



Driving the Charge Forward:

Insights on Global Electric Vehicle Trends, Smart Charging Infrastructure, and the Role of Single-Board Computing



okdoTM LIVE WEBINAR

Driving the Charge Forward:

Insights on Global Electric Vehicle Trends, Smart Charging Infrastructure, and the Role of Single Board Computing

28/02/2023, 11AM-12PM GMT

MEET OUR SPEAKERS



Richard Curtin

Co-Founder & CTO,
OKdo



Naeem Farooqi

CEO & Founder,
FleetZero



Marc Palmer

Brand Director,
Auto Trader UK

ABOUT



TEAM OF
CUSTOMER
CENTRIC
EXPERTS

>£50M ON
HAND
INVENTORY

>1M
CUSTOMER
COMMUNITY

BROAD CHOICE
OF PRODUCTS
WITH DIRECT
FRANCHISES

Part of the



FTSE 100
COMPANY

80 YEAR
HERTIAGE
SUPPORTING
ENGINEERS

>60K
PRODUCTS
SHIPPED
DAILY

INNOVATION
AT THE HEART
OF THE
BUSINESS

WE WORK WITH LEADING BRANDS



What We Offer



DESIGN

Modify your existing board to reduce waste and meet your connectivity needs, creating the right hardware & software to increase performance.



MANUFACTURE

Bring your design to life & leverage our vendors & manufacturing expertise to produce your board at scale and skip the DIY headache



DISTRIBUTE

Leverage a 1.2M global customer network and distribution centres in 32 countries to increase speed to revenue and commercialise your innovation globally



ENGAGE

Utilise our Design Spark and the Industrial Knowledge Platforms for building brand awareness, idea sharing and lead generation



SCALE

Organically scale quickly, while exploring existing Resellerships for potential future developments

FLEET ZERO

Zero Emissions. Zero Headaches.

Global EV Outlook & Adoption Drivers

Naeem Farooqi

February 28, 2023

Safety Moment

- Globally electric vehicle and charging infrastructure have experienced a series of high risk fires
- There have been renewed interest in training and emergency training for electrical vehicle use across residential, private and public fleets
- This safety moment is focused on proper inspection of charging hardware

Safety Steps:

- Follow OEM inspection and preventative maintenance schedule
- Ensure work is conducted by certified and trained technicians
- Before every use, inspect charging cord and hardware for any physical damage
- After every use properly stow the cord and equipment



About FleetZero

- Decarbonization start-up focused on energy transition for fleets using hydrogen and battery electric vehicles
- Global consulting and SME network to assist in complex decarbonization decision making
 - (Toronto, London, New York)
- End to end solution for all types of fleets and operations

Experts from Multiple disciplines:



Electrical



Environmental



Finance



Mechanic



Asset Advisory



Engineering

Our Track Record:

