

OPTIMISE PRIME

Accelerating the transition to EV for commercial fleet operators

CONNECTED TRANSPORT

MANUFACTURING

HEALTHCARE

ENERGY AND UTILITIES

BUILDINGS & INFRASTRUCTURE

OPEN INDUSTRY

ENABLING IoT





Ram Ramachander
Chief Commercial Officer
Hitachi Social Innovation



Jim Donaldson
Director of Innovation
Hitachi Social Innovation

op | Optimise Prime

HITACHI
Inspire the Next

Uber




Scottish & Southern
Electricity Networks

centrica



Royal Mail

UK
Power
Networks



**790,000 deaths each year in the Europe and
8.9m globally are attributed to poor air quality**

Source: <https://academic.oup.com/eurheartj/article/40/20/1590/5372326>
<https://www.pnas.org/content/115/38/9592>

**Transport is responsible for a quarter of
greenhouse gas emissions
70% of transport emissions are from
road vehicles**

Source: https://ec.europa.eu/clima/policies/transport_en

More cities are announcing low, ultra-low and even zero emission zones

Complete bans on internal combustion vehicles are likely not far away

**London
Bridge
Southw
A2207**

1

How do we quantify and minimise the network impact of commercial EVs?

2

What is the value proposition for smart solutions for EV fleets and PHV operators?

3

What infrastructure (network, charging and IT) is needed to enable the EV Transition?

How will mobility services affect car ownership in cities?

In a Reversal, 'Car-Rich' Households Are Growing

Despite ride-hailing's promise, vehicle ownership (and traffic) is on the rise in America's biggest, most transit-oriented cities. So how is mobility really changing?

Citylab

Uber and Lyft to turn the wheels on car ownership: industry experts

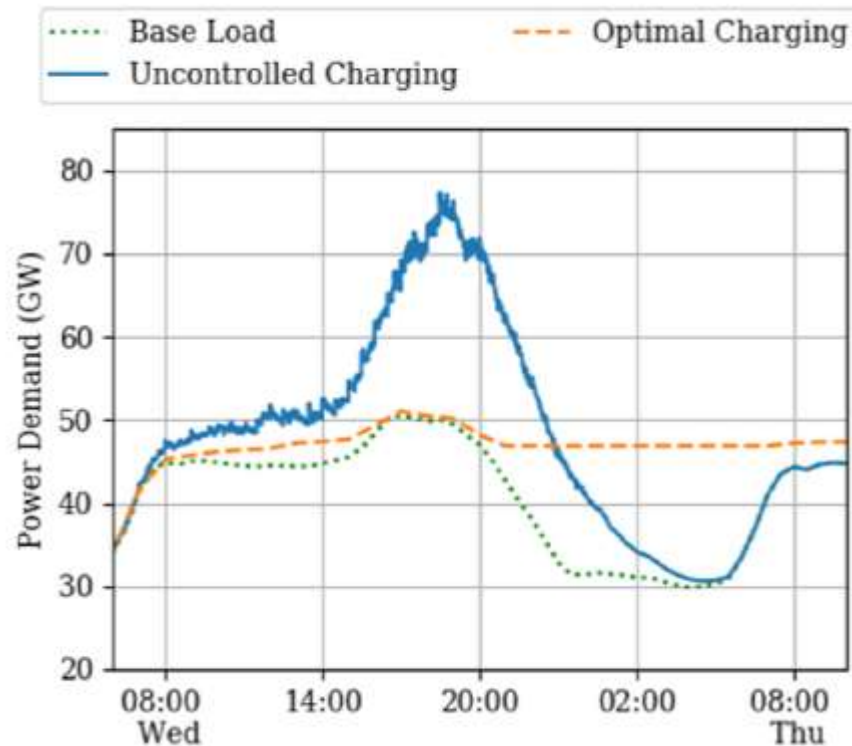
Reuters

Uber

lyft



What is the impact of 'smart' or controlled charging?

