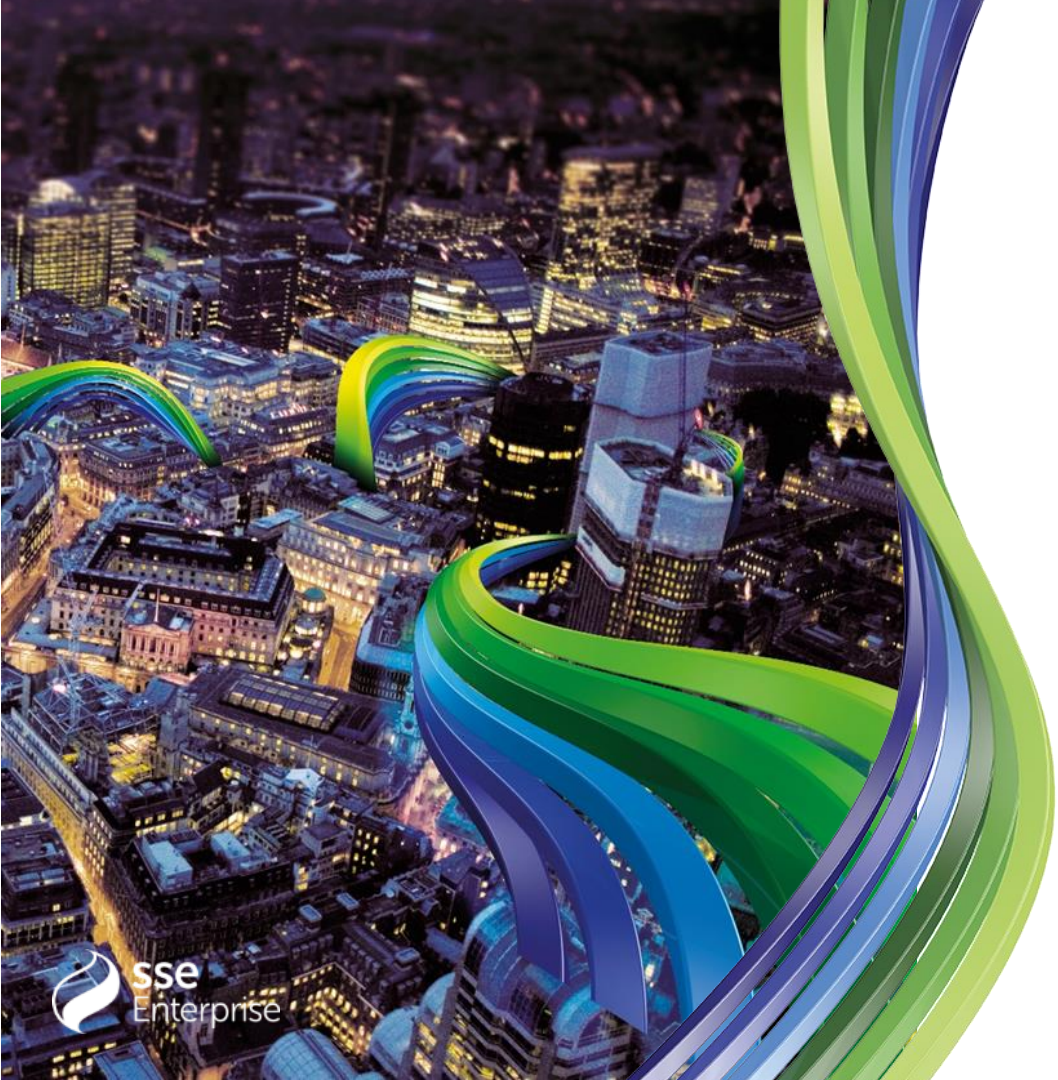

SSE Enterprise

E-Mobility Infrastructure

Overview and Capabilities

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Introduction to SSE

We're part of the SSE Group

Supporting the low-carbon transition

SSEN Transmission

SSEN Distribution

Enterprise (B2B)

SSE Renewables

Energy Customer Solutions

Thermal Energy

Energy Portfolio Management and Investments

Our vision
To be a leading energy provider in a low carbon world

Our purpose
Provide energy needed today and strive for a better world of energy for tomorrow

Our strategy
To create value for shareholders and society from developing, owning and operating energy and related infrastructure and services in a sustainable way

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Distributed Energy

Rail

Contracting

Telecoms

Distributed Energy's strategic direction

Mission: Construct, own, operate, maintain and optimise local energy infrastructure for Smart Cities in the UK and Ireland

Asset Ownership	Smart Enablement	Integrated Local Energy Systems

Develop opportunities in the Public Sector, Private Sector, focusing on Transport, Utilities Commercial and Industrial

Vision: Be the leading low-carbon localised smart energy infrastructure solution provider in the UK and Ireland

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Distributed Energy

SSE intends to be a leader in the emerging **£20bn** distributed energy market.

Employing technological advances in **flexible generation and storage**, **digital platforms, consumption** and **energy management** to deliver resilient, optimised energy infrastructure closer to the point of need.

Our long-term investment ensures security of sustainable energy supply and helps our clients meet their economic, social and environmental goals.

- Electricity, heating and cooling networks
- Distributed generation and storage
- Electric vehicle charging infrastructure
- Building and site energy optimisation
- Smart city and smart place solutions
- Energy as a Service

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"We are delighted to be working with SSE Enterprise, a company that shares our core values of sustainability and customer service excellence."

Gerry Walker,
Regional Development Director at A2Dominion

Multi-utility infrastructure

Developers face the challenge of building essential energy-related services and solutions into their construction projects.

