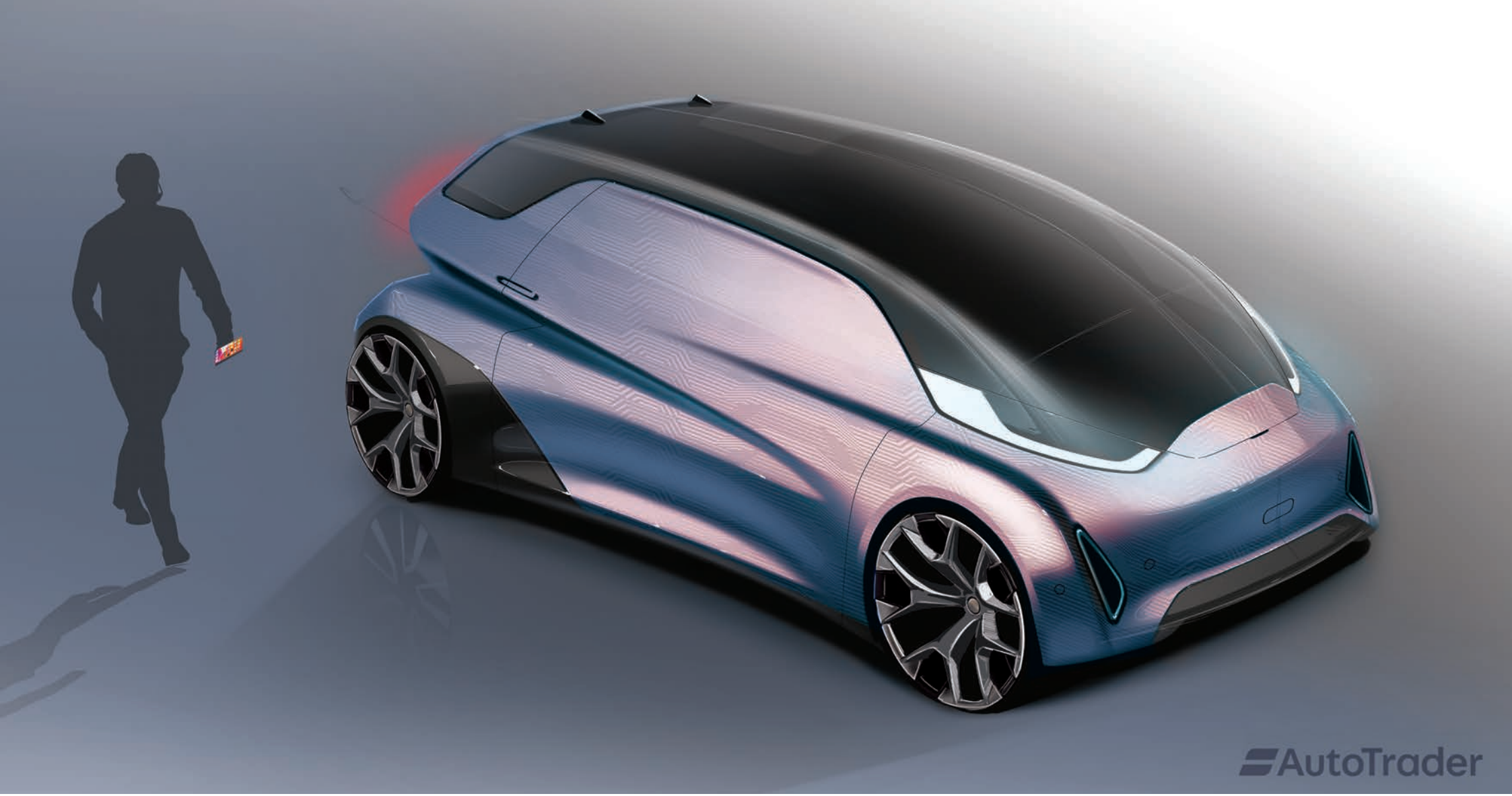


Cars Of The Future

Report by Auto Trader
February 2020

AutoTrader

We are the UK's largest digital automotive marketplace and have helped millions of drivers find their next new car – so we wanted to share our insights into what a new car might look like in 10, 20 and even 30 years' time, as the automotive industry evolves.

This report combines leading futurology insights with drivers' attitudes towards the evolution of motoring to build a considered picture of what the future may hold for the car industry.

Here, we take a look at key advancements in technology and innovation, car buyer demand and purchasing habits, and more.

Source:
Futurology report by Tom Cheesewright, the world's first 'applied futurist', January 2020. Consumer data taken from the findings of a nationally representative survey of 2,142 UK drivers, January 2020.

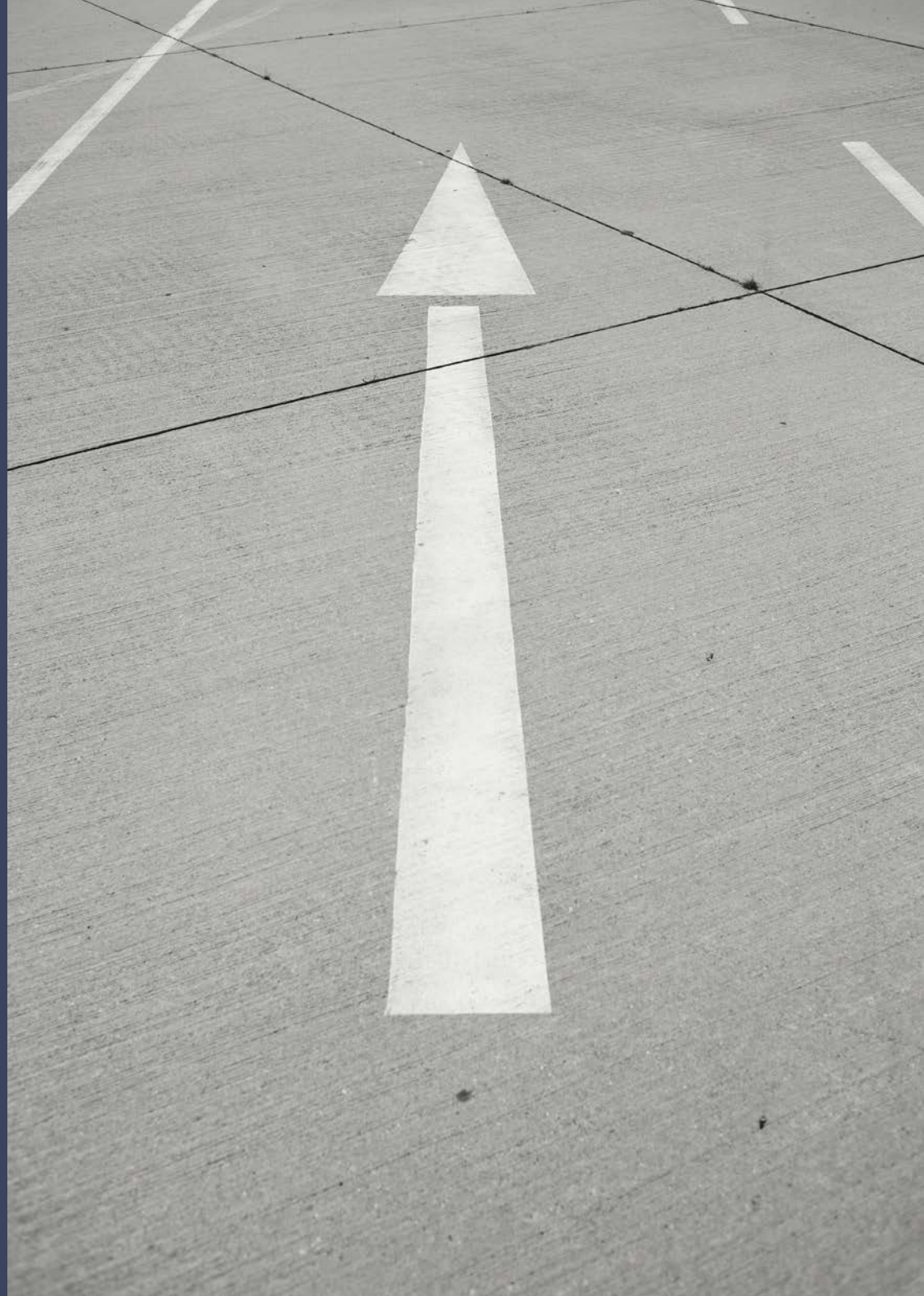
Cars of the Future - Futurologist Insights

