



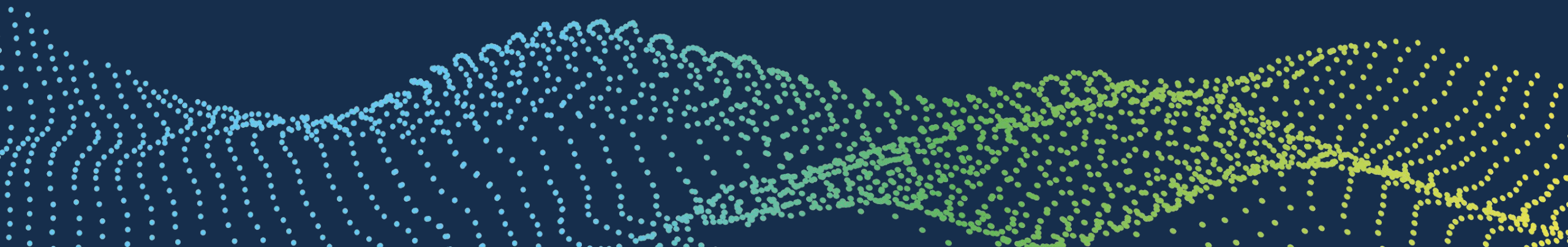
KALUZA
AN  COMPANY

DOMESTIC FLEXIBILITY AND DATA

What is needed to achieve net-zero?

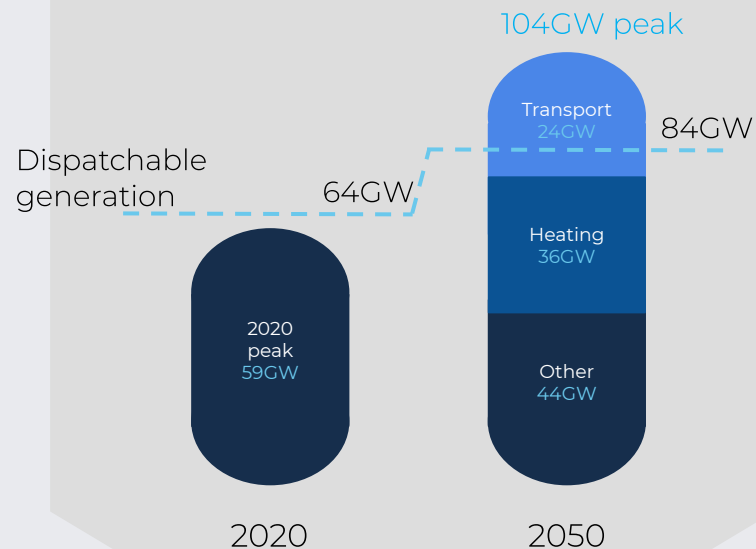
VALTS GRINTALS

SENIOR FLEXIBILITY ANALYST



PEAK THREAT

REQUIRES MITIGATION



Source:
National Grid Future
Energy Scenario 2019

Addition of EVs, smart heating and home
energy storage

GETTING READY FOR A DECARBONISED GRID

The transition to a distributed
energy network is happening

The utilisation rate
of renewable energy must be
improved

Flexibility and storage is
proving to improve network
management

Flexible & smart home
technologies can empower
customers to be part of a
democratised system



@Kaluza_tech

WHAT THE ENERGY TRANSITION **MEANS FOR HOUSEHOLDS**



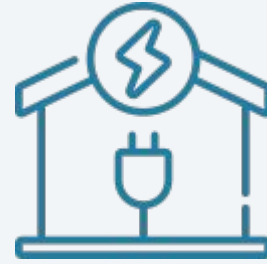
More EVs means demand increases...

Instead of getting fuel at a petrol station, many EV drivers will now charge at home. On average, this means adding 1,800 kwh to their annual electricity consumption. In a world with millions of EVs on the road, this a significant rise in electricity demand.



Their demand must now match supply...

Non dispatchable, intermittency, non inertial, renewables come with their own challenges. More and more, demand will need to adapt to supply, rather than the traditional other way around. This means opportunities for households to participate in demand response and manage their energy bills.