We offer new and innovative ways to deliver, manage and invest in energy infrastructure.

- **We invest** directly in energy infrastructure, reducing the capital cost of your project.
- **Staged payment** plans, tailored to the needs of each individual project.
- **Innovation** through addition of DG&S; EV; Heating and cooling; Energy management.

We have over a decade's experience delivering energy infrastructure solutions.

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On the road to decarbonisation, Distributed Energy will be SSE's local, flexible energy arm…

Market changes affecting SSE

Decarbonisation of heat, transport and power

- Flexible data-driven energy and networks
- Locally managed electricity networks
- Growing grid constraints
- Growth in local energy generation

DE is positioning to be a leader in the potentially disruptive markets…

Local, flexible energy for Smart Cities and Places

- Infrastructure for Heat and Transport
- Flexible small-scale low-carbon generation and grid management
- Smart EV charging, generation and buildings
- Small-scale network owner and operator

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SSE Enterprise Fleet Update

Scotland has set ambitious transport targets…

NEWS

Home | UK | World | Business | Election 2019 | Tech | Science | Health | Family & Edu

Scotland | Scotland Politics | Scotland Business | Edinburgh, Fife & East | Glasgow & West

Climate change: Scotland to set faster target for net-zero emissions

By Kevin Keane
BBC Scotland's environment correspondent

Police Scotland proposes all-electric vehicle fleet

Police Scotland is planning to become the first UK emergency service to go fully green by replacing its entire vehicle fleet with electric or hybrid vehicles.

Sep 12, 2019 By Tony Thompson

Scotland aims to phase out petrol and diesel by 2032

Scotland to 'phase out' petrol and diesel cars and vans in public sector fleets by 2025

Accelerating growth through investment and partnerships

SSE can provide asset financing models or, if the client has sufficient funding, then offer a design, install and operate solution as appropriate.

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e-Fleet model

SSE's e-Fleet proposition delivers an end-to-end solution to workplaces, taxis fleets and depot-based operators looking to electrify their fleet, from planning and provision of EV charging infrastructure, O&M and energy supply with SSE's sustainable EV business tariffs.

Best Advice

Full consultancy, design & project management for transitioning to electric vehicles

Our service provides you with specialist guidance to help you reach and sustain your corporate objectives including cost reduction and mitigating environmental impact. With experience, expertise and innovative thinking in a variety of disciplines, incorporating EV hardware and software, design and planning, grid infrastructure, HR and tax implications, procurement and funding options. Our consultants take a holistic approach when reviewing your strategic requirements:

- ✓ tailored features
- ✓ bespoke solutions
- ✓ charging pattern
- ✓ distributed energy
- ✓ optimising charging demand
- ✓ charging infrastructure

Depots - EV Hubs - Workplaces

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Our Strengths

- Integrated end-to-end solution
- Hardware agnostic
- Open Charge Point Protocol
- Flexible Back office/online tools
- Apps, RFID and Contactless Payments
- Future-proofed
- First class partnerships
- Nationwide coverage
- Safety record

Client Benefits

- Future proofed
- Hardware agnostic
- Open Charge Point Protocol
- Flexible Back office/online tools
- Apps, RFID and Contactless Payments

- Operation and maintenance
- Warranty
- Finance options
- Integrated end-to-end solution
- Strong safety record
- First class partnerships
- Nationwide coverage

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Innovative Solutions adding Value

Revenues

Generation of revenues through energy sales, DSR and ancillary services supply, 3rd party charging

Savings

Energy management platform to minimise the risk of commodity volatility

Carbon Savings

100% green energy tariff and solar generation on site

Resilience

Our design, build and maintain complex infrastructure to ensure security of supply

Grid constraints resolution

Resolution of problematic grid connections, savings of money and time

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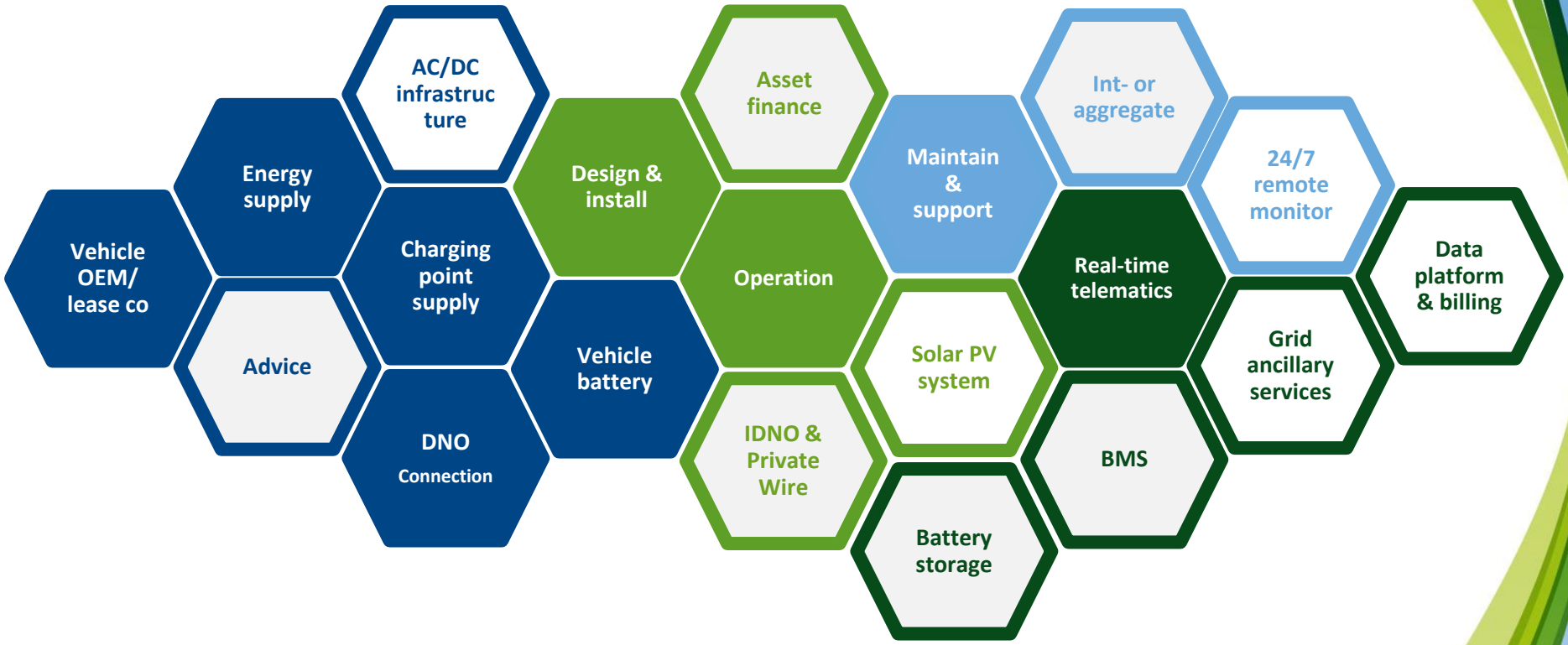
Integrating the Building Blocks for E-Mobility Solution