Tom Cheesewright is the world's first 'applied futurist' and a leading UK futurist speaker, commentator and consultant on technology and tomorrow. The following predictions were made using the Intersections methodology.

This looks for the collision of macro trends driven by technology with major pressure points affecting the market. These include the environment, economy, population and demography, political and social trends.

Possible intersections are then refined by examining existing business conditions, market forecasts, and technology developments to try to put a timeline on events.

Note that in forecasting it is always easier to say what will happen than when it will happen as so many forces can accelerate or delay particular shifts.



2020-2030: The last decade of the combustion engine

Manufacturers squeeze last few years from petrol power

Retro conversions grow in popularity

Electric vehicles dominate in every metric by 2030

Flying taxis in cities around the world

Many high street garages face closing unless they change operations and understanding of new vehicles.

The rate of sale of alternatively fuelled vehicles (AFV) is growing almost exponentially, from just 1.7% of vehicles in 2018, to 9.9% of vehicles in the last months of 2019 (SMMT).

With the average age of a car on British roads hovering at around 8 years though, that suggests that even if this incredible growth continues, the majority of cars on the road will still be powered by the internal combustion engine (ICE).

New cars will look very different. Battery technology looks set to advance dramatically in the next decade with money pouring into research. While we are unlikely to have commercialised new battery chemistries (like metal-air) at scale yet, incremental improvements in range, power and safety will see range anxiety largely a thing of the past.

Battery electric vehicles (BEV) will dominate in every performance metric, including safety, comfort, speed, and range.

The scaling up of European manufacturing, and particularly recycling efforts of batteries (see recent announcements from BASF and Northvolt) will help to bring down the cost of BEVs, and also allay fears about the carbon cost of their manufacture, and any ethical issues about the extraction of lithium and other component elements like cobalt.

Increases in safety and performance will be helped with the continuing advancements in materials science, lowering weight and adding rigidity. This will be powered by a combination of refinements to existing core materials, like advanced high strength steels, and newer materials, like graphene-doped carbon fibre.

The addition of graphene to other components, such as car tyres, will also improve performance and reduce wear, further extending the service intervals for BEVs.

This presents a growing challenge to the high street garage, which is going to be capable of servicing a declining pool of vehicles, which themselves need less and less maintenance. One ray of hope for them will be BEV conversions.

With the growing supply and falling cost of batteries, drive units and power electronics, there will likely be a small but profitable market in converting classic vehicles to electric power, as already evidenced by the success of small businesses like ZeroEV and the recent availability of electric ‘crate motors’ designed to be drop-in replacements for existing power plants.

The driving environment will likely be very different, with ramping focus on environmental impact and particularly on air pollution. Diesel’s decreasing popularity means they will be a rarity on the roads in 2030, but you might also find you get frowns if you’re driving an oversized petrol engine.

Expect clashes between young and eco-conscious city dwellers and those still choosing ostentatious ICE-driven 4x4s coming in from the countryside and the suburbs.

The car of 2030

Stronger, stiffer materials allow designers more flexibility, while maintaining safety, for example with pillar sizes and the amount of glass. Average performance will continue to increase along with the economy and range of BEV, PHEVs and ICE cars, as engines, motors and batteries improve, and weight comes down.

Your tyres will last longer and servicing intervals will likely increase, though remote monitoring as standard may see your car ask to be taken in for preventative maintenance now and again – especially given that 80-90% of cars are still likely to be bought on PCP. Cars will also be increasingly recyclable, with the introduction of some advanced materials delayed by their poor recyclability and high carbon cost in production.

Autonomy will come slowly to cars rather than all at once. Large manufacturers will continue to install driver aids, monitoring road conditions and driver performance and correcting as required, rather than pushing for semi-autonomy which carries its own risks: where the responsibility is shared, the driver often gets complacent.

Voice and gesture interfaces are increasingly the norm, with many dash instruments replaced by a smart screen in most vehicles. In-car AI gets increasingly branded and personalised.

By the end of the decade many cities around the world will have point-to-point (e.g. city to airport) ‘flying taxi’ services, though these won’t exactly be flying cars as they can’t drop and drive. Instead they are more like passenger-scale drones.

2030-2040: The electric decade

Improved battery technology eliminates range anxiety

Vans taken off the streets by rolling drones

First fully autonomous vehicles by decade's end

Rising array of alternative transport forms

The first 'lounge' cars

Large manufacturers have stalled on all-electric vehicles in the 2010s, with many instead choosing to extract maximum value from their experience and production capability with the internal combustion engine. Their electric programmes in the 2020s are increasingly reliant on external partnerships with Chinese giants like BYD and Geely, which may cost them in margins and in the development of their own intellectual property.

This will see many of the established manufacturers lose ground to new entrants. But it will take the new entrants time for them to establish scale and a credibility with car buyers – especially in an age where global trade is being challenged by protectionist policies and growing nationalism.