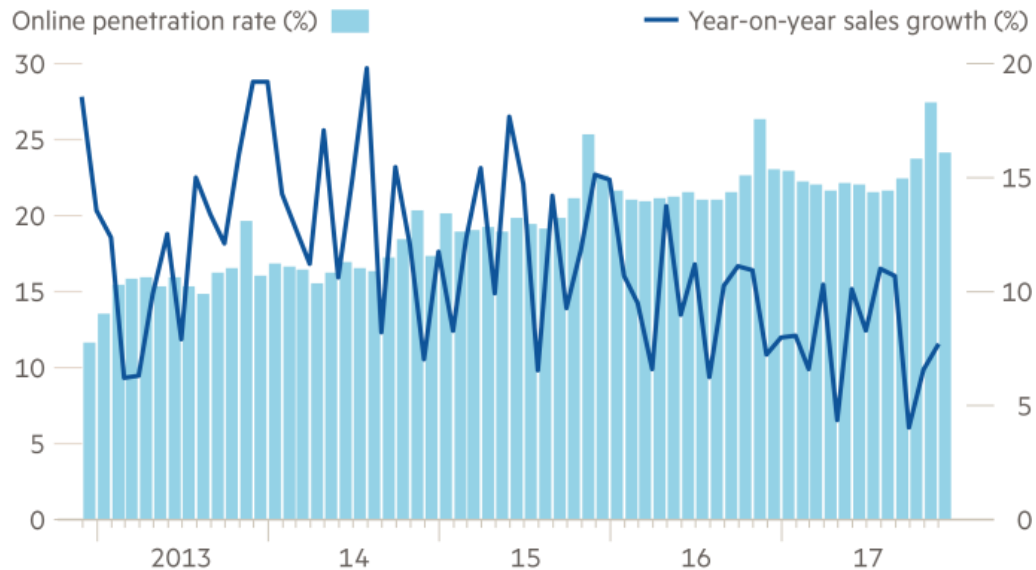


Ref: Crozier et al., Energy Policy 118 (2018) 474-481

Is there an increase
in commercial
mileage being
driven?

UK's online shopping boom

Non-food sales



Source: British Retail Consortium
© FT



Will EVs charge at centralised hubs?

Enables faster charging, mimicking
petrol stations



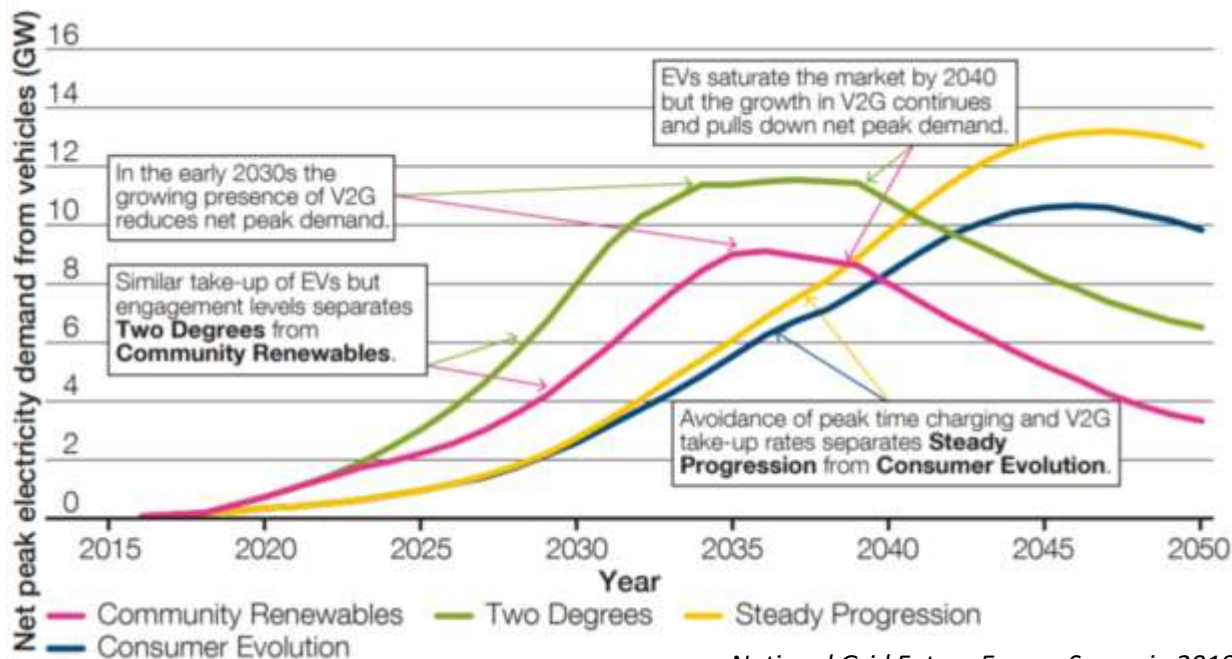
Car Fueling Today

The background of the slide is a photograph of a street lamp at sunset. The lamp is on the left, glowing with a warm light. The sky is a mix of orange, yellow, and blue. In the background, there are silhouettes of buildings and power lines.