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UK EV Engagement

Current Partnerships

- ***Bus Depots and Operators*** – electrified 298 of 300 buses in London. Delivered World's first fully electrified Depot. In discussion with 3 major national operators for exclusive delivery for their UK roll out
- ***Source London*** – 6,000 ChargePoint roll-out
- ***Bus2Grid*** – first of its kind multi-MW demonstration of technical and commercial potential of e-buses to support the electricity system via V2G
- ***Oxford Park and Charge*** – 35 sites/ 250+ charge points

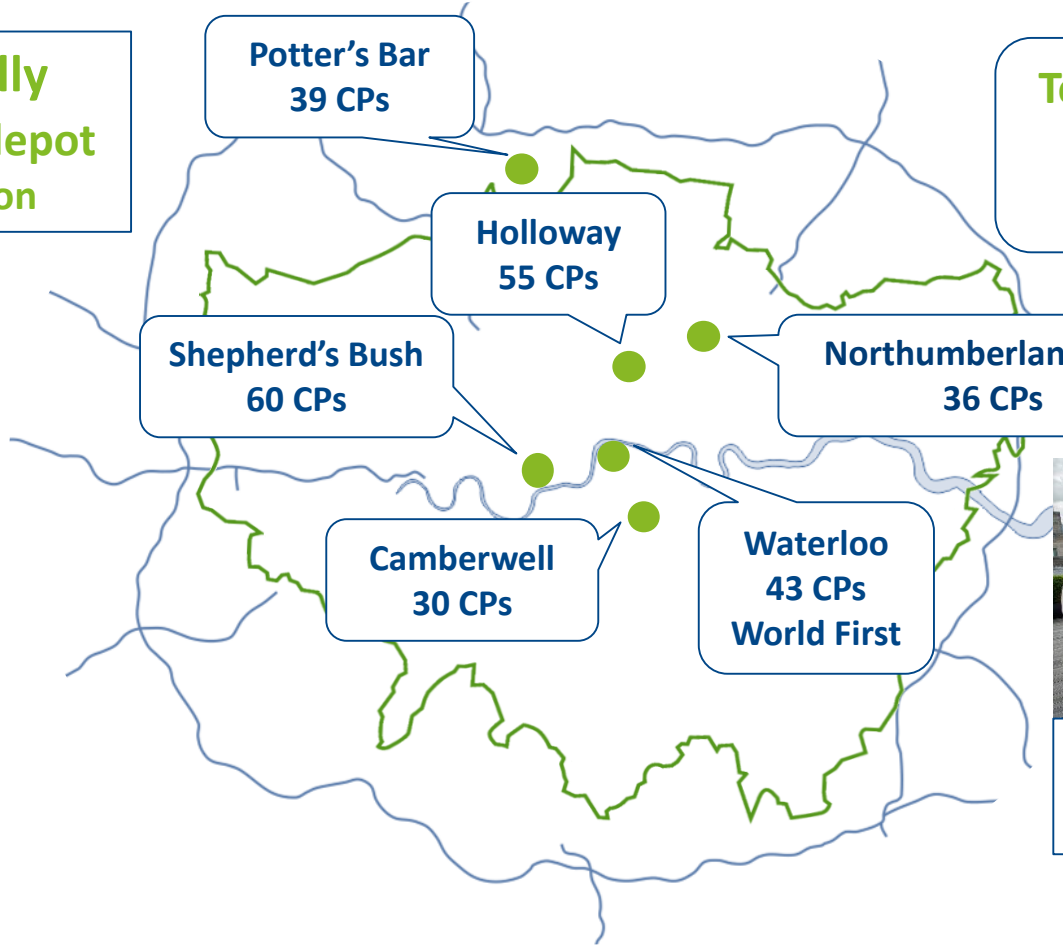
UK EV Engagement

Working with…

- London based client – 75,000 vehicle EV fleet nationwide solution
- ***Gridserve*** strategic partnership (electric forecourts)
- **West Cumbria Consortia** to deliver 200 CP's with battery and smart technology
- National Car lease and Rental Enterprises – UK Rollout solutions
- National Car Park Operators with 5000 CP requirement
- Utilisation of 3rd Party Land for EV Hubs for Fleet
- ***EV100*** – 2030 electrification objective
- ***Go Ultra Low*** – OLEV 2019 / 2020 campaign
- Senior partner in ***TfL Infrastructure Taskforce***

