pins connect data between the car and charger to determine the maximum current available to the vehicle – which prevents the car from moving while still connected. The three larger pins are for the 110/240-volt AC power connection, including the earth. Because there are few public chargers with Type 1, early adopter vehicles can use a Type 2 adaptor.

Type 2 AC

Also referred to as the IEC 62196 or Mennekes plug, **this is the standard port in Australia and Europe for AC charging** and is used by European and American EV manufacturers, including Tesla.

The Type 2 plug has a seven-pin design, with five power pins to support three-phase charging. While Teslas use a Type 2 plug, its chargers will only top up Tesla vehicles thanks to an electronic 'lock' that prevents other EV owners from charging on the firm's network. All plug-in hybrid models in Australia, are equipped with Type 2 charging ports. EVs with CCS2 sockets can accept Type 2 plugs



CCS2

Short for Combined Charging System, *CCS* can be used for AC and DC chargers. This is the ideal charging port for Australia as it can connect to CCS DC rapid chargers and Type 2 AC chargers. These are becoming more and more popular and can be retrofitted to existing models with only Type 2 sockets.



CHAdEMO



This is an abbreviation for Charge de Move, which is French for 'move using charge'. It is the standard **DC port** in Japanese-built EVs and PHEVs such as; the Nissan Leaf, Mitsubishi Eclipse-Cross PHEV and Lexus UX300e, though Tesla models can use a CHAdEMO via an adaptor. Most vehicles with CHAdEMO sockets also have a Type 2 socket for AC charging.



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