As a result, it is only in the 2030s that we will see the wholesale shift to all-electric. All new cars will be electric by 2035 in line with the UK government's deadline. While the deadline may be brought forward, some exemptions are likely to see the production of combustion engines well into the 2030s and beyond any newly-set deadline.

New brands from the US, China, India and Latin America will come to the roads in numbers by the 2030s and with sharp marketing and quirky design, they may well appeal to those choosing to own a vehicle.

But by the 2030s, fewer and fewer young people are likely to lust after cars so much. With the average age of the driving test already rising, and a social prestige increasingly focused on what you do, not what you own, manufacturers may struggle to sell young people on new cars. Especially with a range of other, smaller transport options available.

Car ownership will increasingly be something, like home ownership, that you consider later in life. Perhaps in your late 30s or 40s when you move out of the city.

This will be both a lifestyle and an economic choice, as the best prospect for cost-effective charging may be the home, where solar roofs and battery storage will be increasingly the norm.

Earlier in life we might look to different modes of transport, both public, private and shared. By the 2030s the UK government should have legislated to allow alternative forms of electric transport, which will be numerous and diverse – one wheel, two-wheels, or three, covered or uncovered.

The lines between electric bike and small car will be increasingly blurry, and these new options will be very affordable given the scale of production of batteries and motors.

For the young, driving might increasingly be a form of entertainment. The rising demand for risky and thrilling experiences may see a renaissance for motor sport participation.

This behaviour shift combined with improvements in battery technology diminishes the issue of charging points. Many homeowners will have local solar generation and storage. Fewer cars will be entering cities, driven by clean-air zones and improving alternatives.

The grid will still struggle in some places though, particularly in less-wealthy commuter suburbs or more rural villages and towns.

A good chunk of the logistics market will be in the hands of semi-autonomous rolling electric drones by the 2030s, though human cyclists will likely remain the most flexible and likely cost-competitive labour.

By 2040 the technological, legal, and legislative challenges to full autonomy in vehicles will have been overcome. Legislation will likely divide the road system into zones where different classes of vehicle can operate autonomously, from the simplest (motorways), to the most complex (city centres).

But there will still be some cultural battles to be won. Only the newest and most expensive vehicles will offer full autonomy, but this technology will rapidly start to trickle down.

The Car of 2040

By 2040, over half the cars on the road are likely to be alternative fuel vehicles with the vast majority of new cars being battery electric vehicles. Hydrogen will be an option and likely be used for larger vehicles. But the rapid progress and mass market adoption of battery technologies mean that it is likely to be used in only a small proportion of cars.

New materials will again have created new design possibilities for the car, and with the advent of full autonomy and heavy development of the electric powertrain, today's visions of the 'lounge car' might be realised: a sleek bubble with no driver's seat and instead, four facing seats around a shared table.

At lower price points, heavy customisation will be possible, thanks to the 'skateboard' layout of the electric drive train, all integrated into the chassis layer.

Multiple, and even flexible body shapes will be possible, and many cars will come with digital paint, allowing them to be recoloured using an app on your smart device, or resprayed in mixed reality.

At this point there will be practical, and road-legal flying car options for the super-rich, but their use will still be heavily restricted, particularly in built-up areas.

2040-2050: The self-driving decade

Full autonomy becomes widely available

Subscription mobility services beat car ownership

Digital personalisation, tailoring every ride to your preferences

Cars as social spaces for people living at home/in shared house

Interaction of mobility services and social graph to create serendipitous meetings

The 2040s is the earliest point at which the vision of full autonomy is likely to be realised. Early successes have inflated people's expectations for the technology but there is a long way to go before fully autonomous vehicles can be relied upon to pilot themselves around cities and towns in all conditions.

When they can, the business model for cars begins to change radically. The more flexible model adopted by young urbanites of mixing ride sharing with small electric vehicles and public transport gets productised by the car brands into subscription-based 'mobility as a service', realising the car industry's CASE vision: connected, autonomous, shared, electric.

Your subscription brand will define the comfort and style in which you move, whether it's a premium experience or a more standard class ride, in an autonomous vehicle or on a train. Car ownership begins to decline markedly for all those living in easy range of big mobility hubs. The car becomes a space to do things, rather than an activity in itself (except for entertainment).

That may mean working on the move, or leisure activities. Your subscription will include a measure of personalisation, ensuring that the car that picks you up is tailored to your needs. That might mean external style and colouring – even branding, with digital paint.

Inside, you will be welcomed by the car AI with your preferences in terms of speed and driving style, music, temperature and seating position. Cars increasingly become venues for socialising, an escape, particularly for those in shared housing or living with their parents later in life.

Rising numbers of autonomous vehicles drives changes to planning decisions. Without human drivers to get frustrated, and less demand for parking, it is easier for planners to make streets more friendly for humans. Though this doesn't make the cost of works any cheaper and the loss of fuel duty and parking revenues will put pressure on public spending.

Office developments and homes are equipped with less and less parking, allowing homes to expand and offices to offer more flexible layouts.

Flexible working is increasingly the norm at this point, but the autonomous vehicle helps to support the demand for working and meeting face to face. Despite a plethora of digital options, people still choose to meet and work together rather than separately, at least some of the time.

The car of 2050

The car of 2050 is an incredibly sophisticated AI by today's standards, capable of processing the data from an enormous array of sensors and external data sources, communicating with other vehicles and street furniture, and navigating anywhere in the country based only on a voice command.

It is extremely efficient, manufactured from light-weight materials, highly aerodynamic, and capable of advanced energy recovery from braking. This, combined with new battery technologies, means it can run for a full day or over 1,000 miles without recharging.

When not in use, most cars live in giant hangars where they are serviced and recharged before being sent out on the road again the next day.

Most of the servicing and maintenance is fully automated, with the cars being designed to allow robot handling of tyre and fluid changes, body panel replacement, and battery rotation. A small number of humans oversee the process and handle more complex tasks.

Cars come in a variety of configurations from single person pods, to larger group vehicles designed for social travel. Interaction between mobility apps, social networks and dating sites allow automated journey matching, creating serendipitous meetings between friends, family or love interests.

Your personal AI interacts with your mobility service to match long travel periods to binge-watching of favourite series, gaming sessions or business meetings.