Strong Support of Innovation in London

first fully electric depot in London



Total ~300 e-bus operating in London

We are members of the TfL EV Taskforce

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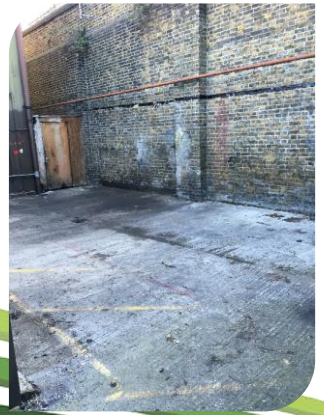
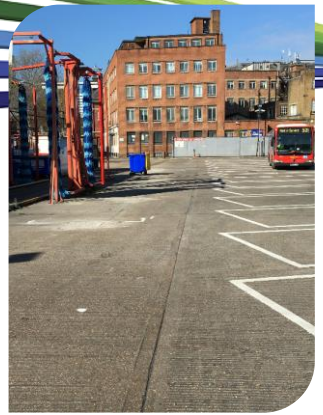
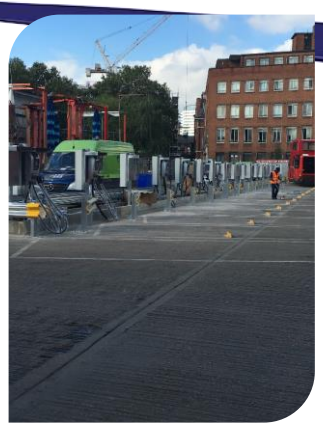
* CPs = Charging Points

Waterloo 43 CP's World's First Fully Electrified Bus Depot







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Shepherd’s Bush 50 CP’s

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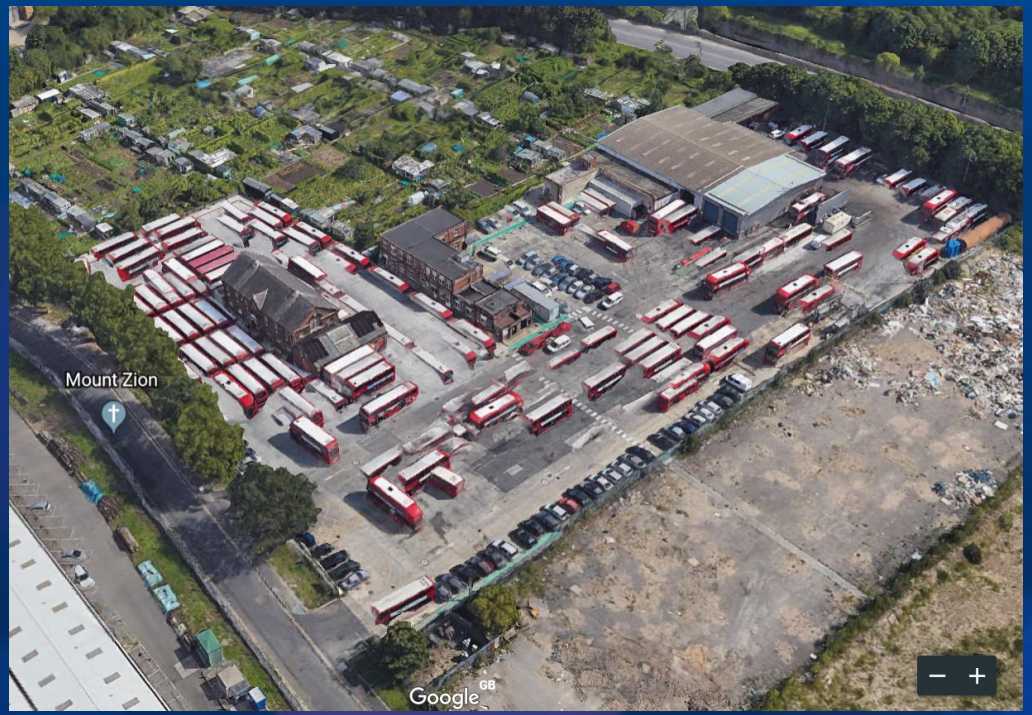
Creating smart electrification networks to unlock revenue from infrastructure assets

Northumberland Park
91 e-buses
2x2.5MVA loading (peak)
Daytime bus service
3rd party charging for fleets and V2G trial