24

Person
International
Team

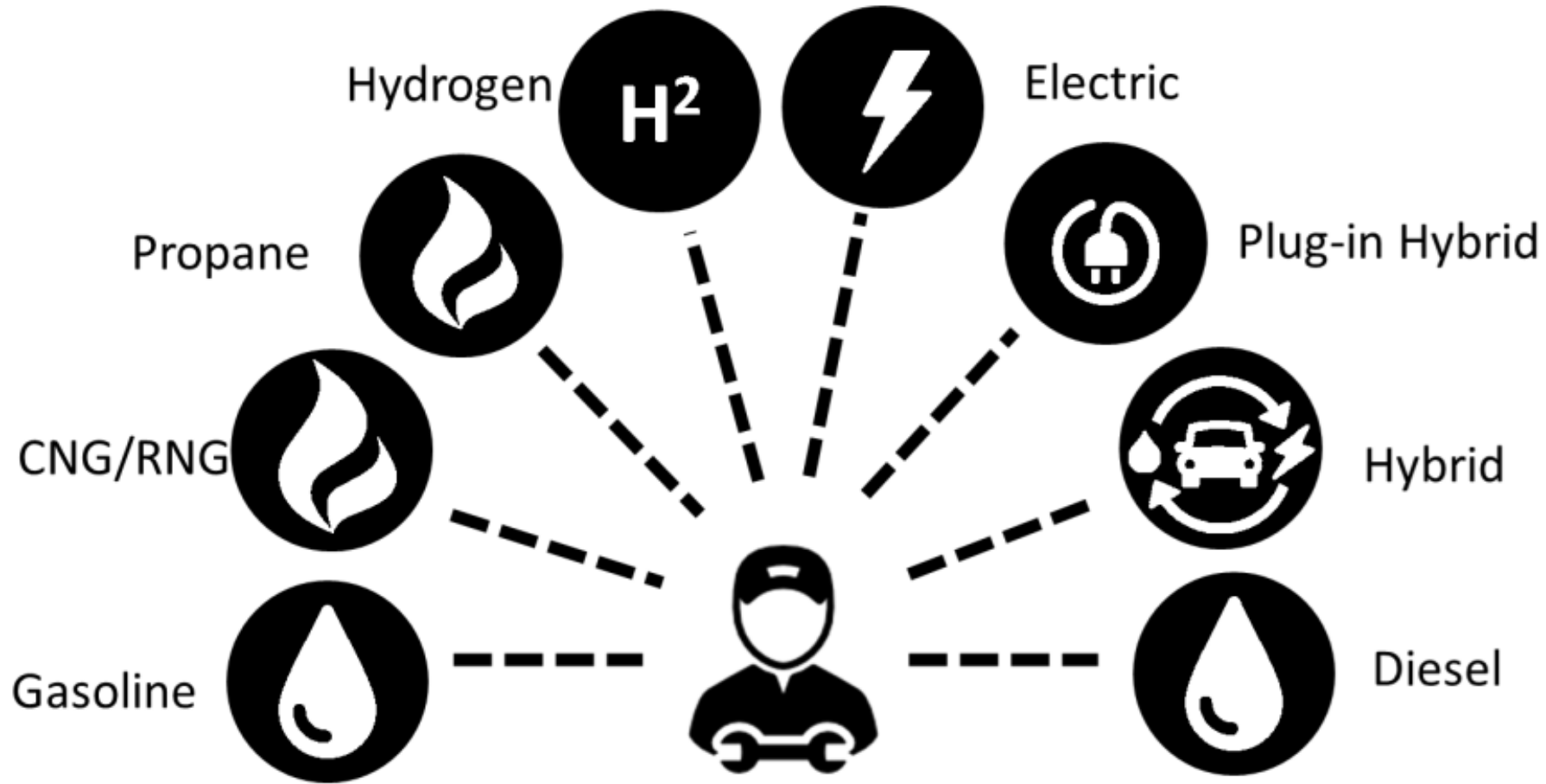
80+

Battery &
Hydrogen
Feasibility
Studies

22K+

Fleets Assets
Advised

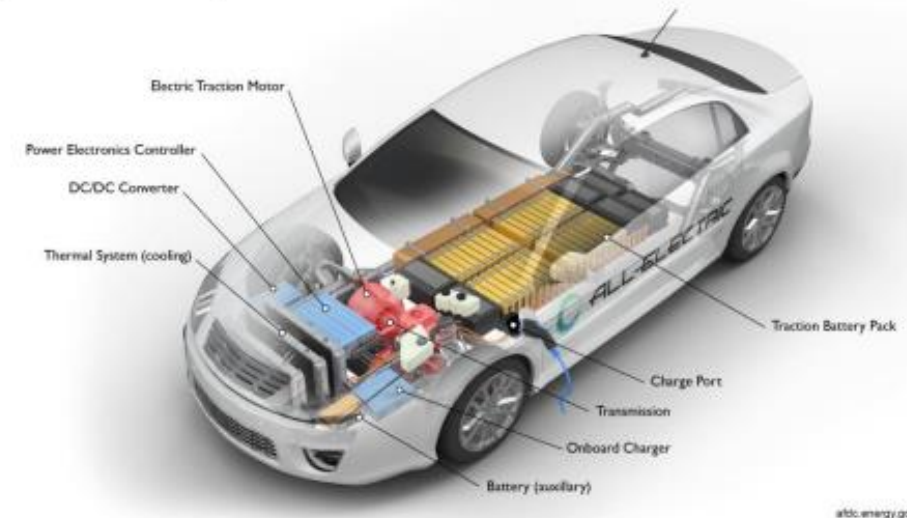
Many options not all made equal



What is an Electric Vehicle?

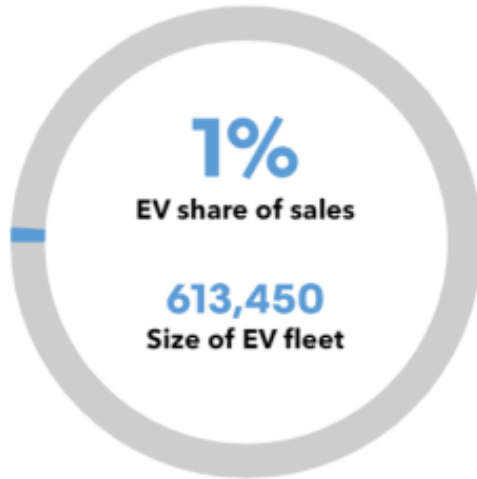
Batteries

- The vehicle is derived of a battery, traction motor, battery management system with zero tail-pipe emissions
- Electricity as their fuel with charging available from the grid's infrastructure
- Vehicles can charge from the grid and bi-directionally support use of on-board battery to power assets
- Electricity can come from energy sources that vary in their level of emissions on up-stream basis
 - Renewable sources such as wind, solar and hydroelectric
 - Conventional energy sources such as natural gas and coal