Evolution Of The Car

1. **1930** Ford
Car Radios – the first car radio was invented, costing the equivalent of $3750

2. **1940** Packard
Air Conditioning – the first car to have factory-installed A/C was the 1940 Packard

3. **1940** Packard
Electric Windows – the first power windows used a hydro-electric mechanism

4. **1966** Cadillac
Heated Seats – the Cadillac de Ville convertible was the first car to offer heated seats

5. **1968**
Air Bags – the world's first electromechanical automotive airbag system was designed

6. **1986** Buick
Touch Screen – the world's first production car with a touchscreen was the 1986 Riviera, offering climate control and radio features

7. **1995** Oldsmobile
GPS Navigation – the first built in GPS system required an antenna, a computer in the trunk and a data cassette

8. **1995** Mitsubishi
Autonomous Cruise Control – Mitsubishi Dimante debuted cruise control in Japan

9. **1999** Chrysler
Bluetooth technology – the first Bluetooth capable system was introduced

10. **2020-2030**
Battery Technology – battery electric vehicles (BEV) will dominate in every performance metric

11. **2030**
Decline of Diesel – increased environmental concerns are likely to make Diesel engines a rarity on the road

12. **2030**
Recyclable Cars – cars will be increasingly recyclable

13. **2030**
Flying Taxi – point-to-point passenger-scale drones in main cities around the world

14. **2030 - 2035**
Electric Shift – all new cars will be electric by the end of the decade in line with the government's deadline

15. **2040**
Divided Roads – legislation will divide roads into zones where different vehicles can operate autonomously

16. **2040 - 2050**
Full Autonomy – the 2040s is the earliest point at which fully autonomous cars will exist

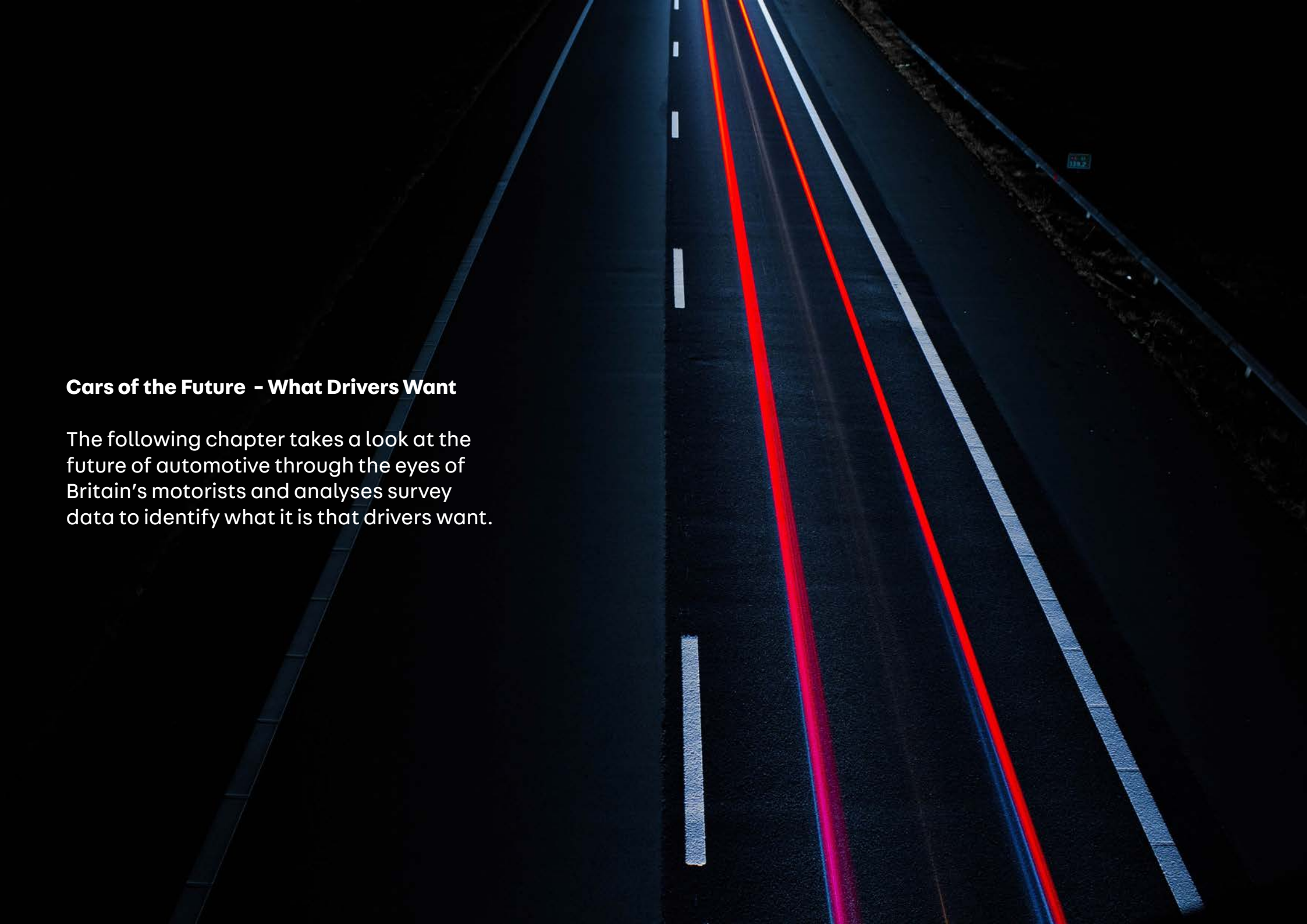
17. **2040 - 2050**
Subscription services – a flexible subscription-based car model will be adopted by young urbanites

18. **2050**
Long-lasting lives – battery technology advances mean cars can run for a full day or over 1000 miles without recharging

19. **2050**
Social Travel – autonomous cars will now be available as group vehicles designed for social travel

20. **2050**
Apps - Interaction between mobility apps, social networks and dating sites allow automated journey matching

AutoTrader



Cars of the Future - What Drivers Want

The following chapter takes a look at the future of automotive through the eyes of Britain's motorists and analyses survey data to identify what it is that drivers want.

Electric Dreams!

British motorists are certainly dreaming of an electric future. But what needs to change in order for this dream to become a reality?

Our data has found that 42% of motorists believe that most cars will be electric in future and whilst currently just two percent of our respondents already drive an electric car, the data shows a clear shift in attitudes in favour of going green as 91% say they would consider purchasing an electric model in the future.

However, for the time being it is clear that there are a number of barriers preventing those electric dreams from becoming a reality.

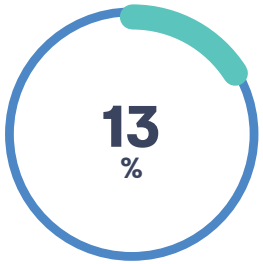
The biggest turnoff for the average motorist currently is price, with nearly a third (31%) of consumers saying they would consider purchasing an electric vehicle if it were a more financially viable option. 1 in 5 said they would consider making the purchase if the government offered better subsidies and if installing a home charging point was more affordable.

13% even said they would consider converting their current cars engine into an electric model, if it were cost effective to do so.