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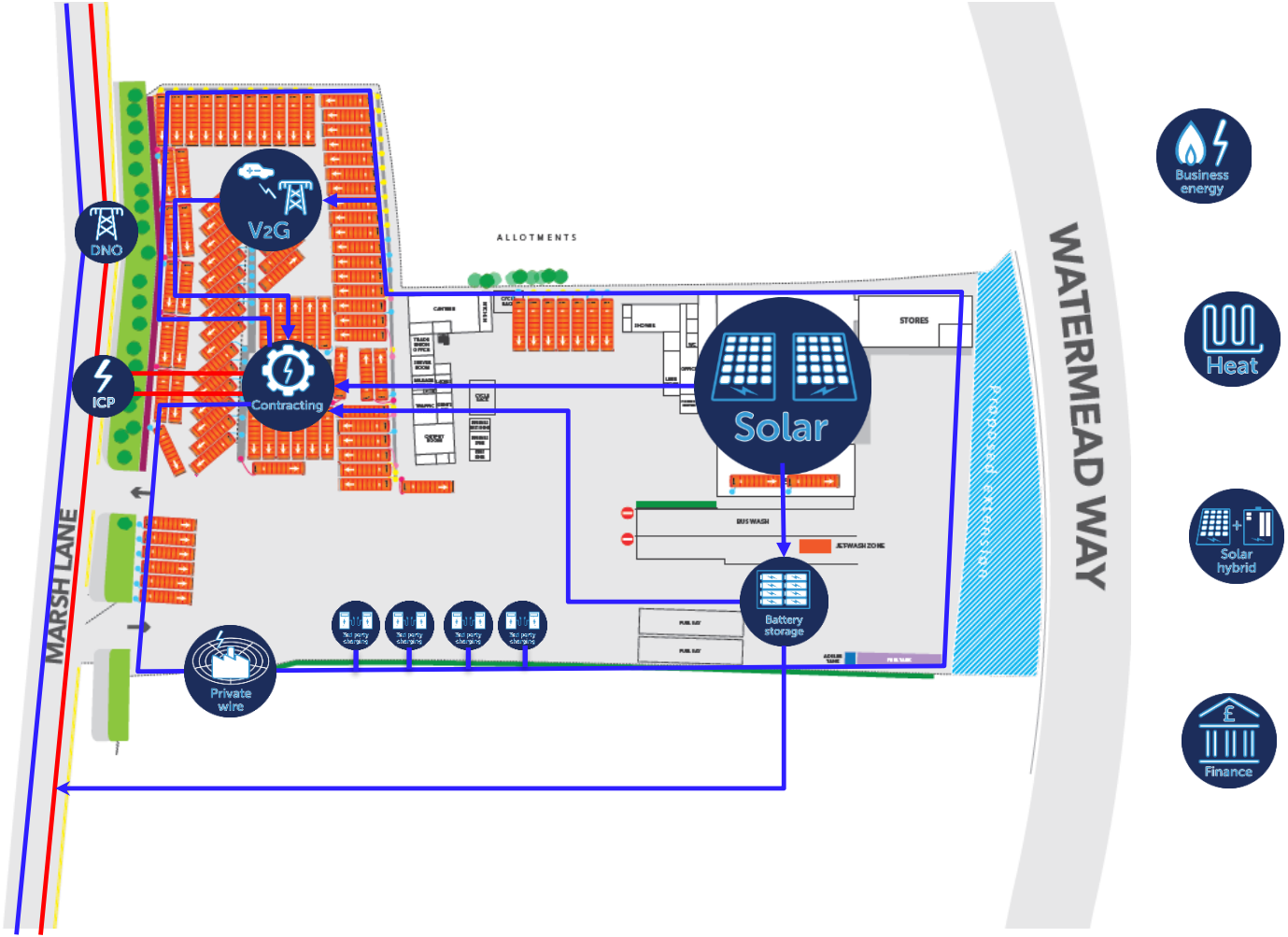

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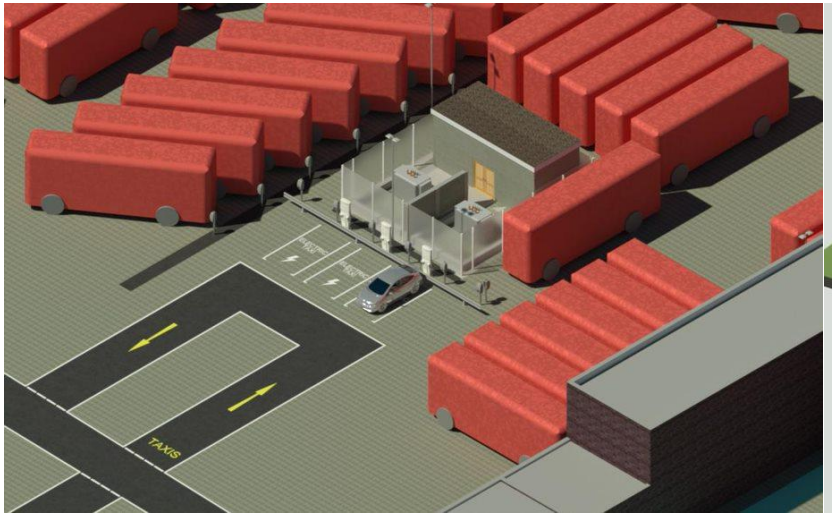