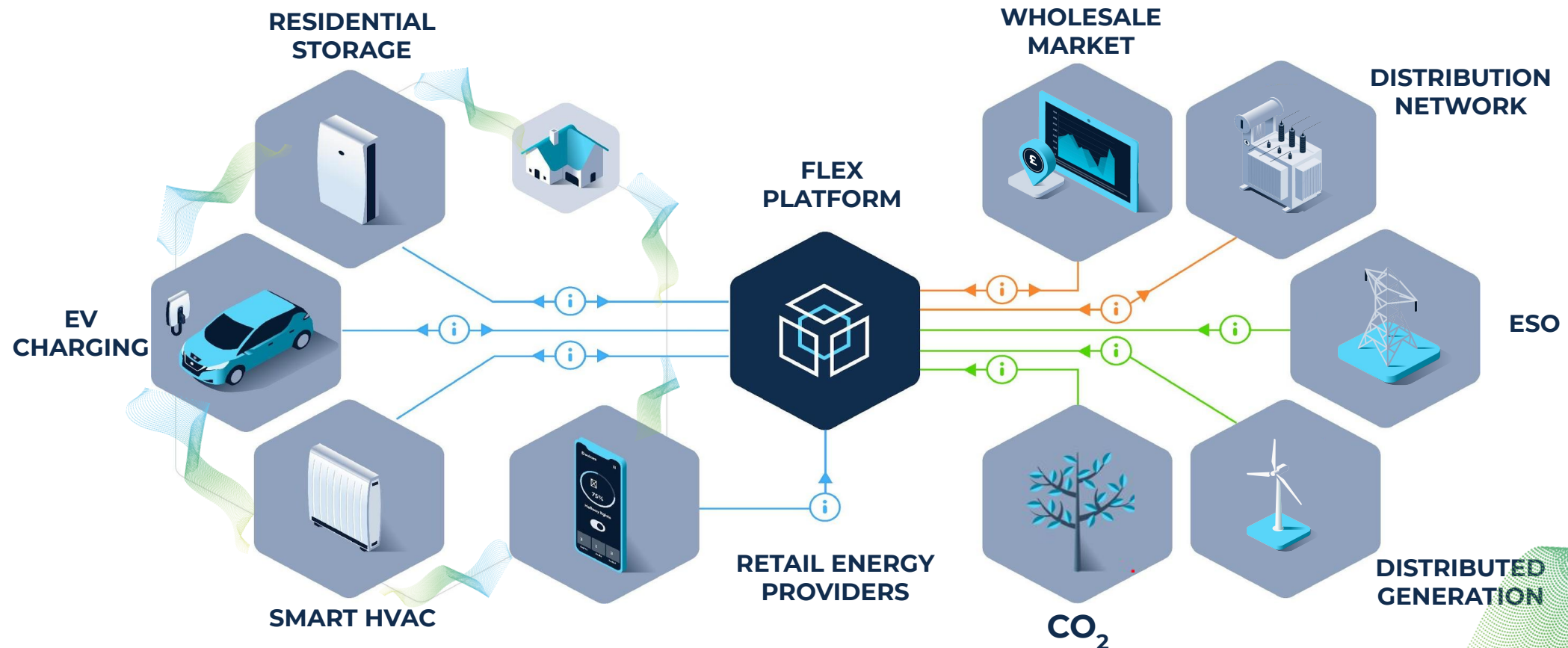


More smart devices in homes...

Decarbonising heat in homes will either mean leveraging technologies such as heat pumps and electric radiators or cleaning up the gas we mostly use today. In both cases, this means significant investments for households.

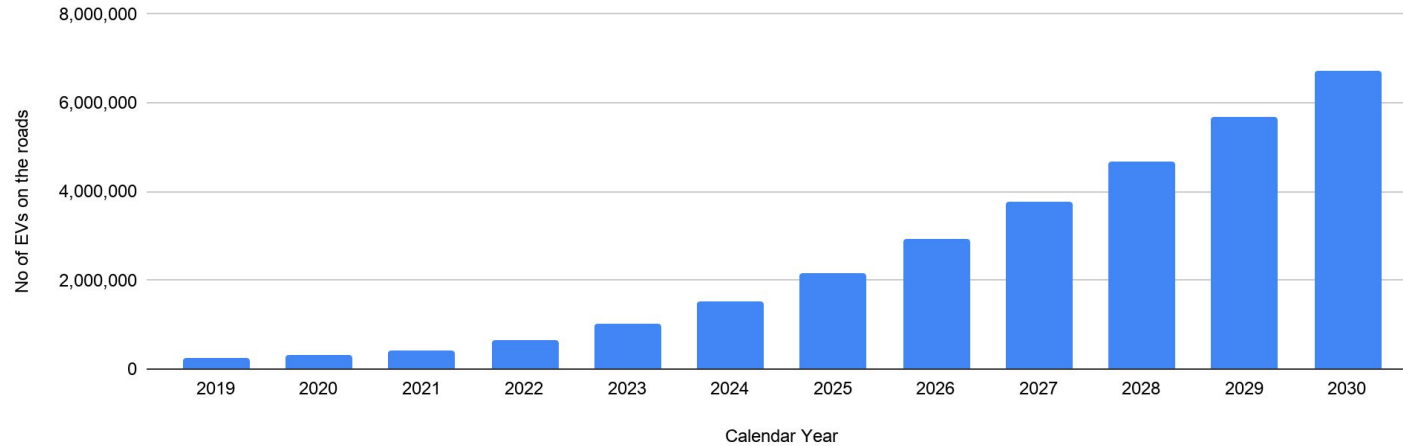
AND THIS IS HOW IT WORKS...