**Electrification provides the opportunity to
change the fuelling dynamic**

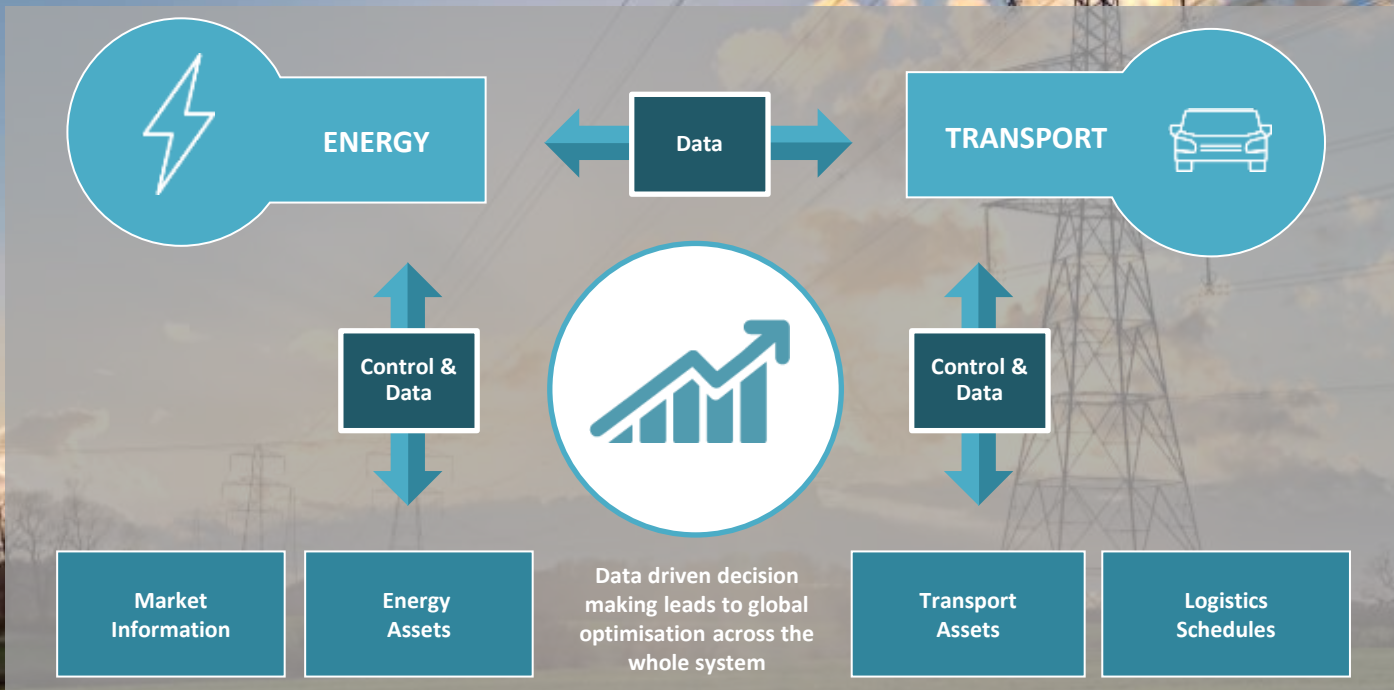
**Allows charging at home overnight – or
wherever the vehicle may be**

What is the potential impact on the grid? – some projections....