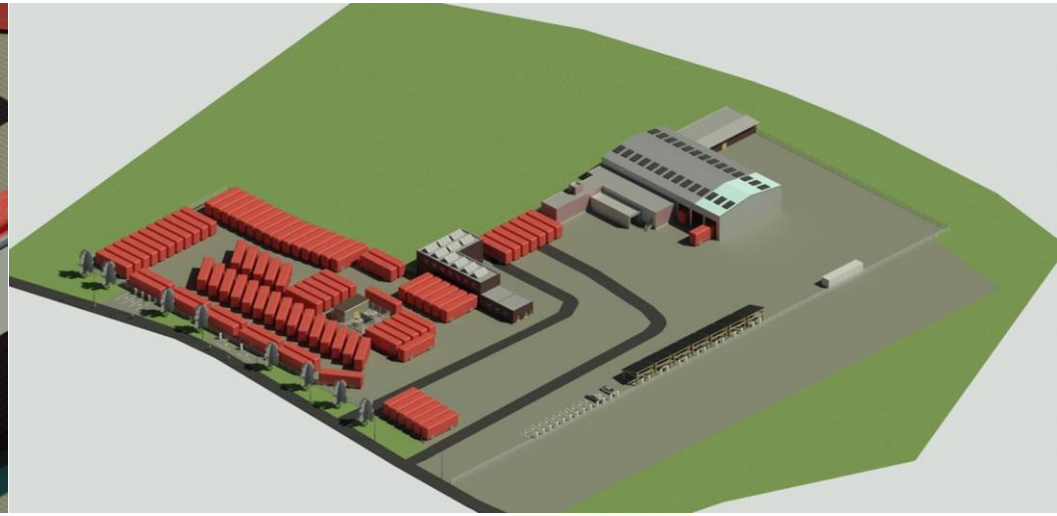

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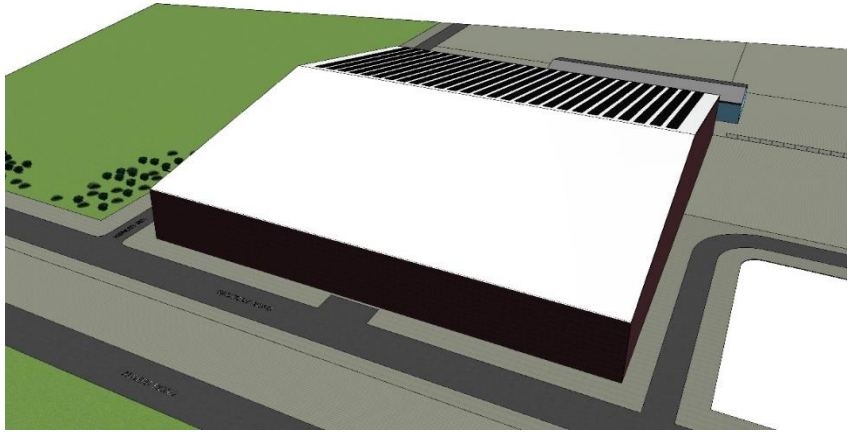
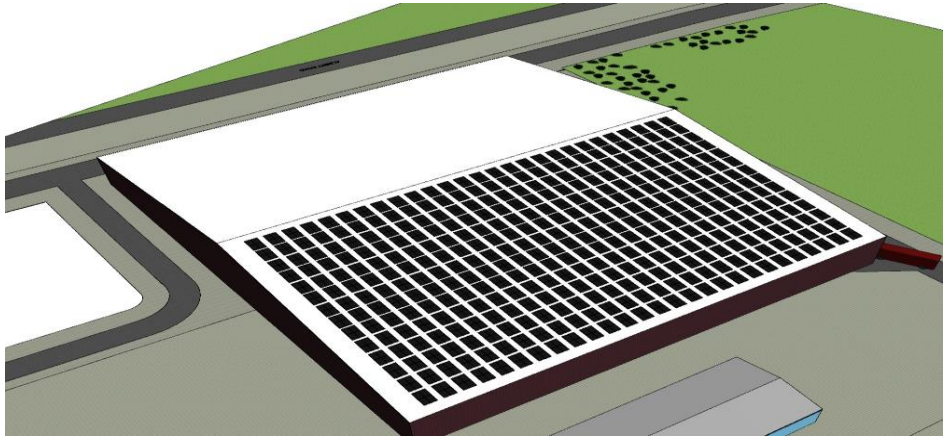
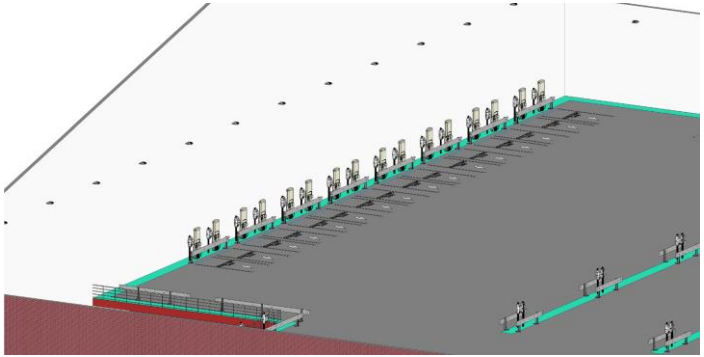
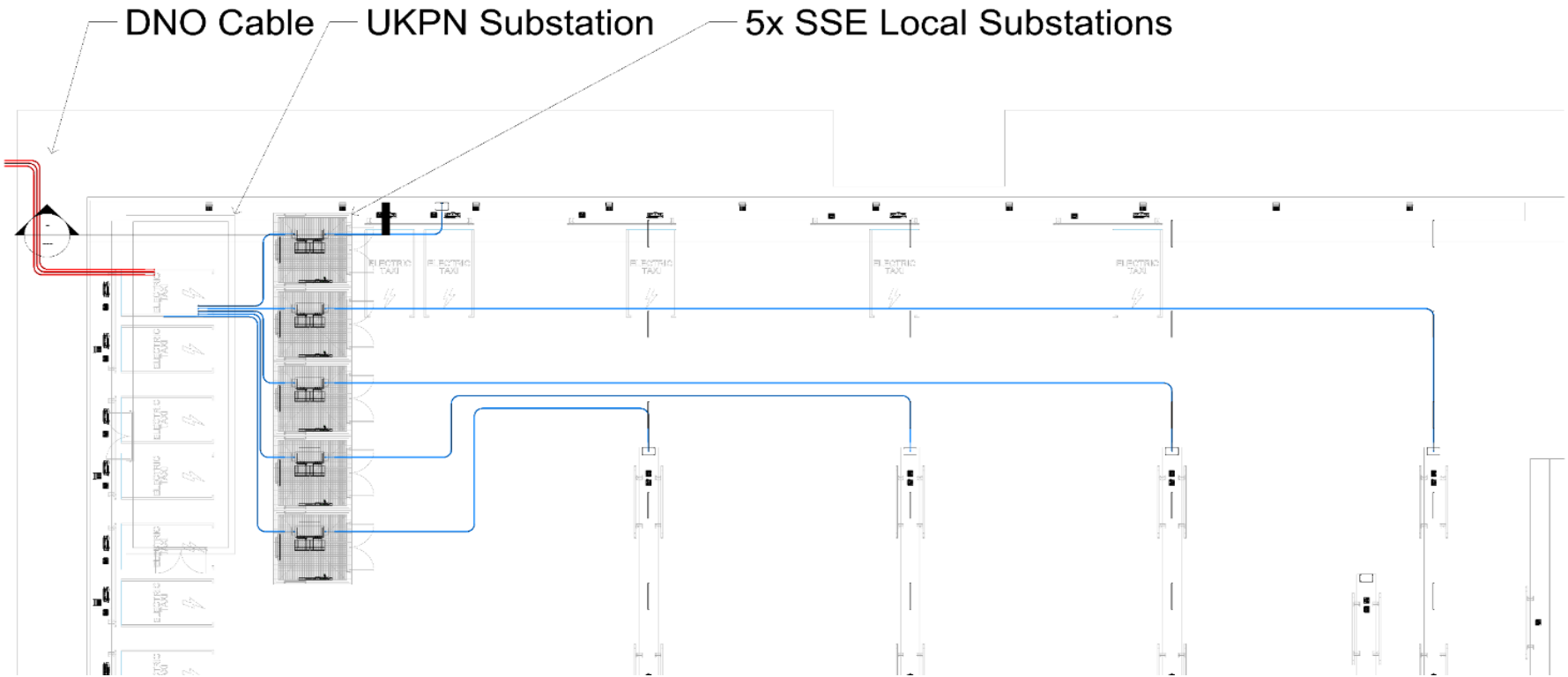
Creating Innovation from the Ground Up