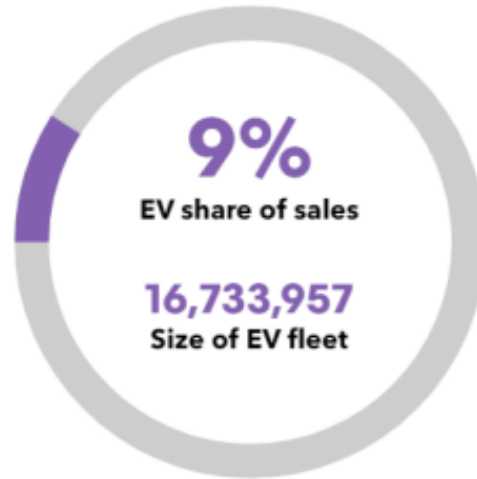


EV Market- Today

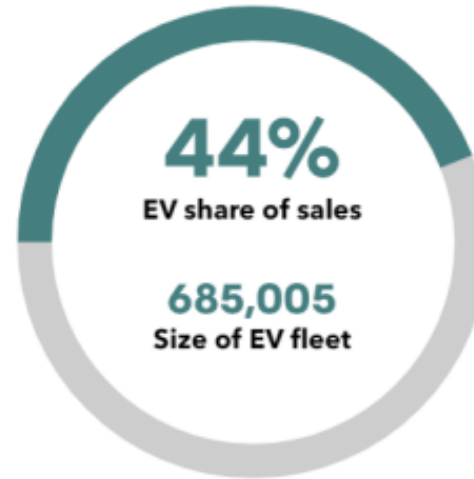
Vans and trucks



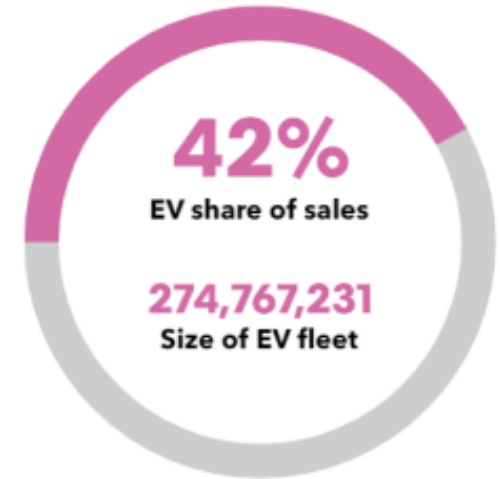
Passenger cars



Buses



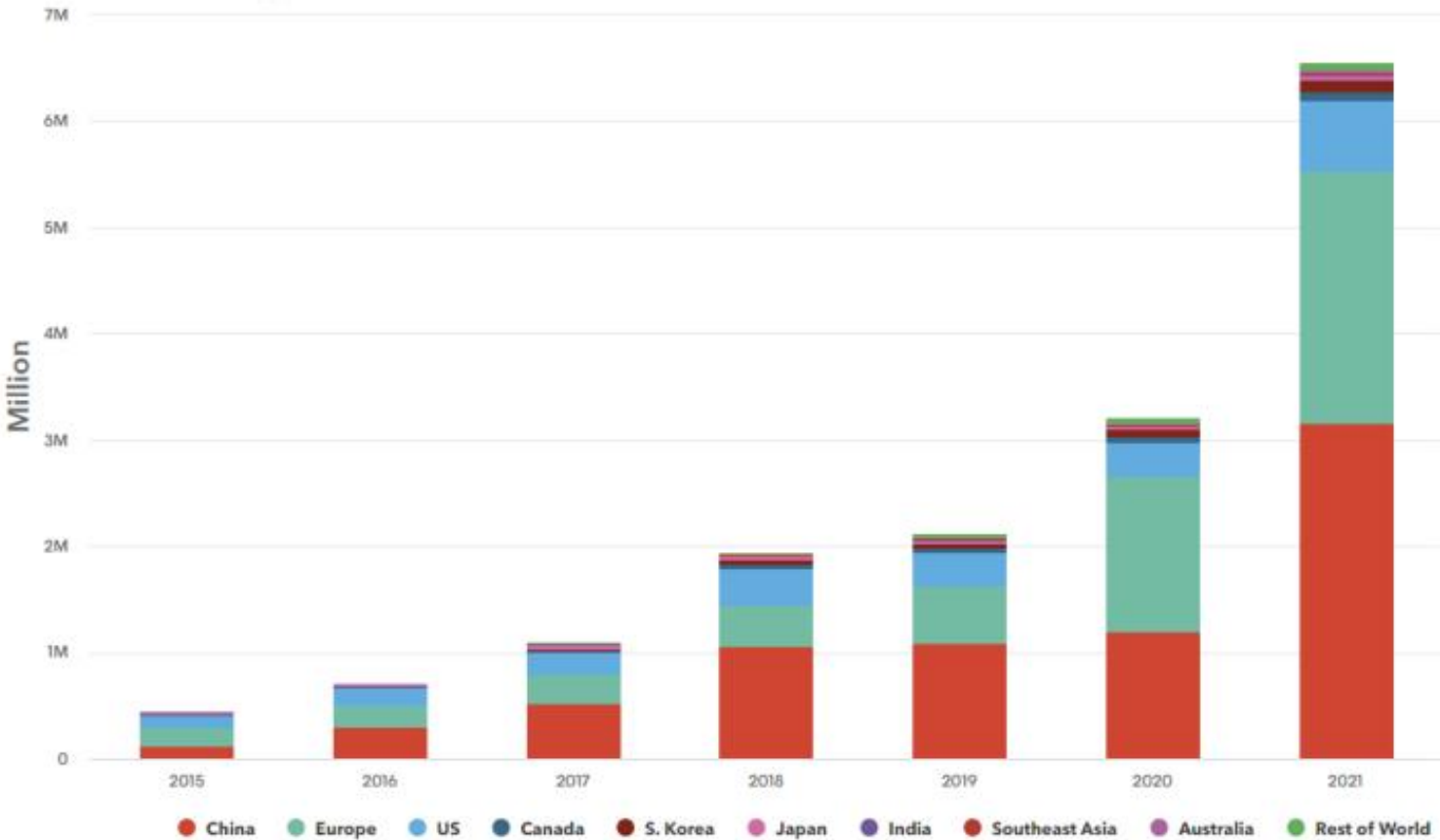
2 and 3 wheelers



Source: BloombergNEF EVO 2022

EV Market- Trends

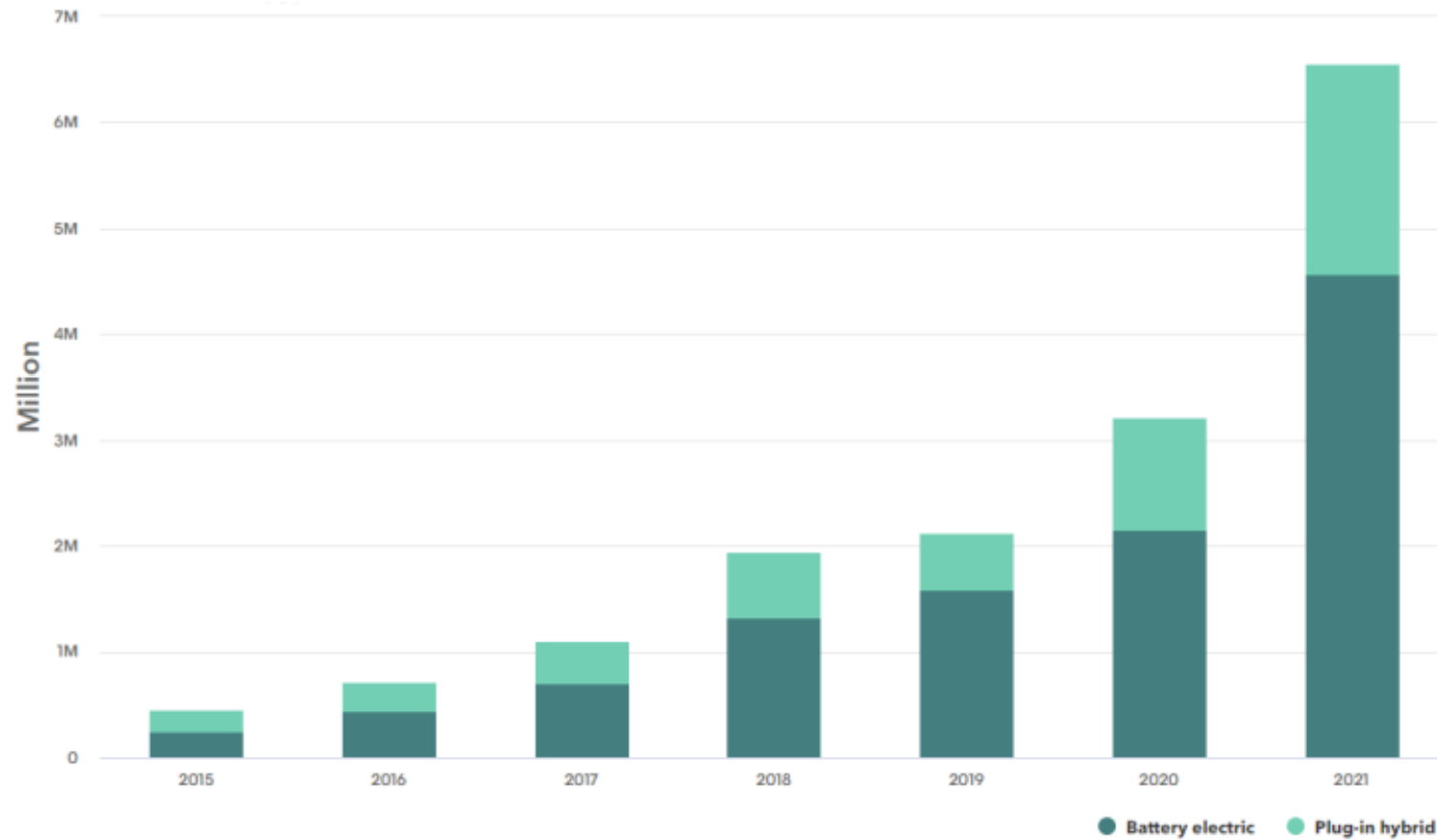
Global passenger EV sales by market



Source: BloombergNEF EVO 2022

EV Market- Trends

Global passenger EV sales by drivetrain



Source: BloombergNEF EVO 2022

The Drivers for Transport Decarbonization



Government & Policy	Society & Governance	Environment & Climate Change	Technology & Innovation	Economics & Total Cost
<ul style="list-style-type: none">▪ Carbon Reduction Commitments▪ Policy Phasing-Out ICE Vehicles▪ Grants & Incentives▪ Emissions Accounting	<ul style="list-style-type: none">▪ Employees Values▪ Customers Preferences▪ Sustainable