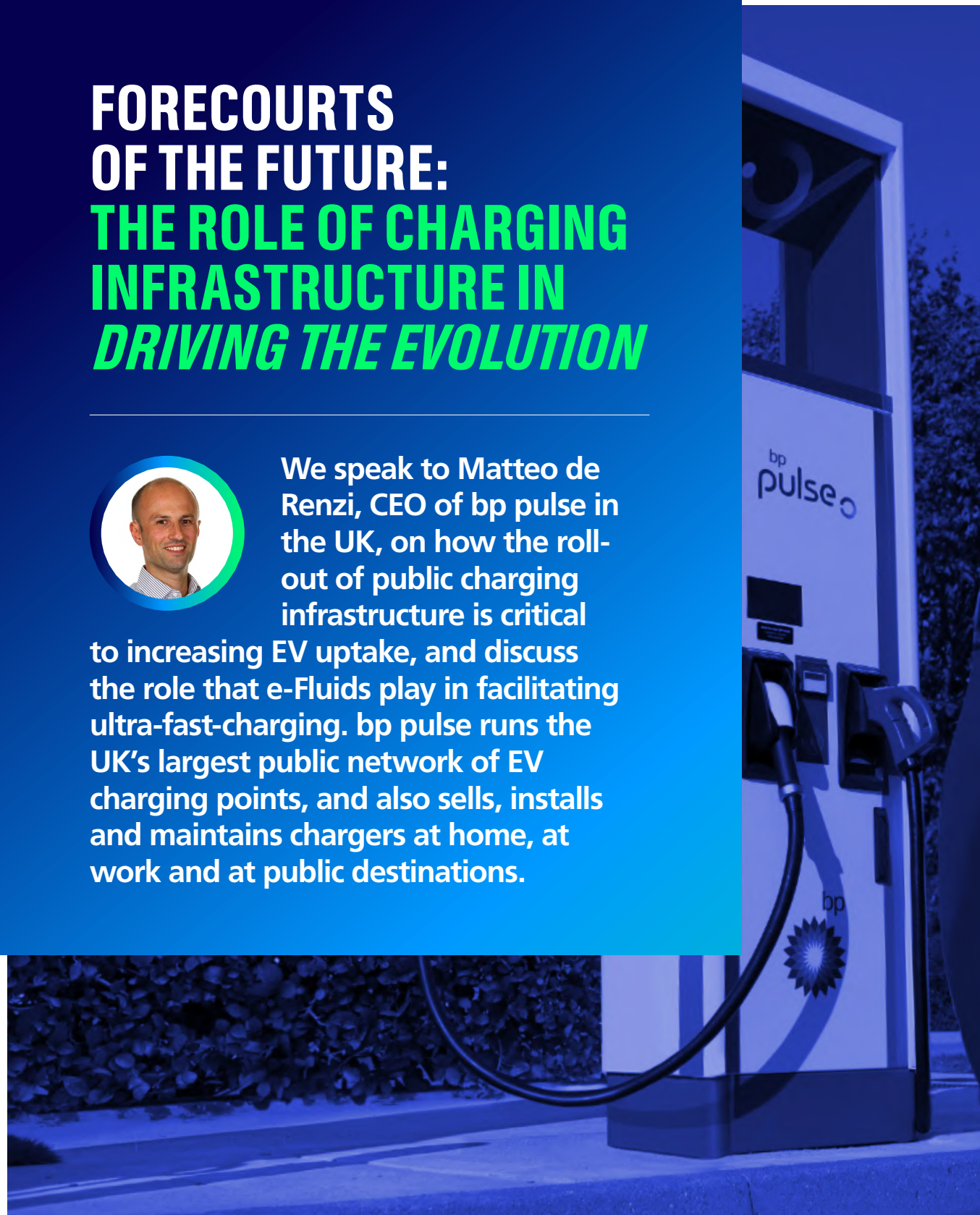


FORECOURTS OF THE FUTURE: THE ROLE OF CHARGING INFRASTRUCTURE IN DRIVING THE EVOLUTION



We speak to Matteo de Renzi, CEO of bp pulse in the UK, on how the roll-out of public charging infrastructure is critical

to increasing EV uptake, and discuss the role that e-Fluids play in facilitating ultra-fast-charging. bp pulse runs the UK's largest public network of EV charging points, and also sells, installs and maintains chargers at home, at work and at public destinations.