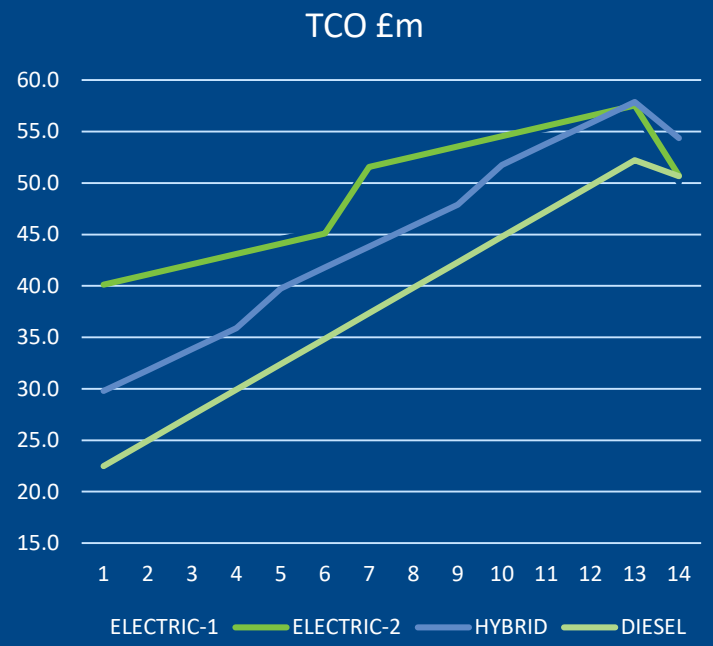




We have the ability to design, install, own and operate complex networks on behalf of our clients



14yr Total Cost of Ownership



	Year	1	5	7	10	14
ELECTRIC-1	Depot Capex	1,091				
	Bus Capex	39,130				
	One-off Costs	0		5,460		-7,826
	Annual Opex	872				
	TOTAL £K	41,093	44,581	51,784	54,400	50,062
	£/mile					**0.89**
ELECTRIC-2 Financed	Depot Capex	0				
	Bus Capex	39,130				
	One-off Costs	0		5,460		-7,826
	Annual Opex	997				
	TOTAL £K	40,127	44,113	51,567	54,557	50,718
	£/mile					**0.90**
HYBRID	Depot Capex	0				
	Bus Capex	27,755				
	One-off Costs	0	1,820		1,820	-5,551
	Annual Opex	2,037				
	TOTAL £K	29,792	39,762	43,836	51,768	54,366
	£/mile					**0.97**
DIESEL	Depot Capex	0				
	Bus Capex	20,020				
	One-off Costs	0				-4,004
	Annual Opex	2,476				
	TOTAL £K	22,496	32,401	37,353	44,781	50,682
	£/mile					**0.90**

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SSE Solutions for EV Fleet Charging

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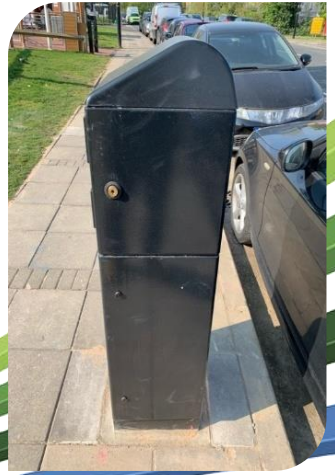



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Charging Infrastructure Investments


At home


At Work


Depots

Fast Charging Point	Fast Charging Point	Rapid Charging Point
£359	**£3k-£10k**	**£25-£40k**
Charging point & installation	Charging point & installation	Charging point & installation
EO Mini Pro (smart, up to 7.2kW, 3yr warranty)	Supply chain: EO Charging, Alfen, Schneider, Ensto (smart, 7-22kW, 3yr warranty)	Supply chain: Tritium, Siemens (smart +50kW, yrs of warranty vary across OEMs)
(inc. OLEV EV Homecharge scheme, inc. VAT)	(inc. OLEV Workplace charging scheme)	Doesn't include potential DNO connection costs