and Ethical Supply Chain	<ul style="list-style-type: none">▪ Climate Events▪ Inter-Governmental Alignment▪ Individual, Company and NGO focus on Environmental Action	<ul style="list-style-type: none">▪ Battery chemistry▪ Vehicle Engineering▪ Fuel-Cell Design▪ Infrastructure Innovation (ESS, Peak demand)▪ Range Anxiety	<ul style="list-style-type: none">▪ Declining Cost of EVs with Scaled Manufacturing▪ Incentives to Reduce TCO▪ Declining Infrastructure Cost Through Innovation



2023 - a pivotal year

Marc Palmer, Insights Director

FEBRUARY 2023

 AutoTrader

Current projections indicate EVs will account for over half of new car sales by 2027 and nearly 90% in 2030

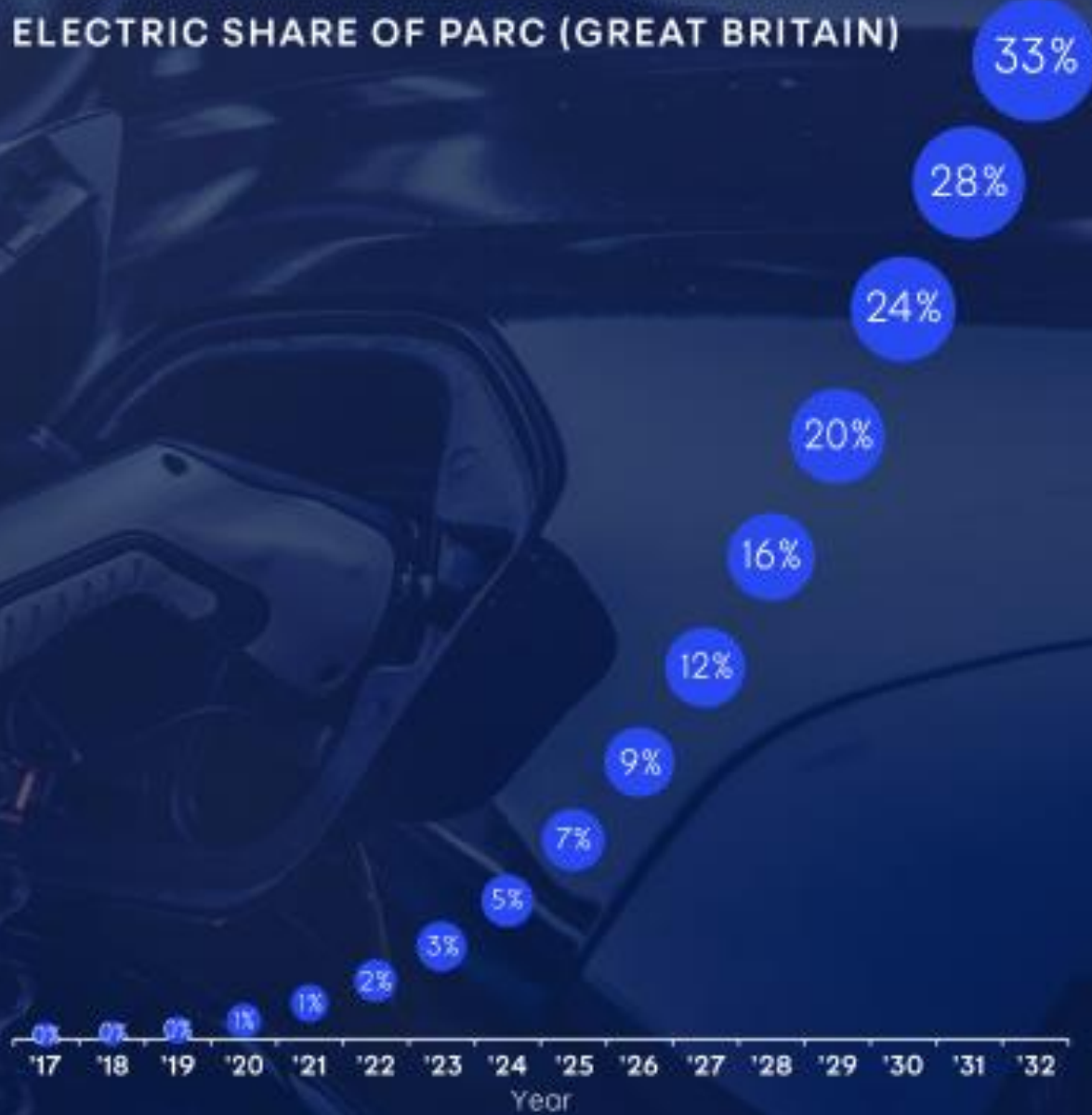
EV SHARE OF NEW CAR SALES

UK. SMMT & Auto Trader forecast (2023 onwards)



In 2030, nearly a quarter of cars on the road will be electric

ELECTRIC SHARE OF PARC (GREAT BRITAIN)