ON THE FAST TRACK TO FAST CHARGING

Consumer concerns about a lack of fast-charging on the road is a significant obstacle to increased EV uptake.

Castrol's study, Accelerating the EVolution found that for 68% of consumers, the current speed of rapid charge points was a factor that prevented them from making the switch to an EV.

Matteo explains that bp pulse's current focus is on rolling out ultra-fast (150kW) charging at bp retail sites across the country. Matteo believes that this will be critical to accelerating the widespread adoption of EVs:

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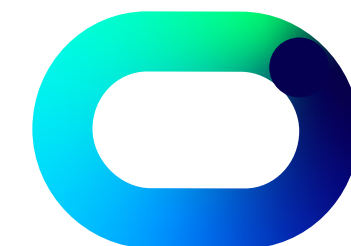
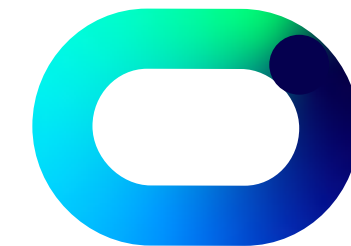
We're providing EV charging that's easy to find, easy to access and easy to use. And it's got to be fast – it's clear that the public wants fast charging.”

Matteo explains: “As well as 650 50kW rapid chargers, our UK network currently includes more than 60 ultra-fast chargers, with plans to reach 1,400 by 2030. If there are plenty of fast chargers

available, you can just jump in an EV and drive, without having to plan your stops in advance.”

It is already possible to get a decent charge in a shorter time than the 31 minute charge time tipping point, depending on the type of vehicle and the charger: “A decade ago, it could have taken some EVs around 10 hours to charge your EV so that you could travel for 100 miles,” Matteo says: “With the ultra-fast 150 kW chargers it is possible to get 100 miles from a 10 minute charge, based on an efficiency of 4 miles per kWh. We're on a very steep development trajectory.”

Next-generation e-Fluids such as Castrol's dielectric battery e-Thermal fluid, support fast-charging by keeping the batteries cool and the car running. The advanced e-Thermal fluid has important properties to enable enhanced thermal management. The low viscosity and strong electrical insulation control battery temperatures without risk of electrical breakdown. Ultimately, this helps to maintain higher levels of battery performance for longer. This means that as the number of ultra-fast chargers increases, EV drivers can be confident that they can protect their vehicles as well as keeping the battery in good condition.



Our UK network currently includes more than 60 ultra-fast chargers, with plans to reach 1,400 by 2030.

Castrol e-Fluids benefits are demonstrated in bespoke testing and development. Go further¹, charge faster² and last longer³.

¹ vs mass market EV factory fill fluid.

² vs indirect cooled battery system.

³ vs standard EV-transmission fluid.



PROVIDING AN INFRASTRUCTURE MIX TO SUIT ALL CHARGING HABITS

Matteo also says that the presence of ultra-fast chargers isn't just about providing charging capacity; crucially, it's also about making EV charging more visible:

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For EVs to become mainstream, charging infrastructure is an important enabler. But it's also about inspiring confidence and providing reassurance.

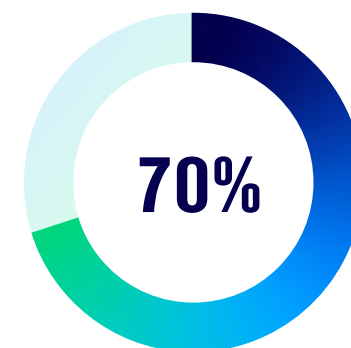
“We know that not being able to find a charge-point while on the road is something that really worries consumers. The more people that see these fast chargers and understand how many miles they could travel on a relatively quick charge, the less they'll be concerned about the practicalities of having an EV.”

As EV uptake increases, a mix of infrastructure to support different driving and charging habits will be key.