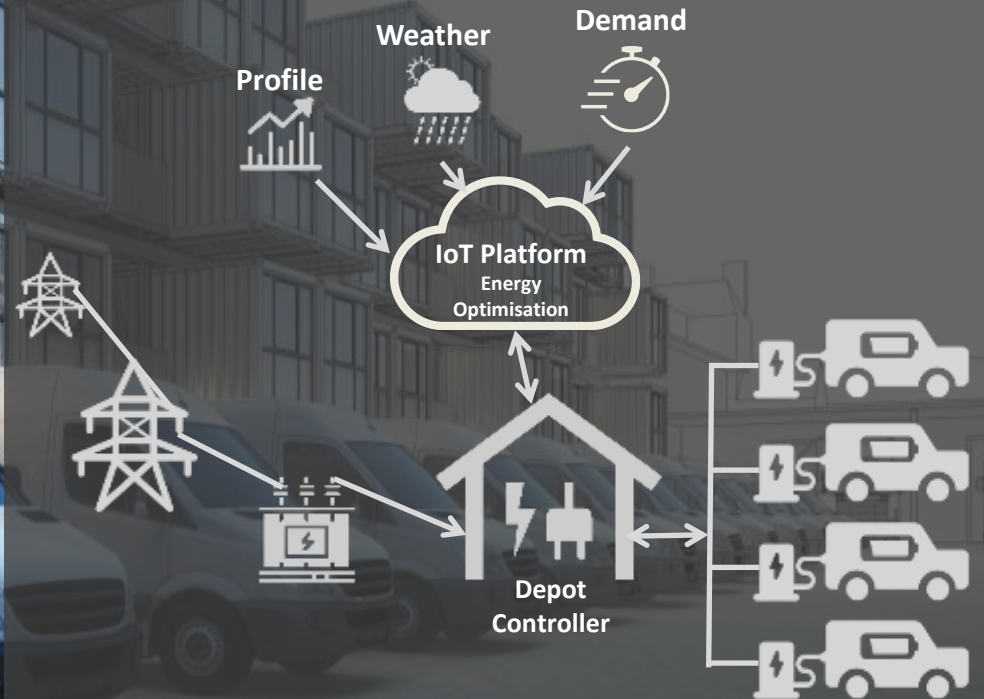
National Grid Future Energy Scenario 2018

We need to take a whole system view in order to properly understand requirements

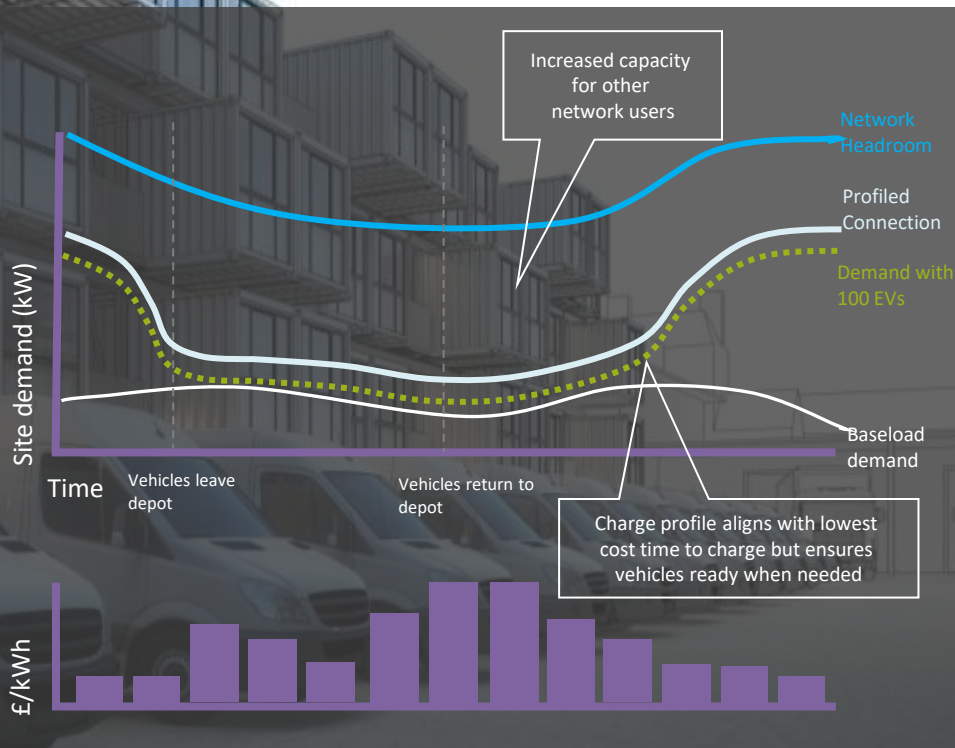


Commercial depot based fleets present potentially significant issues to the energy networks.

Deploying a large number of chargers on one site may result in potentially prohibitive connection costs.



Optimise Prime's depot optimisation tools will serve two purposes: saving money for the fleet operator and ensuring the network capacity limits are not exceeded.