EV interest reached

1 in 4

of all new car views in 2022,
four times the 2020 share

77%

increase in public
chargepoints vs 2020

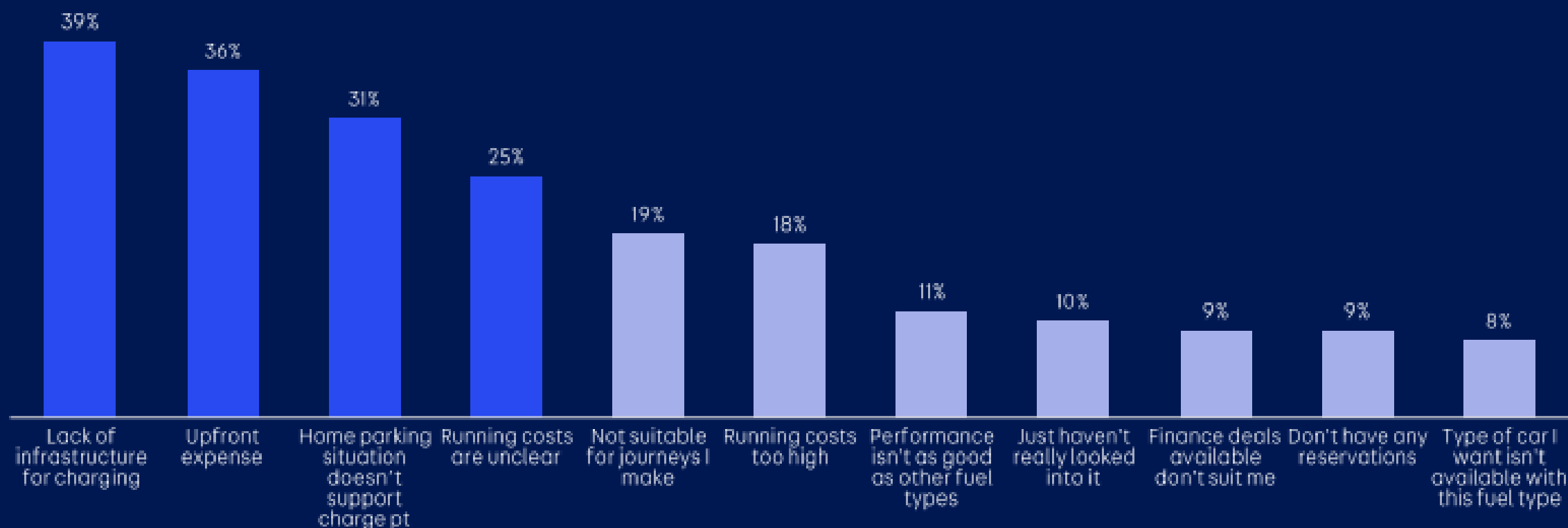
>70

different models
to choose from

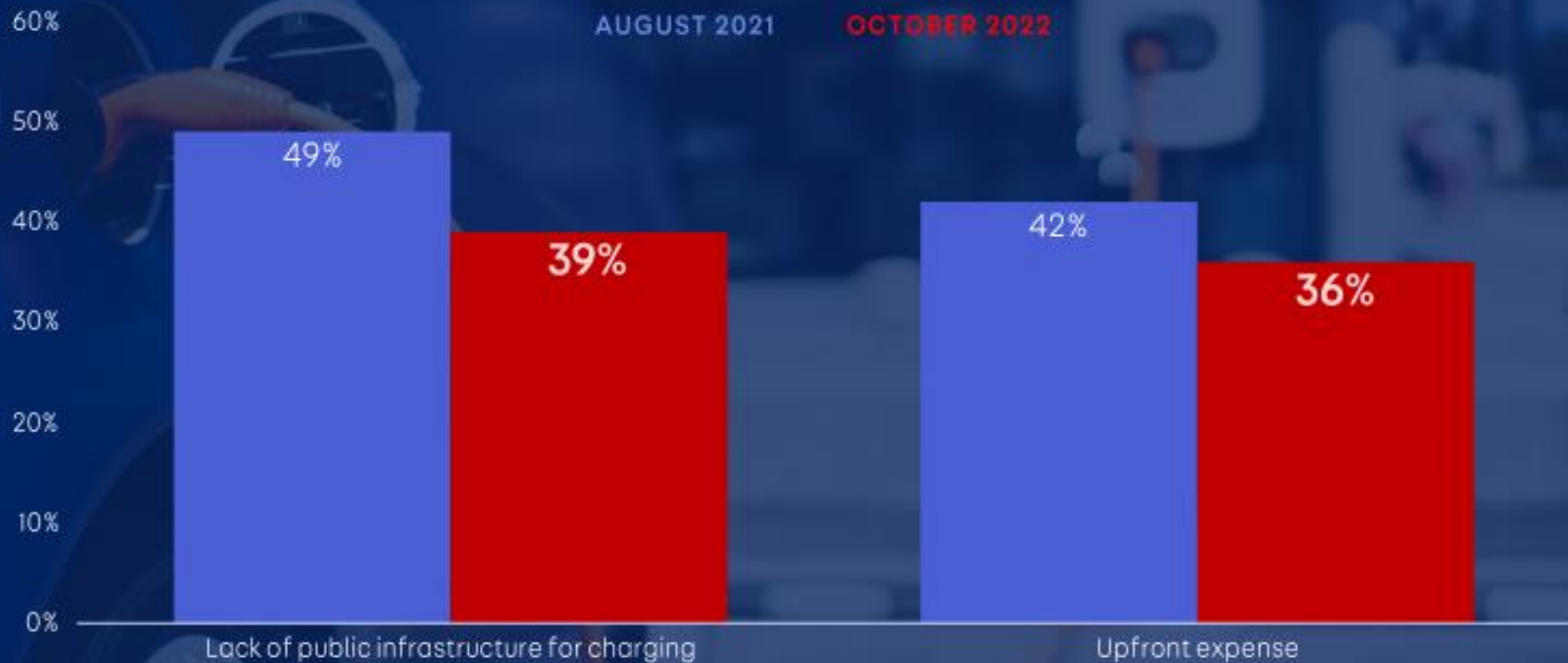
There still exist some **concerns when buying a new EV** – cost and infrastructure remain the largest barriers to consideration

BARRIERS TO BUYING AN EV, SEPTEMBER 2022

What, if any, reservations do you have about EVs?



Barriers to EV consideration are falling





EV interest is
now **less than**
half year-on-
year

Still the wealthy –
no mainstream
growth.