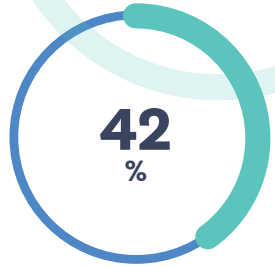
Range anxiety still continues to be a worry for motorists. Almost 1 in 4 (24%) said they would be more likely to purchase an EV if it could travel the same distance as a petrol or diesel vehicle on a single charge and 24% said there would need to be more publicly accessible charging points before they'd consider making the purchase.

In fact, when quizzed on the innovations they'd like to see entering the automotive landscape in future, the innovation that came out on top of the list was self-charging cars (30%).

Electric cars are definitely proving more appealing amongst the younger generation, with 8% of those aged between 16-24 already claiming to drive an electric model, compared to just 0.5% of those over the age of 45. Additionally, 15% of over 55s say they will never buy an electric car.



13% even said they would consider converting their current cars engine into an electric model, if it were cost effective to do so.



42% of motorists believe that most cars will be electric in the future.

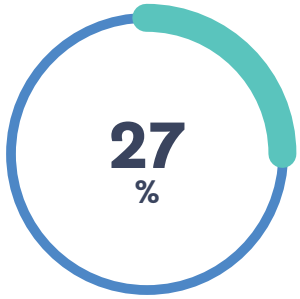
Attitudes towards going electric:

Attitudes to autonomous vehicles

There's currently a lot of anxiety surrounding the safety of self-driving (or autonomous) cars. It appears motorists aren't quite ready to trust the technology yet, despite growing numbers of successful trials of the technology.

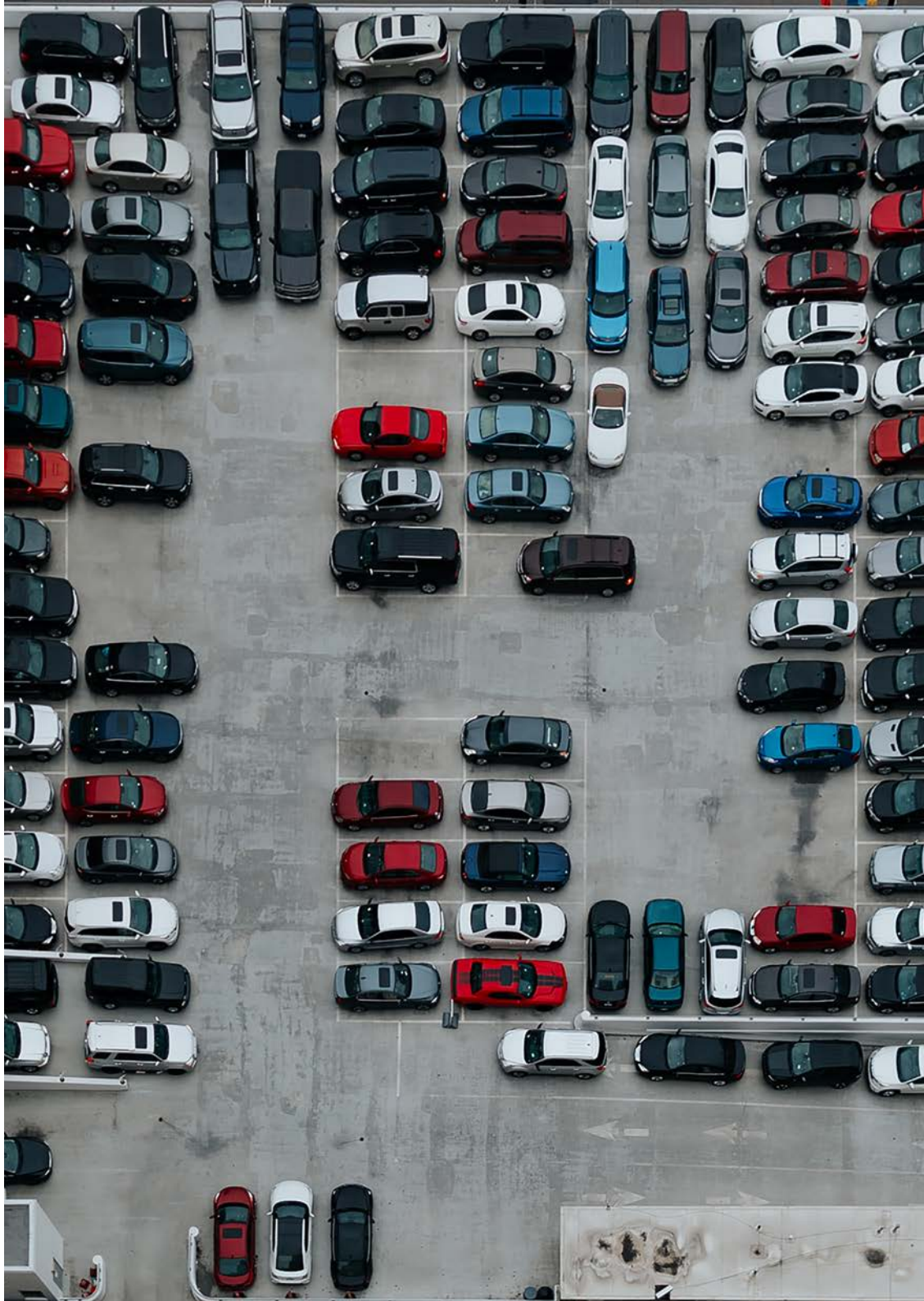
We surveyed drivers on their attitudes towards autonomous vehicles and 27% say they don't trust self-driving cars to keep them safe on the road but 1 in 4 say they would consider purchasing an autonomous vehicle if they could be convinced it was totally safe safe.