SSE Group Fleet Update

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EV100

THE CLIMATE GROUP

SSE Group
EV Roll-Out (EV100)

Vehicle and charging expectation & experience:

- Drive cycle modelling and predictability
- Match vehicle range / specification to requirement
- Vehicle availability
- Vehicle asset/lease cost, depreciation, TCO
- Human factors of interaction with new fleet / journey planning
- Ensuring customer engagement and positive experience
- Being ready when things don't go as planned…

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Deployment of charging infrastructure:

- Charger distribution between home, office, depots
- Challenges of different installation requirements
- Charger specification and performance (as relates to usage case)
- Charger availability and scheduling to avoid excessive infrastructure build
- Parking policy integration
- Infrastructure planning, energy supplier engagement, works scheduling and contract management
- Awareness and behavioural change management

Group Requirements

1. Member of Global EV100 = 2030 SSE fleet migration to EVs, infrastructure commitments and achieve zero emission fleet
2. Clyde Windfarm, Perth A9 requirements (Depot pilot for cars and fleet vehicles)
3. Develop group “parking strategy” including EV infrastructure requirements for 2020 and beyond
4. Reduce Group CO2 footprint and mitigate ULEZ / CAZ impact to operation and cost base

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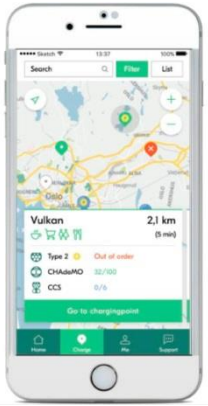
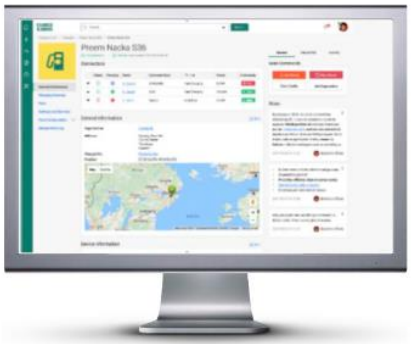
Excellent end user experience…

1. Interface for EV driver (app)



- Enables EV driver to:
  - locate charger and start/stop charging
  - Manage payments
  - Contact customer support
  - See charging history
- Offered as SSE White label

2. Back-end platform for business operations



- Connect & configure chargers
- Remote monitoring & diagnostics
- Remote firmware updates
- Technical error detection
- User management and RFID issue
- Price plan administration
- Enable business analytics
- Customer Service dashboard
- Reporting tools

…to satisfy managers and users needs, in continuous development

- Broad access to charging points at workplaces, public stations and home
- Ability to manage multiple fleets
- Manage fleet member accounts & vehicles
- Order RFID charging keys for delivery to fleet users
- Set charger access restrictions & visibility of chargers to drivers
- Full charging history for fleet managers and drivers
- One bill and total overview of fleet costs for charging at all stations
- Price control and transparency
- Automatic reimbursement for charging at home
- Customer support for fleet managers and drivers

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In Summary

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Innovation and collaboration are key

SSE Enterprise wins government funding to pilot Oxfordshire EV charging hubs

SSE Enterprise-led consortium wins funding to power the smart electric buses of the future

PARK & CHARGE
Electrify Oxfordshire

Up to 300 chargers installed in residential **'charging hubs'** using car parks located in residential areas
The pilot will provide drivers from across the county who don't have access to home charging, with chargers sited at a local 'hub' to overnight.

Innovate UK
UK Research and Innovation

BUS2GRID

V2G technology is key to manage increasing energy demand.

Testing in pilot test centre starting early 2020.
Large scale demonstration operational by early H2 2020.

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World-class fleet solutions underpinned by exceptional partnerships

Our achievements	Our current work and partners	Our innovation
Source London: >1,000 charging points delivered	Transport for London	Bus2Grid/ Oxford Park and Charge
Pioneer on bus depot electrification	SMMT and OLEV (Go Ultra Low)	Solar Integration – DG&S
Fleet pilot for Severn Trent Water	Robust charging point supply chain	Smart Cities
	Partnership with world leader back office provider	Digital Service platform

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Broader SSE group engagement on EVs

Project LEO

£40m project to test electricity market flexibility models and markets across Oxfordshire.

It will explore how the growth in local renewables, electric vehicles, battery storage, vehicle-to-grid technology and demand side response can be supported by a local, flexible and responsive electricity grid to ensure value for consumers and opportunities for communities and market providers.

LEO Local Energy Oxfordshire

e of the most ambitious, wide-ranging, innovative, and holistic smart grid

Optimise Prime

three-year innovation project that will develop practical ways of overcoming the up-front costs that are holding back many of the country's biggest commercial vehicle operators from making the switch to EVs.

Led by global data technology solutions provider Hitachi Vantara and electricity distributor UK Power Networks, the trial will see up to 3,000 electric vehicles take to the road, supported by distribution network operator, SSEN.

SSEN's Optimise Prime project wins international environmental sustainability award

Community, Environment, Keeping the lights on, Making a difference / 07 October 2019

Scottish and Southern Electricity Networks (SSEN) is delighted to accept the Hitachi Transformation Award for the Optimise Prime project, which is the world's largest commercial EV project dedicated to accelerating the transition to electric vehicles (EVs).

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Our EV Offer – to be the integrator

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