-  Auto Trader audience
-  New EV audience on
Auto Trader

HOUSEHOLD
INCOME OVER £50k

37%



OLDER THAN 45

45%



SOCIAL GRADES A&B

25%



56% +1% vs. March



55% -1% vs. March



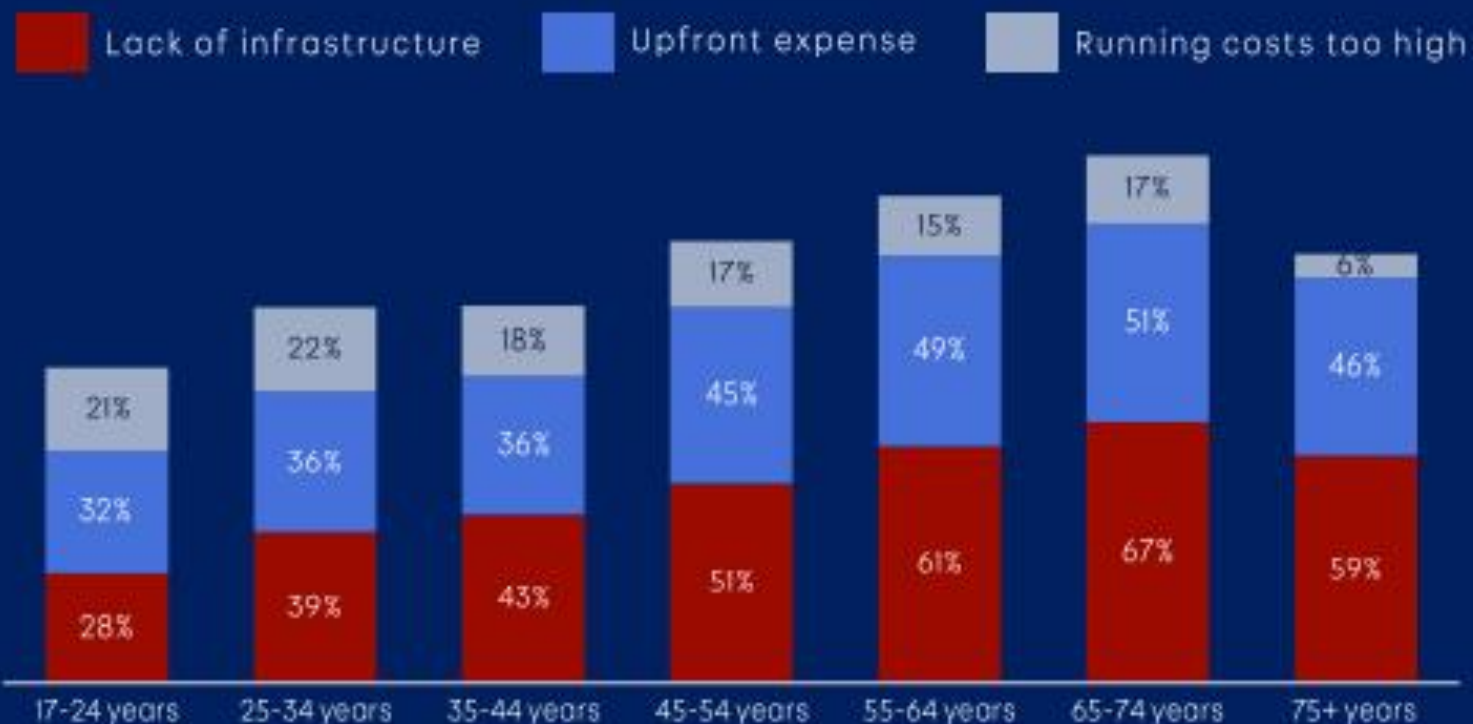
42% +2% vs. March



Older drivers have more reasons to reject.

BARRIERS TO SWITCHING TO EV BY AGE GROUP

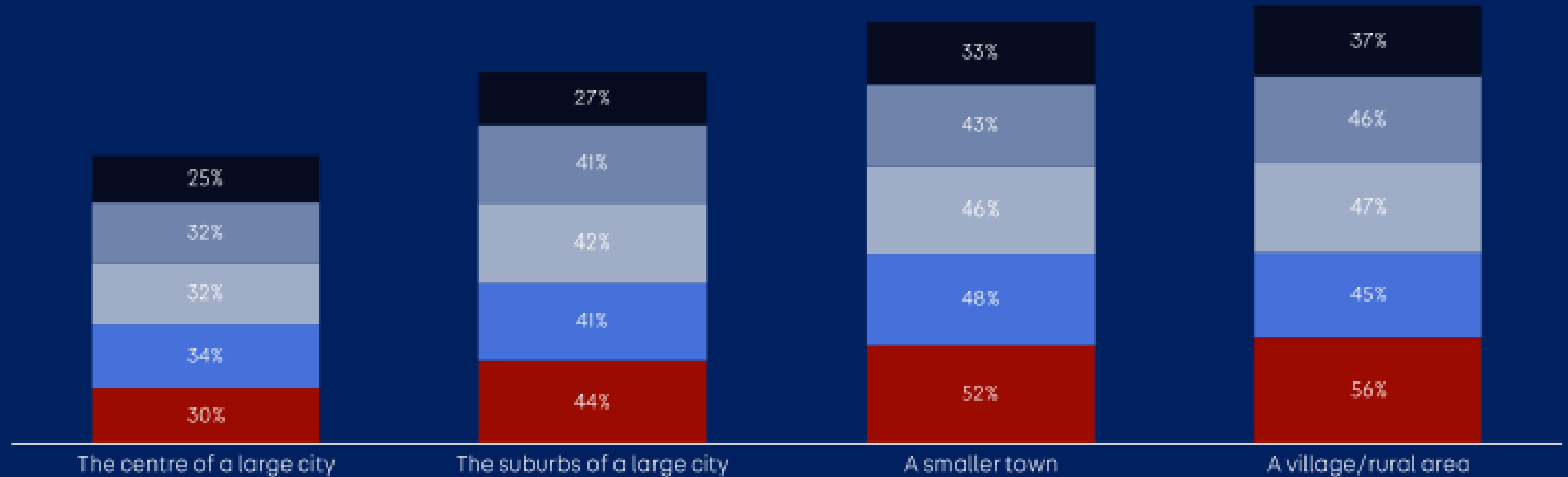
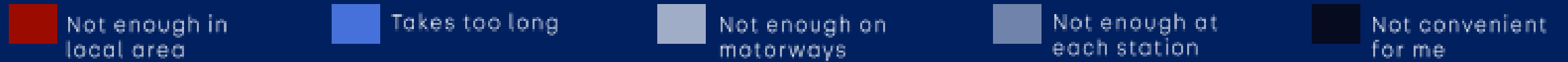
August 2021



Cities ok – the rest have many obstacles.

INFRASTRUCTURE CONCERNS BY LOCALE

August 2021



Progress is at risk.