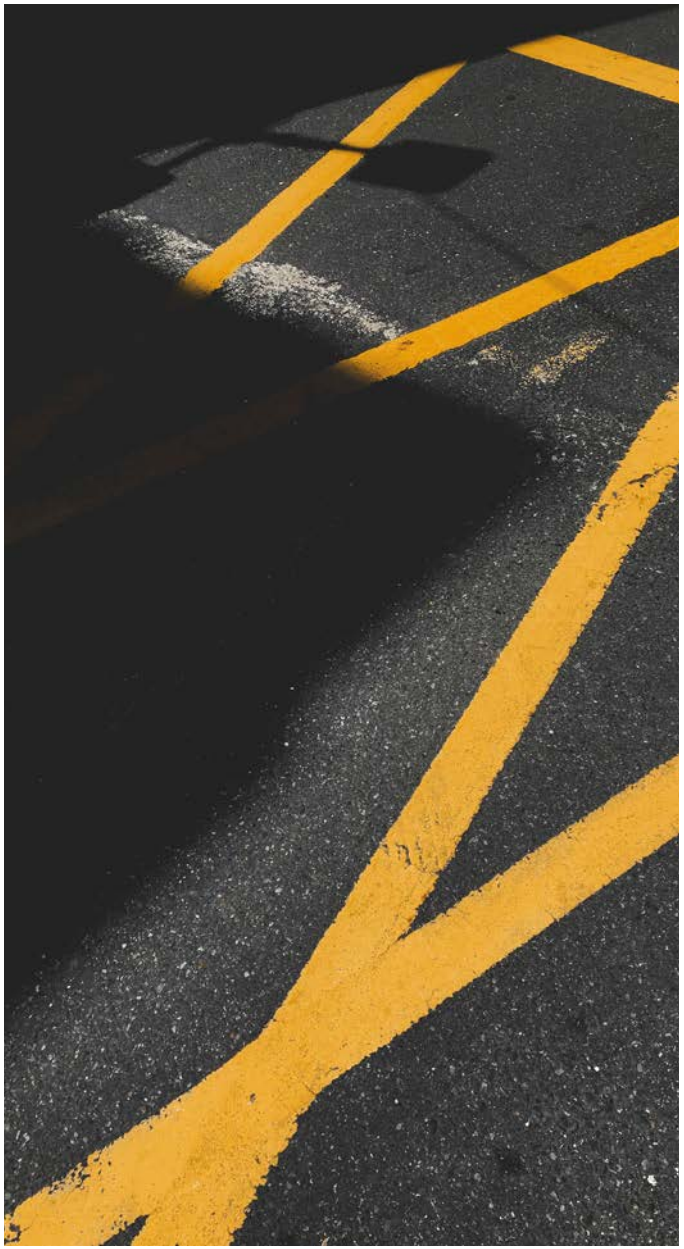
18% said they would consider purchasing an autonomous car if it were more affordable.



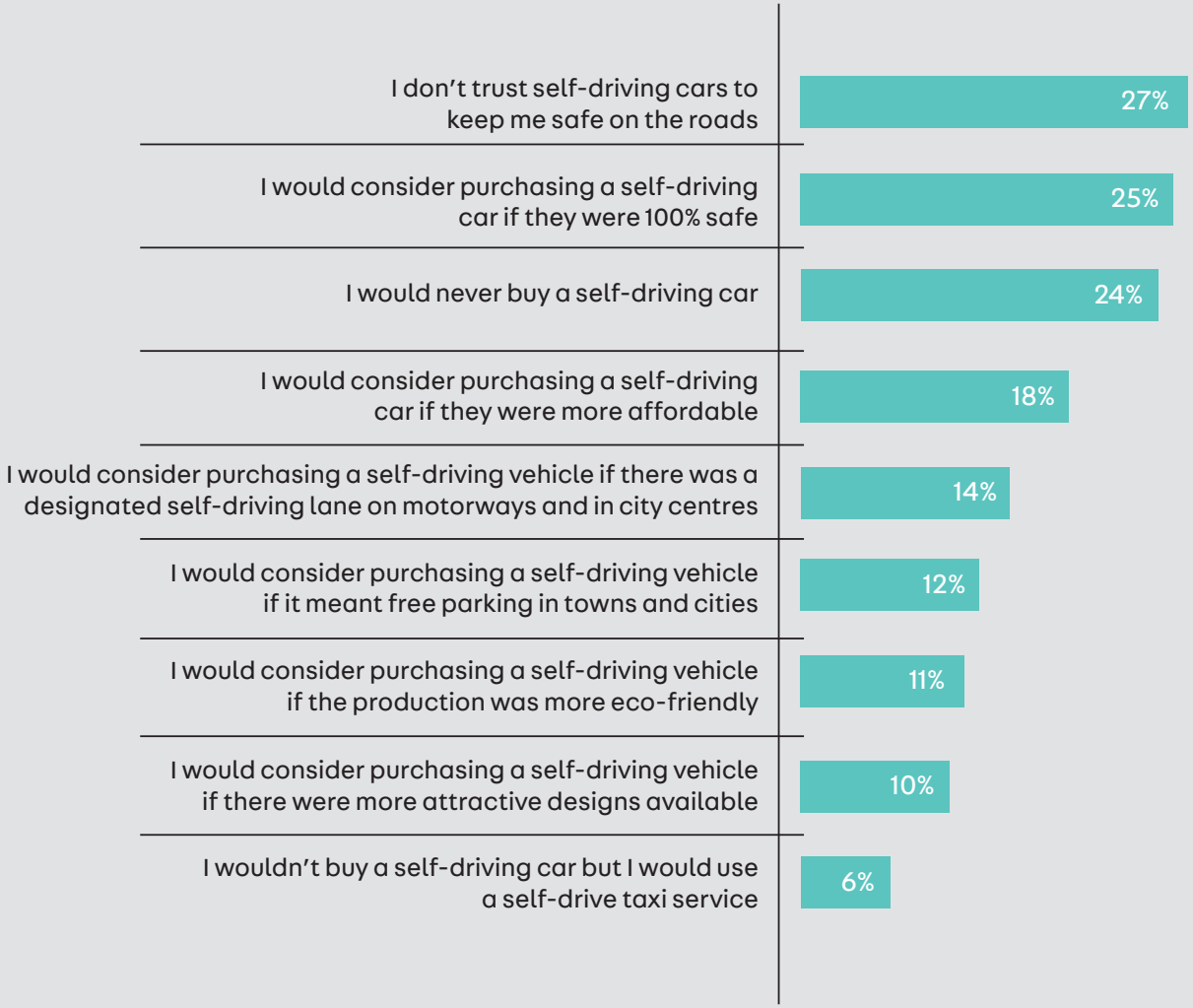
27% said they don't trust self-driving cars to keep them safe on the road.

A number of other incentives appeared to sway opinions, with 18% saying they would consider purchasing an autonomous car if it were more affordable, 14% interested in purchasing if there were designated self-driving lanes on motorways and in city centres, and a further 12% expressing interest if it meant free parking in towns and cities.





Attitudes towards autonomous vehicles:



We thought it would be interesting to explore the ways in which autonomous vehicles might shake up the role that cars play in daily life, if they were to become commonplace in future.

Taking inspiration from our futurology insights, we asked our respondents to imagine a self-driving car that takes the form of a pod with no driving seat, but instead just seats lining the inside and plenty of space in the middle. We then asked them: 'In what ways, if any, might you make use of your time in the self-driving car?'

The results showed that people would largely enjoy being able to take some time to themselves.

