SHIFT 2010

Dr. Cristiano Marantes
Low Carbon Networks Development Manager
UK Power Networks

2nd December 2010
Cambridge

UK Power Networks

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- UKPN trials and studies
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UK POWER NETWORKS

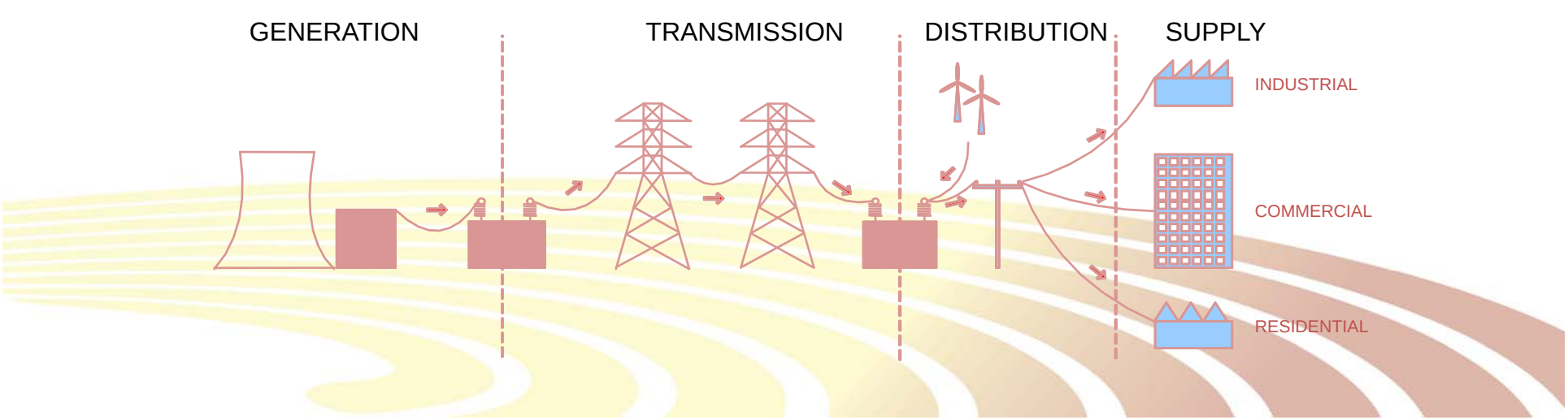
UK Power Networks

Cheung Kong Infrastructure Holdings Limited
長江基建集團有限公司

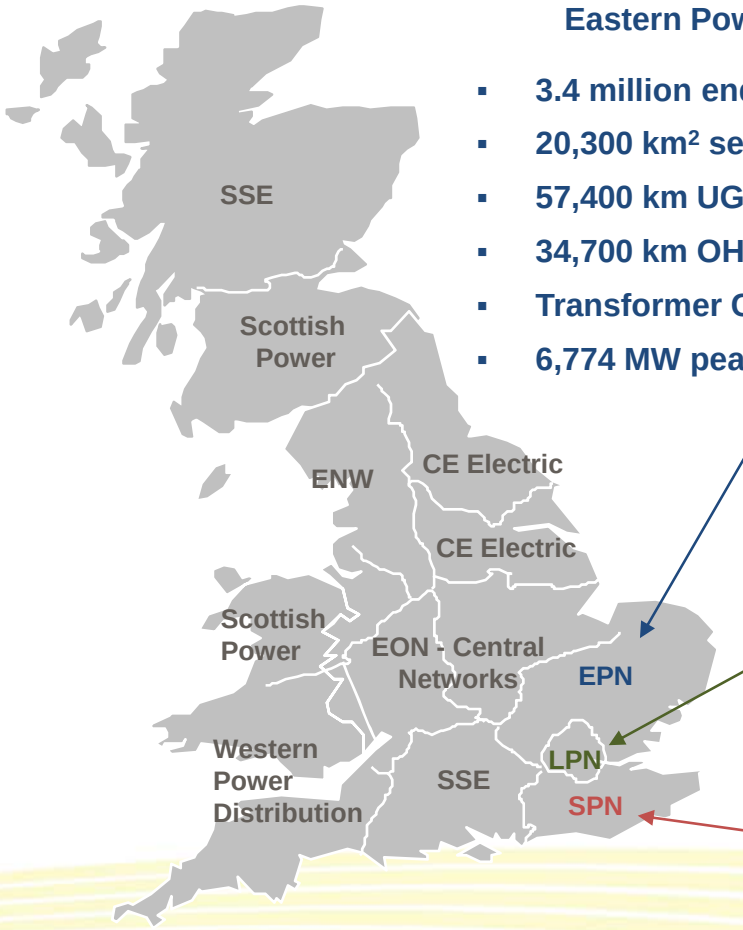
hongkong electric 港燈
HK Electric

李嘉誠基金會
LI KA SHING FOUNDATION
Education · Healthcare · Culture · Community

UK Power Networks



UK Power Networks



Eastern Power Networks

- 3.4 million end customers
- 20,300 km^2 service area