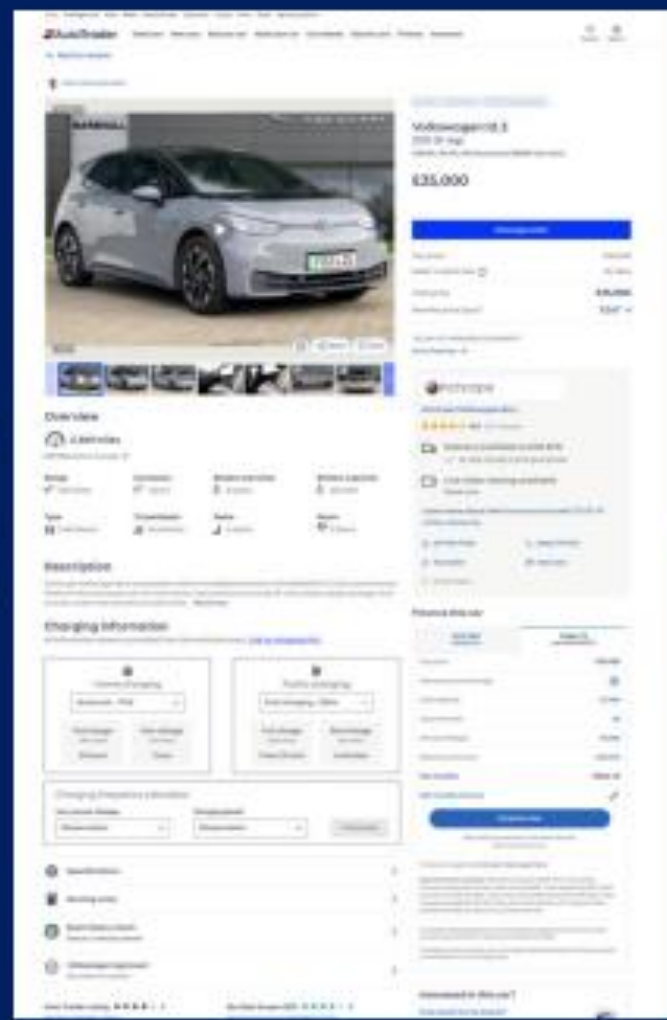
THE ROAD TO 2030

A blue and white racing boat is shown from a low angle, moving through the water. The boat's hull is white with blue accents. A sign on the side of the boat reads "TAKE THE RACE". The background is a dark blue sky with some light spots, possibly stars or distant lights.

Time to
re-energise

Simplifying the information the car buyer needs

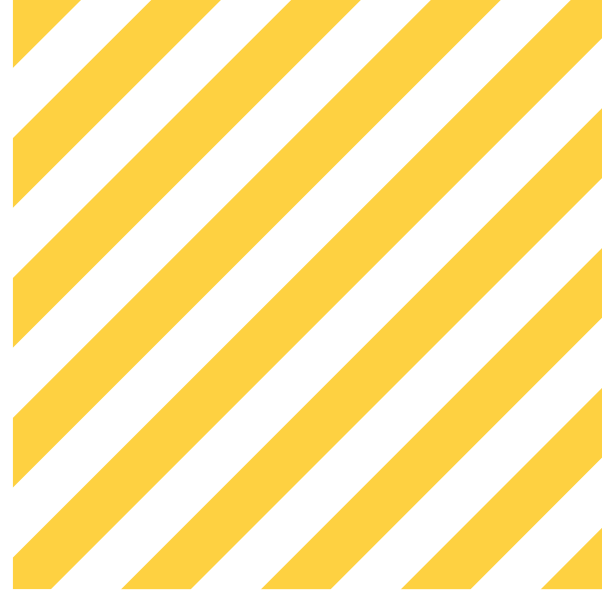
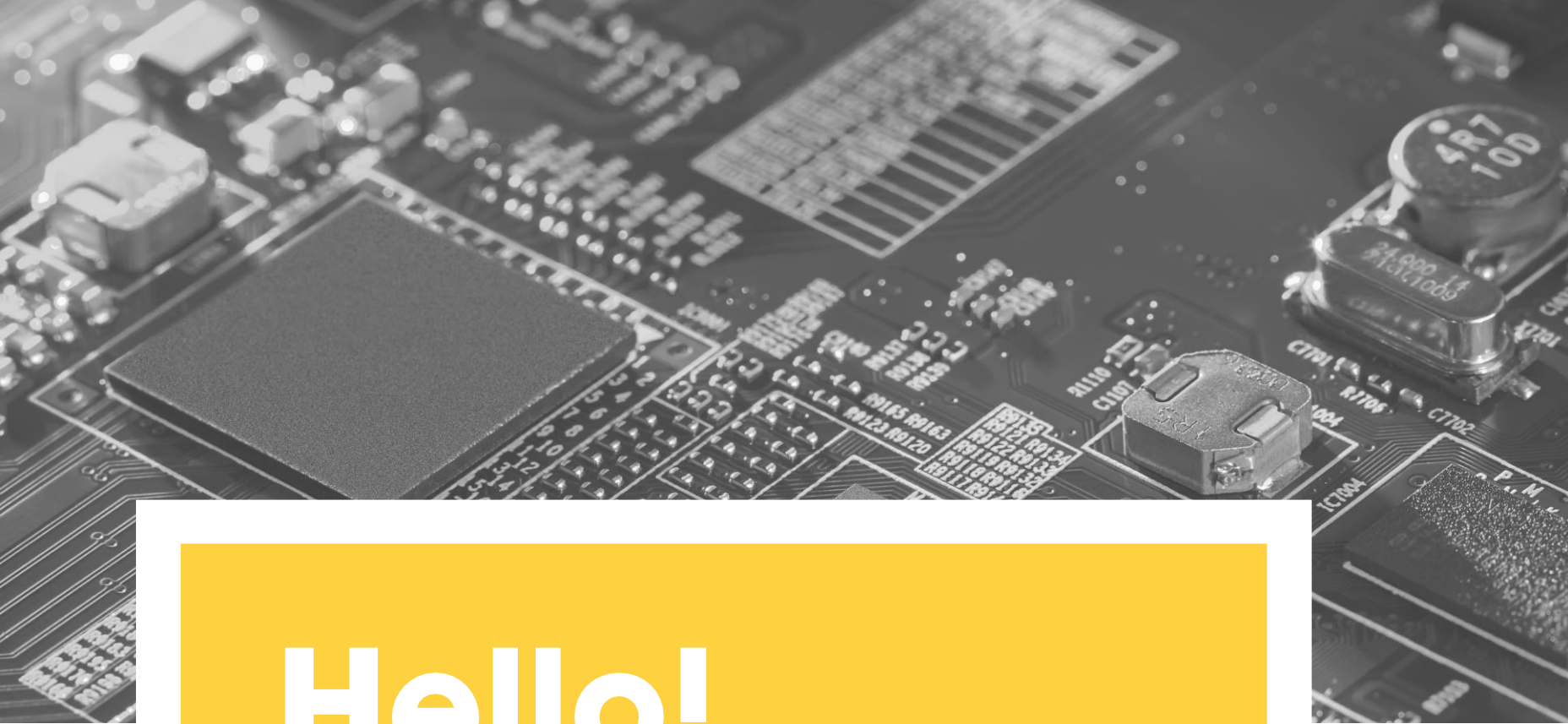
- Choose
- Afford
- Charge