Responding to live device data, real-time market signals and customer schedules, Flex optimises device charging on a minute-by-minute basis to maximise value generated for the energy supplier and their customers.



WHY RESIDENTIAL FLEXIBILITY? LET'S LOOK AT EVS...

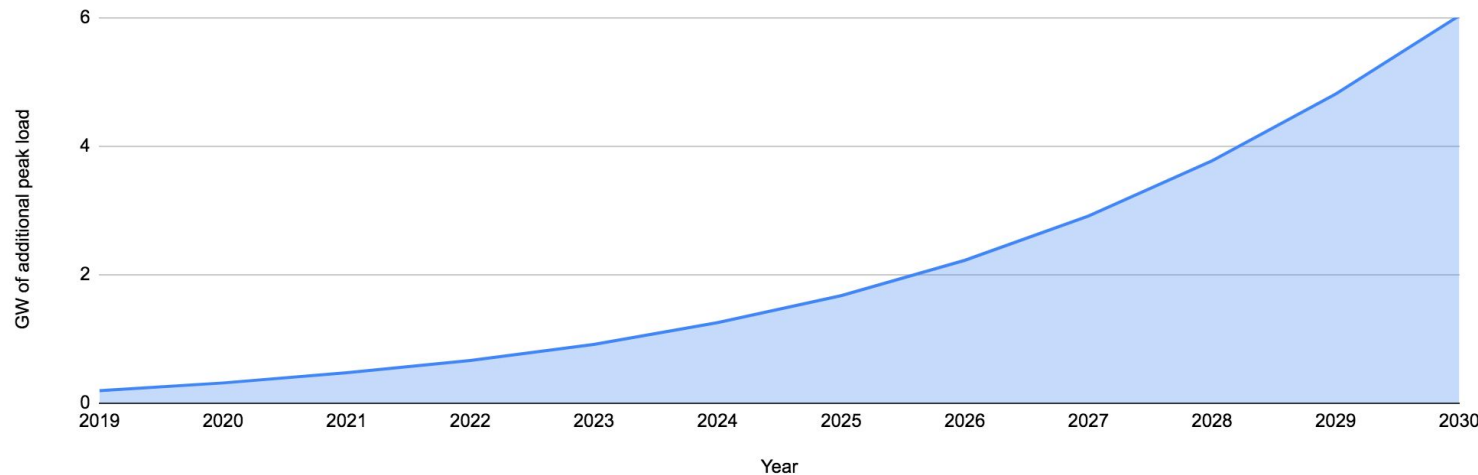
Number of EVs in the UK



**More EVs on the roads
>6m by 2030**

=

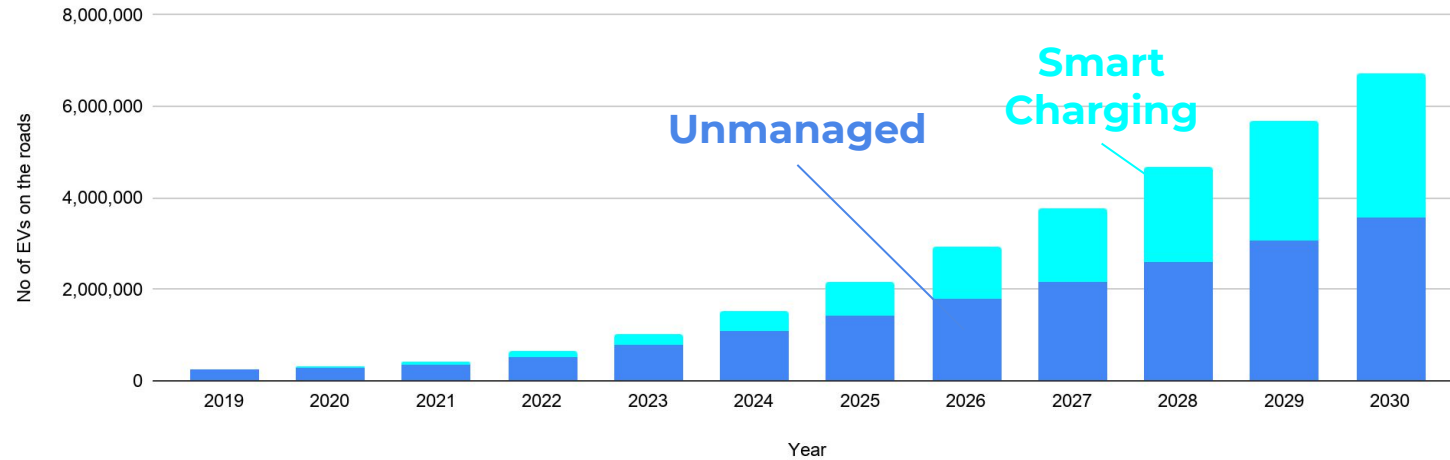
Peak load from unmanaged EV charging by 2030