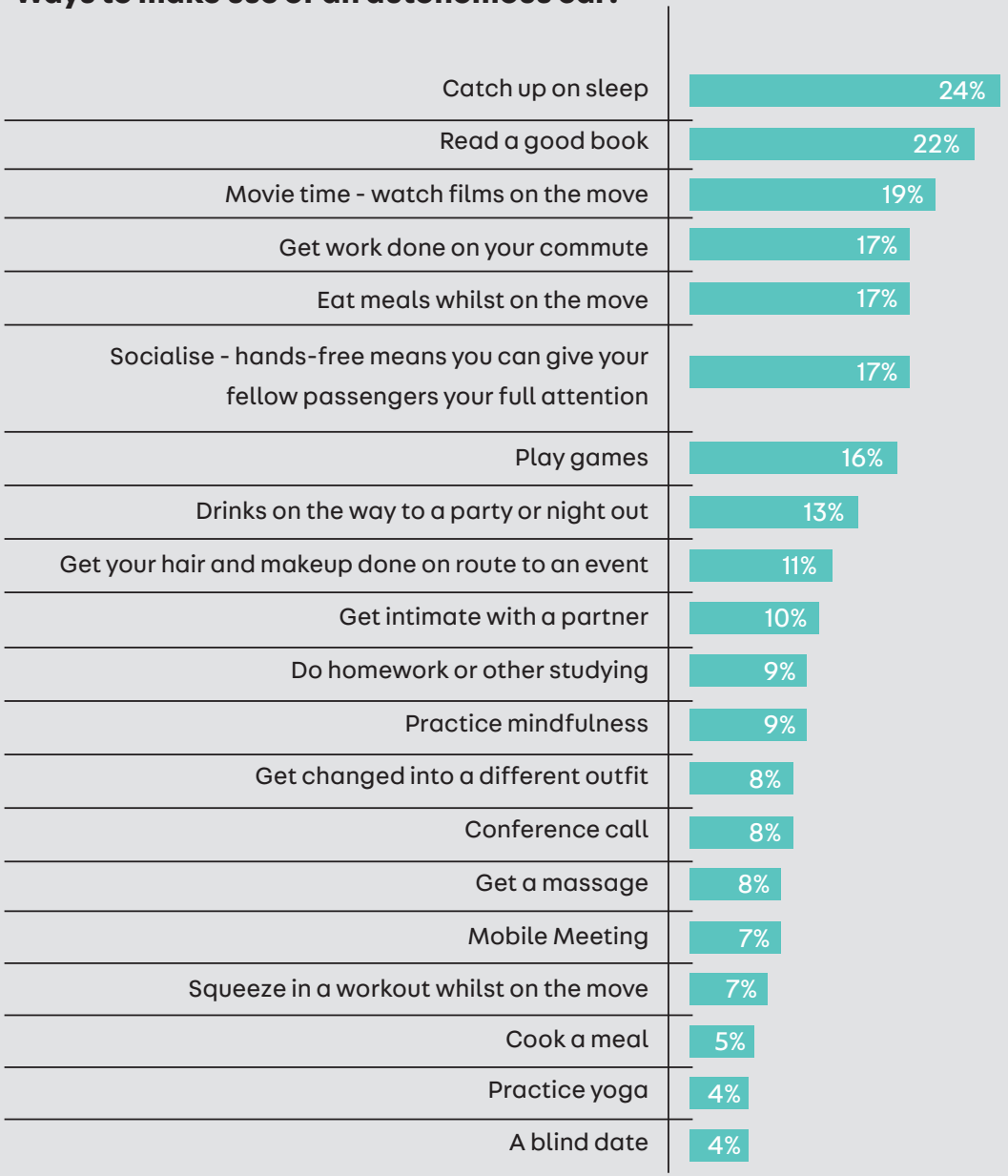
The most popular response was catching up on sleep, which 24% of respondents chose. Read a good book was the second most popular averaging 22%. 26% of women selected this option, compared to 18% of men – and 19% said they would watch movies on the go. An additional 17% said they would use the time to get work done on their commute.

Smaller proportions of our respondents suggested they might like to use the time for more social activities. Indeed, 17% said they would use the time for socialising and 16% would play games.

There was also an appetite for using self-driving cars in the run up to an event or night out. 15% of women say they would use the space to get their hair and makeup done on route to an event and 13% would take advantage of not needing to drive by having a few drinks on the way to a party or night out.

A brazen 13% of men say they would like to get intimate with a partner in a self-driving car – you've heard of the mile high club, but what about the 100mph club? However, only 6% of women selected this option.

Ways to make use of an autonomous car:



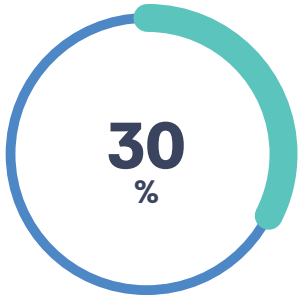
The Nation's most desired innovations

When it comes to futuristic innovations, it transpires that we Brits like to keep things relatively uncomplicated.

We asked our sample of drivers what innovations, if any, they'd like to see become commonplace in the automotive industry and the responses show that drivers would value practical innovations more than cosmetic add-ons.

The innovation that drivers would be most interested by would be the invention of self-charging cars – 30% of our respondents said they'd like to see this idea become commonplace in the industry.

18% said they'd like recyclable cars to become available.



30% said they would be interested in the invention of self-charging cars.

The ability to self-charge would certainly take the hassle and expense out of stopping to fill up, as well as removing the age-old worry of "can I make it to the fuel station before the tank runs out...?"

The second favourite innovation was in-car WiFi (29%) followed by electric vehicles (24%) and then hydrogen-powered vehicles (19%) – cars which run on water.

In-keeping with growing global concerns around the need to protect the planet, 18% also said they'd like recyclable cars to become available.

Some of the more out there innovations that a proportion of motorists would like to see become commonplace include tech that translates foreign road sides into your language (13%), car seats that convert into beds (11%) and digital paint that allows passengers to change the colour of their car from an app (11%).

1 in 10 are also hoping amphibious cars will come into their own (that's cars that can drive on water as well as roads!).

Interestingly, fewer than 10% said they'd like flying cars to become commonplace in the automotive industry and fans of the James Bond film *Die Another Day* will be sorry to discover that just 4% said they'd like cars that can become invisible to be common in the future.

What innovations, if any, would you like to see become commonplace in the automotive industry?