The image shows a tablet displaying a car listing for a Volvo XC40 Recharge. The listing includes a main image of the car, a price of £35,000, and various specifications such as engine type, transmission, and fuel economy. The interface is clean and organized, with sections for 'Overview', 'Description', and 'Charging information'. The background of the slide features a blurred car listing page and a scenic image of a blue Volvo SUV parked by the water.

And for suppliers, data on regional demand must be used to inform targeted infrastructure investment.





Hello!

SCB's for EV

Rich Curtin - Co-Founder & CTO at OKdo



What makes SBC's the right choice?

As the SBC market have matured the key benefits to any engineering project where SBCs bring clear value are

Time To Market – Time To Implementation

The SBC allows you to start your project from an established baseline both from a HW and SW perspective.

SBCs come pre certified for CE/FCC, accelerating go to market strategies

Performance vs. Cost

By aggregating global volumes SBC's offer the ability to ensure the best performance at the lowest price points.

Engineering efficiencies

SBC's provide tested HW & SW that can be integrated into end application

Allowing engineers & developers to "quickly" change core platform.

Ecosystem

Ability to scale and expand the application through ecosystem of HATs, Shields and carrier boards.

Supply chain optimization

The team at OKdo ensure that our SBC BOM's supply chain is robust, includes second source components, is cost optimised and provides global manufacturing solutions to meet customer needs & mitigate global economic uncertainty/challenges

Scalability

Some SBC's offer a path to Compute Modules (CM) or System on Modules (SoM), allowing for further cost & performance optimization of the application as volume grows. The final step from here would be to design directly on the Silicon vendors System on Chip (SoC).

How can SBC's be used in EV applications?

The use of SBCs in EV charging infrastructure can help to improve efficiency, reliability, and user experience while also enabling advanced features such as energy management and remote monitoring.

SECURITY

SBCs can be used to provide security features such as access control, authentication, and encryption to protect the charging station and the data it collects from unauthorized access or tampering.

ENERGY MANAGEMENT

SBCs can be used to manage the flow of energy between the charging station and the power grid, as well as between multiple charging stations. This can help to balance loads on the grid and prevent overloading during periods of high demand.

REMOTE MANAGEMENT

SBCs can enable remote management and monitoring of EV charging infrastructure, allowing operators to perform diagnostics, update software, and troubleshoot issues without the need for on-site technicians.

USER INTERFACE

SBCs can be used to provide a user-friendly interface for EV drivers to initiate and monitor charging sessions, as well as to pay for charging services. This can include touch screens, keypads, and wireless connectivity to mobile devices.

CONTROL & MONITORING

SBCs are used to control and monitor the charging process, ensuring that the charging station is functioning properly and that the vehicle is being charged safely and efficiently. SBCs can also collect and transmit data on charging activity, allowing operators to track usage and perform analytics to improve charging infrastructure.

Why SBC for EV?

SBCs are complete computers on a single circuit board, with processors, memory, I/O, and other features. They're compact, efficient, and reliable, making them ideal for vital operations in traffic, medical imaging, and more. SBCs are now being used in EV charging infrastructure to manage the network of charging stations and handle data processing at the edge.

POWER

- SBCs have reduced power requirements due to their minimalist design
- SBCs are cost-effective and suitable for applications that require more processing power than micro-controllers can provide

RELIABILITY

- SBCs have a proven track record of reliable performance in industrial environments
- They have less maintenance issues and longer lifespans compared to desktop computers
- SBCs are designed to withstand vibration, shock, and extreme temperatures, making them suitable for automotive, aerospace, and military domains.

SECURITY

- Secure Boot is a feature on ensures the system only runs trusted code during boot-up.
- It prevents unauthorized software from running on the system, reducing the risk of malware infections and other security threats.
- The TPM chip stores the private keys used to sign trusted boot code, ensuring that only authorized code can be loaded.

SPACE

- SBCs are ultra-compact due to their minimalist design
- They can be easily integrated into existing equipment and reduce overall system size
- ROCK SBCs can be customised to reduce waste and cost

CONVENIENCE

- Troubleshooting and upgrading is easier with only one circuit board to deal with
- OKdo can offer support from talented engineers that can help develop a custom solution for your needs

OKdo x Six Watts

Six Watts produces EV charging points, they have embraced the SBC as the core component, however, post-pandemic, they faced supply chain issues which led them to put their project on hold and explore alternatives. OKdo was able to help Six Watts overcome their supply chain issues by finding an application relevant SBC and collaborating with them to reengineer their charging points.

Challenge

- Six Watts faced supply chain issues with their initial SBC choice, causing a setback for their EV charging points project. They had to explore other alternatives and put their project on hold.

Solution

- The team at OKdo worked with Six Watts' founder, Adam Heavens to understand their business needs and find a reliable, compliant, cost-effective alternative.
- OKdo recommended their ROCK CM3 as a replacement.
- OKdo is collaborating with Six Watts to re-engineer their charging points to work with the ROCK CM3.

Results

- OKdo's support enabled Six Watts to find a reliable and cost-effective alternative that met their business needs.
- The ROCK CM3 is now being incorporated into other Six Watts products, including Solar PV.
- The collaboration between OKdo and Six Watts helped Six Watts continue their business operations smoothly and we are excited about future innovation.

Conclusion

- OKdo's expertise in technology solutions and collaboration helped Six Watts overcome their supply chain issues and design requirements.
- The success of this collaboration demonstrates OKdo's commitment to providing cutting-edge technology solutions and supporting smart EV businesses in overcoming challenges.



Thank You!

If you would like to learn more, reach out to one of our experts

support@okdo.com