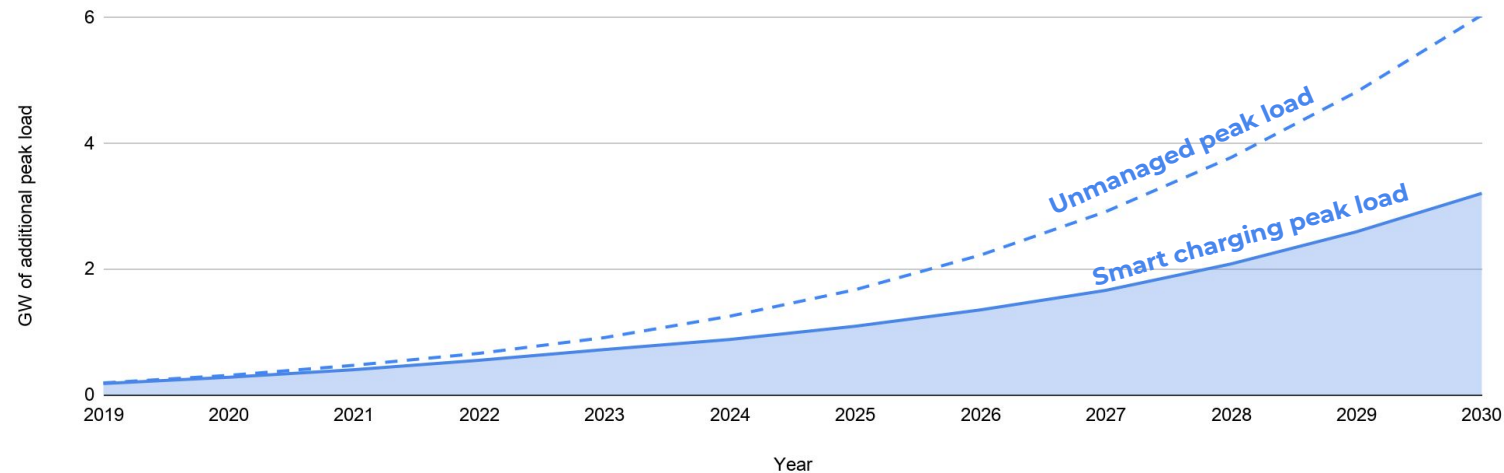
**Additional peak load on
the system
6 GW by 2030**

THE OPPORTUNITY: LOAD SHIFTING

Number of EVs in the UK (smart vs unmanaged)