There are two phases of optimisation

Infrastructure Planning

Existing telematics data and logistics information is used to predict the demand requirements of electric vehicles to allow for **optimal infrastructure specification** resulting in **lower CAPEX**

Charging Operation

Real time scheduling minimises charge costs against **variable electricity pricing** and **other value streams** resulting in **lower OPEX**

EV Charging Schedule Optimiser

EV charging schedule

Initialise

Optimise

Number of EVs

10 EVs

Number of Chargers

10 (6 kW)

Peak Power

30.2 kW

Daily Power Consumption

438.1 kWh

Contract Power [kW]

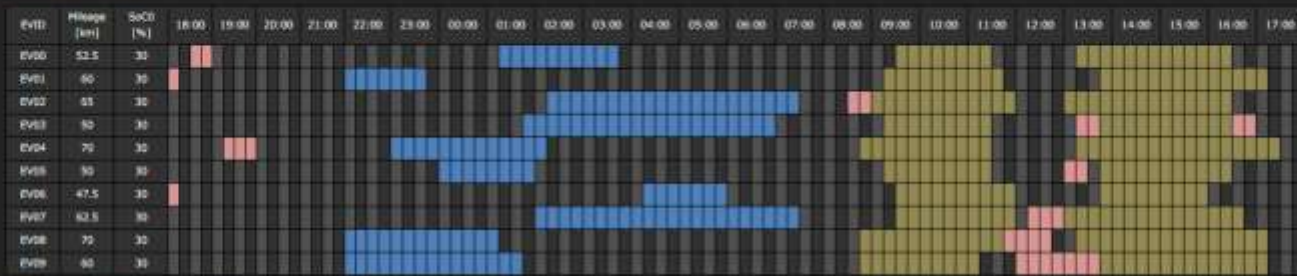
100

Daily Electricity Fee

11591.8 JPN

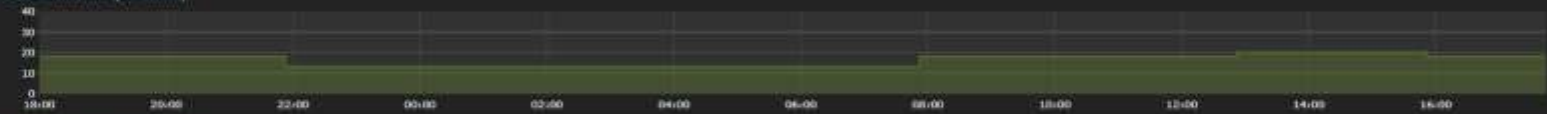
- Simulator
- Schedule
- Unit Price
- Total Power
- Building Demand
- PV Generation
- Power of Battery
- Power of All EVs
- Charging Info

EV Charging Schedule



■ Charging ■ Discharging ■ Driving

Power Unit Price [JPN/kWh]



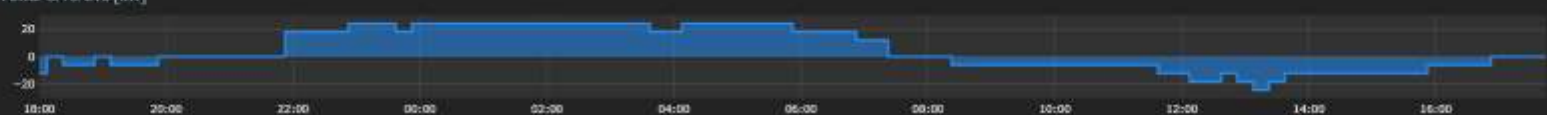
Depot Total Power Demand [kW]