Self-charging cars	30%
In-car WiFi	29%
Electric vehicles	24%
Hydrogen vehicles (water powered)	19%
Recyclable cars	18%
Self-driving (autonomous) cars	14%
Tech that translates foreign road signs into your chosen language	13%
Designated motorway lanes for electric cars	12%
Designated motorway lanes for self-driving cars	12%
Car seats that convert into beds	11%
Digital paint (that allows you to change the colour of your car from an app)	11%
Cars operated by voice command	10%
Amphibious cars (that can drive on water as well as roads)	10%
Drones delivering consumer goods (instead of delivery vans)	10%
Flying cars	9%
Total black out windows for privacy	9%
Drone emergency service vehicles to reduce response time	9%
Subscription taxi services (pay a monthly fee for unlimited rides)	8%
Scalability of size (e.g. switching between a two-person getaway car and a family car)	8%
Hover cars	8%
Interchangeable landscapes for your car's interior, e.g. a beach, outerspace, a rainforest, etc.	6%
Transformer-style mechanics that allow you to reshape a car to your preferred design	6%
A choice of celebrity voices for your car's AI interface	5%
Colour changing seats	5%
Cars that blend into their environment	5%
Drone taxis	5%
Cars that can become invisible	4%

Summary

So what does the car of the future look like?

Futurologist, Tom Cheesewright, shares his thoughts below:

Design will continue to be driven by all the same demands: efficiency, comfort, and safety. But advancements in mechanics and the continuing evolution of materials science will release designers from many current constraints.

The stable four-wheel design remains, unless our roads continue to deteriorate, in which case we might need an extra two to drag us out of particularly large potholes.

The low centre of gravity provided by the 'skateboard' electric layout, combined with lighter body materials, means that cars could actually be taller with limited impact on safety or efficiency, creating easier access through larger doors, and allowing more headroom in a larger cabin.

These larger doors are more likely to slide than hinge or rise in a 'gullwing' design so popular on futuristic designs of the past, which might be impractical with their size. Ultimately the removal of the need for a driver means that larger 'group' cars are likely to be oriented in a face to face layout with two or three seats side by side, either over a space or around a table.

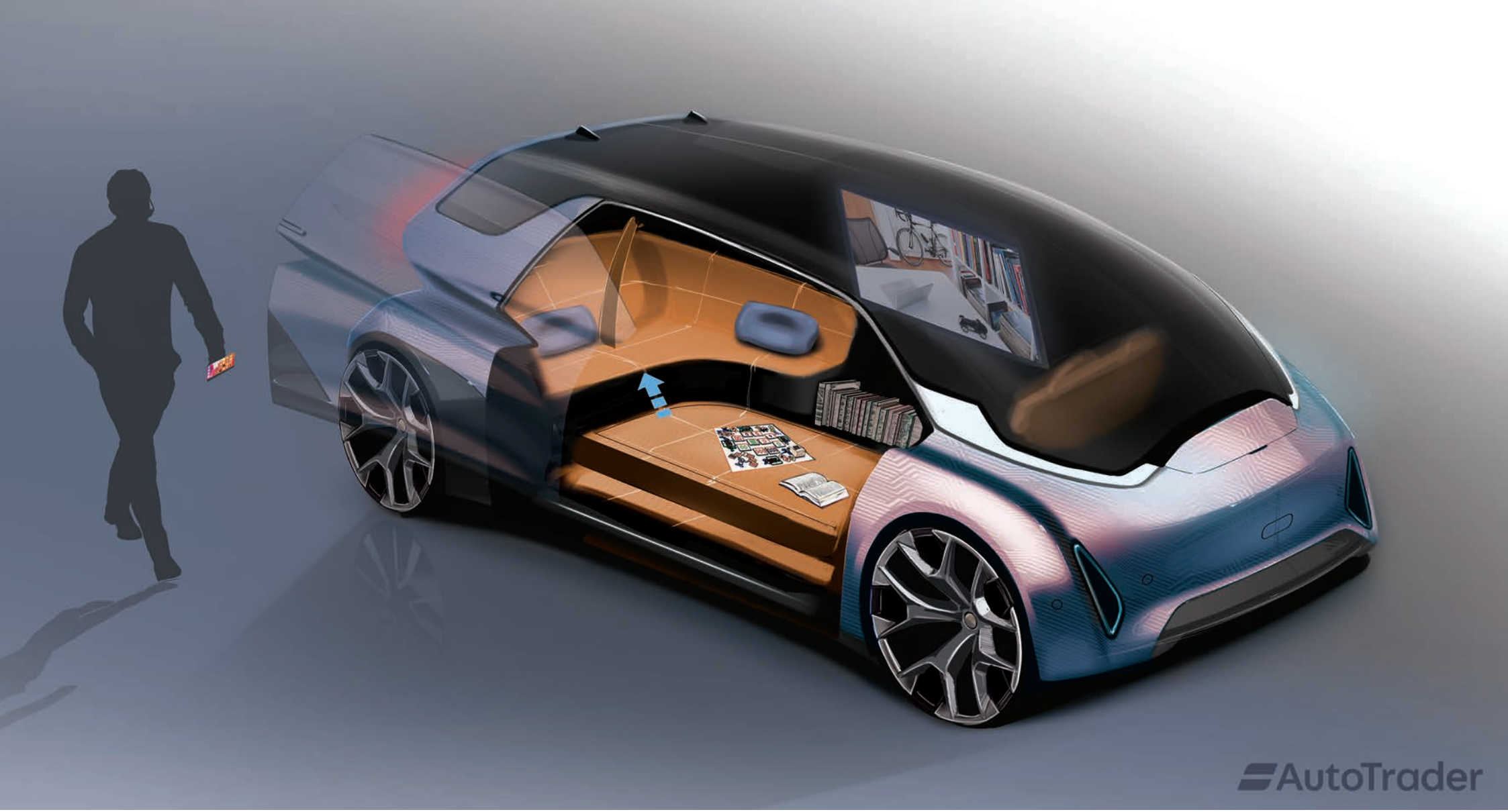
Despite much speculation about replacing windows with screens, the human of the future has not evolved as fast as the car, so they are still likely to suffer travel sickness.

Eliminating the connection with the environment outside would likely exacerbate that so windows are likely to remain, albeit supplemented with large screens for entertainment.

On the outside, future cars are unlikely to be painted in the pearlescent hues and shiny chromes of science fiction. Cars will be there to blend in less than stand out, with few exceptions.

So sleek blacks, clean whites, and simple natural tones will be the norm. While current autonomous vehicles are bristling with obvious sensors, the advances in computer vision and the development of solid-state LIDAR (Light Detection and Ranging) will allow sensors to be largely invisible.

There might be a few small dots and circles on the body but nothing that will disrupt the car's clean lines.



The Visual

Accumulating the futurology and consumer insights, we've worked with a graphic designer to illustrate our predictions for what the car of the future could actually look like. The above visual draws heavily on the themes of autonomous technology and in-car innovations to illustrate what an Auto Trader car of the future could look like.

Looking to find a great deal on your next new car?

Check out Auto Trader's brand new car deals which features many listed at pre-haggled prices.