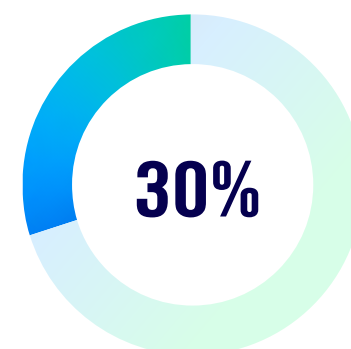
Charging at home won't be possible for everyone – especially in urban areas where many people don't have off-road parking. Not everyone will be doing on-the-go public ultra-fast-charging either. People will adopt different charging habits.

Matteo says: “We currently see about 70% home-charging and 30% out-of-home. But there is a swift uptake of fast-charging. We expect out-of-home charging to settle at around 50%.”

We currently see about...



home-charging. And...



out-of-home charging.

ON THE CUSP OF THE EVOLUTION

“There's no doubt that people will be driving petrol and diesel cars for many years to come,”

Matteo acknowledges, “But perceptions are changing quickly, and the presence of ultra-fast chargers on forecourts is helping with this perception shift.” And Matteo believes that the COVID-19 pandemic has accelerated the move to EVs: “It's made people more aware of their local environment, and many of us have realised that we don't need to travel so far, and perhaps we don't need to commute to work every day.

For those who were on the cusp of buying an EV, now could be the time to make the switch.”

When it comes to achieving the tipping points of a 31 minute charge time, a 469km range and a \$36,000 price point, Matteo emphasises the fact that all of these tipping points are currently in reach, just not all in the same car:

“Individually these things are ‘real world’ today, but they don't all currently exist in the same product.

We're already there on the fundamentals, and it now comes down to technical

and production questions. Over the last few years, range has improved, the cost of batteries has fallen and efficiency has increased.

“

The ‘target EV’ is a lot closer than most consumers might think.”

For those who were on the cusp of buying an EV, now could be the time to make the switch.

MATTEO DE RENZI IN THE DRIVING SEAT: QUICK FIRE QUESTIONS

What do you think is the biggest stumbling block to mainstream EV adoption?

At the moment it is around consumer education – raising awareness and addressing misconceptions about EV ownership.

What year do you think we'll achieve mainstream EV adoption?

In the 2030s. In the next five to 10 years we'll see tremendous growth.



CONTACT US

Want to find out more?
Use the details below:

Learn more about the research
and download the report:
[castrol.com/DrivingtheEVolution](https://www.castrol.com/DrivingtheEVolution)

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ABOUT CASTROL

Castrol provides the oils, fluids and lubricants the world needs, for every driver, every rider and every industry. It's more than just oil. It's liquid engineering.

The world of transport is going electric and e-fluids have a vital role to play. EVs play a key part in the mobility revolution and the pathway to decarbonising transport. Castrol's e-Fluid expertise extends across land, sea and even space.

IN SPACE

Castrol e-Fluids help leap NASA's \$820 million InSight Mars Lander working in the unforgiving conditions on the Red Planet.

AT SEA

Castrol e-Fluids support equipment used in the transfer of power from an engine or electric motor to a propeller or thruster.

ON LAND

Castrol ON has developed a range of e-fluids to meet the needs of vehicle manufacturers. From transmission e-fluids, which are inside many EVs already on the road, to e-Greases and e-Thermal fluids, these fluids enable electric vehicles to run smoothly, efficiently and stay cool.

Developments include Castrol's lowest viscosity e-transmission oil, designed for efficiency, durability and reliability. Castrol is partnering with major manufacturers to ensure its lubricants deliver what drivers want: to go further on a single charge, enable longer life of transmission and component parts, and ensure long-lasting battery health.

As EVs continue to evolve, Castrol's best brains are not only defining the fluids, but the way the fluids are defined: pioneering unique testing and monitoring methods, driving efficiency and economy going beyond the standard requirements of the fluids, taking consumer insights and engineering technical solutions; advancing technologies that will lead to breakthroughs for the transport of tomorrow.

To find out more about Castrol please visit www.castrol.com



CREDITS

Driving the EVolution: Achieving the world's first truly mainstream electric vehicle is based on interviews with industry experts, commissioned by Castrol, designed by Castrol and Man Bites Dog.

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