Peak load shifting opportunity from smart charging



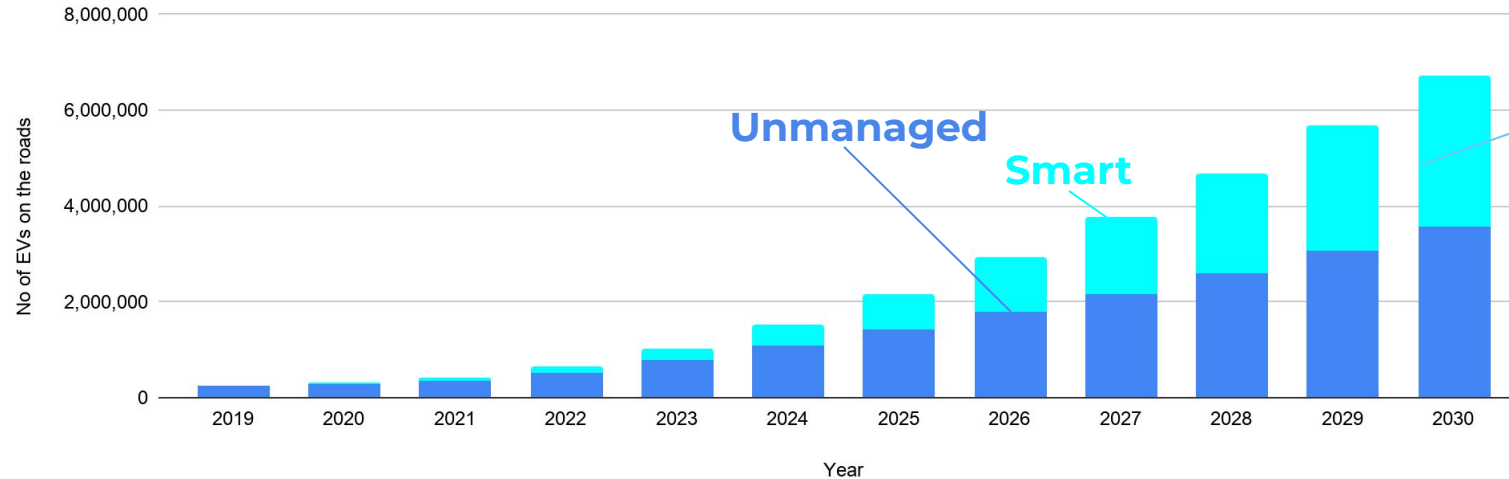
Push for smart/flexible charging

=

~3 GW peak load reduction by 2030

THE OPPORTUNITY: **BALANCING**

Number of EVs in the UK (smart vs unmanaged)



3 GW

Flexible and fast reacting load on the system to deliver further balancing via BM and response/reserve products

The opportunity during lockdown

Kaluza analysis shows that **3GW of EV flexible load** could have reduced the additional system balancing costs **over the 4 month period** by at least **£66m**

BEYOND MANAGING WHEN EVS CHARGE, WE ARE ALSO WORKING ON **VEHICLE-TO-GRID (V2G)**

PROJECT SCIURUS V2G OPTIMISATION



>323

V2G devices installed and
Kaluza integrated

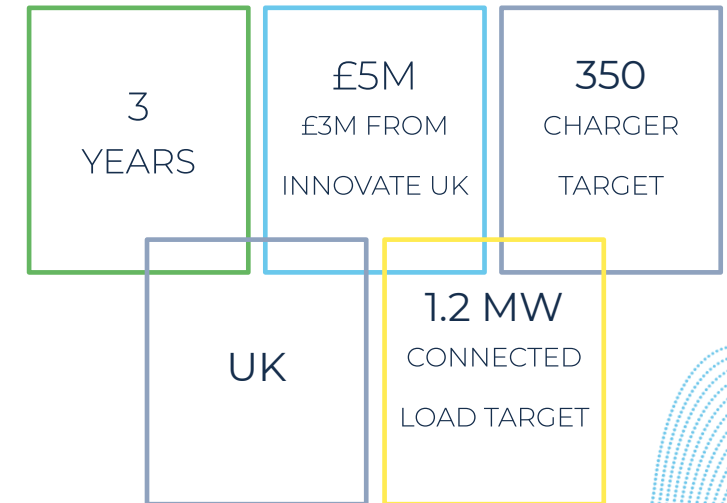
Project Background

Part of the UK's Vehicle-to-Grid competition, funded by OLEV and BEIS, in partnership with Innovate UK. Project Sciurus is the world's largest domestic V2G programme. The aim is to roll out 350+ chargers, at no cost to the customer.

Objective

Validate the technical and commercial potential for a domestic V2G charging solution capable of providing flexibility services to electricity networks and bring added benefits to the device user.

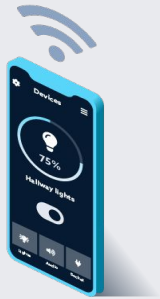
THE WORLD'S LARGEST DOMESTIC V2G PROJECT



UNLOCKING THE **THREE REGULATORY HURDLES**

Domestic flexibility - as it stands today - faces several policy challenges
High participation in residential flexibility will require market reform across three key areas

BEIS



SMART METERING AND HHS

- Smart metering and half-hourly settlement are crucial, exposing customers to price signals and incentivising flexibility

Ofgem



PRICE SIGNALS FOR FLEXIBILITY

- More granular network data essential in delivering efficient network signals down to household level



FLEXIBILITY MARKETS

- Lack of visibility and data is one of the key hurdles for enabling markets that capture the full potential of flexibility at all voltage levels