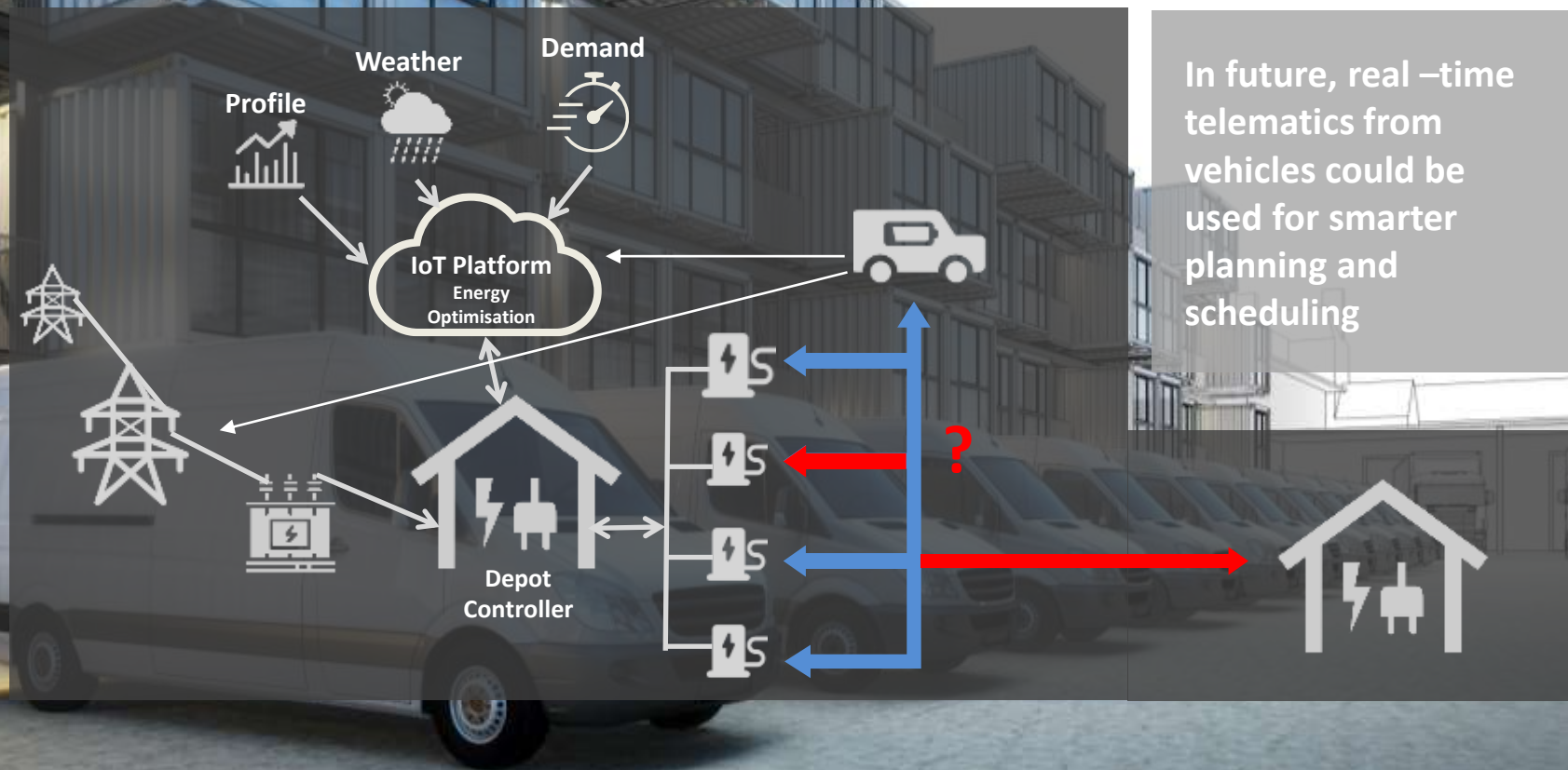


Building Power Demand [kW]



Power of All EVs [kW]







Some commercial fleets, like Uber's private hire vehicles, don't have a defined operating mode - They may charge at homes, charging hubs or at roadside chargers throughout the city.

Demand for these services is growing, yet the potential network impact is not fully understood.



Across all the trials, Hitachi will collect a huge amount of data. We'll be using analysing and forecasting to develop a range of insights of use to network and fleet operators

What are the usage profiles of commercial EVs?

What's the impact of weather and events?

Where could we make pre-emptive network upgrades?

How does state of charge vary by time and geography?

Where are the charging hotspots in the city?

Where could we use incentives to change behaviour?

The learnings and technology demonstrations resulting from Optimise Prime will pave the way to allowing fleets and utilities to accelerating the adoption of low carbon technologies.



2.7 million tons of CO2 by 2030



x 1,484 times

REDUCED LOAD ON
THE OVERALL NETWORK



1.9 GIGAWATTS

And this is just in the UK. Hitachi is currently discussing how the technologies in this programme can help fleets in the USA, Europe and Asia accelerate their journey.



Optimise Prime brings together stakeholders from across the value chain

Energy
Mobility and Logistics
Technology

Taking a whole system view, enabled by IOT, we can optimise across silos, avoiding local optimisation and creating the maximum value for all parties

HITACHI

Inspire the Next

Hitachi Social Innovation is
POWERING GOOD

Email or connect with us via LinkedIn

Ram Ramachander
Chief Commercial Officer
Hitachi Social Innovation Business
Ram.Ramachander@Hitachi-eu.com

Jim Donaldson
Director of Innovation
Hitachi Europe
Jim.Donaldson@Hitachi-eu.com