- 57,400 km UG network
- 34,700 km OH network
- Transformer Capacity 39,000 MVA
- 6,774 MW peak demand

London Power Networks

- 2.2 million end customers
- 665 km^2 service area
- 30,900 km UG network
- 47 km OH network
- Transformer Capacity 20,000 MVA
- 5,154 MW peak demand

South East Power Networks

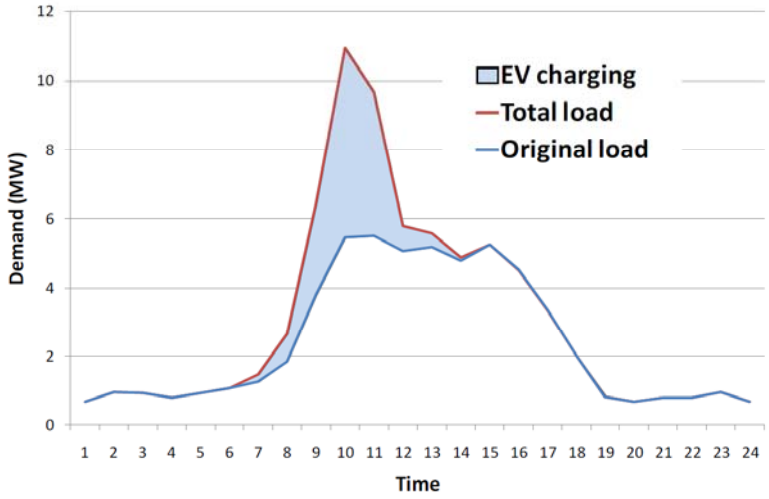
- 2.2 million end customers
- 8,200 km^2 service area
- 37,000 km UG network
- 12,900 km OH network
- Transformer Capacity 24,000 MVA
- 4,166 MW peak demand

Source: UKPN Long Term Development Statements 2009

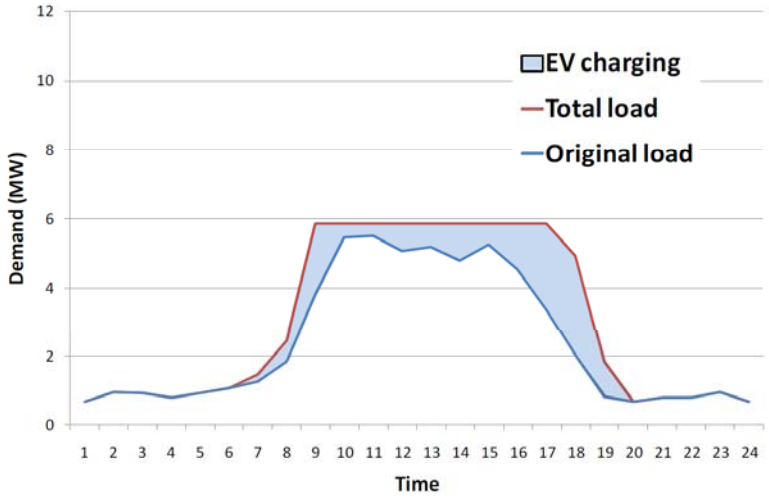
UKPN TRIALS AND STUDIES

Impact of EV work place charging

"Business as usual (BaU)"



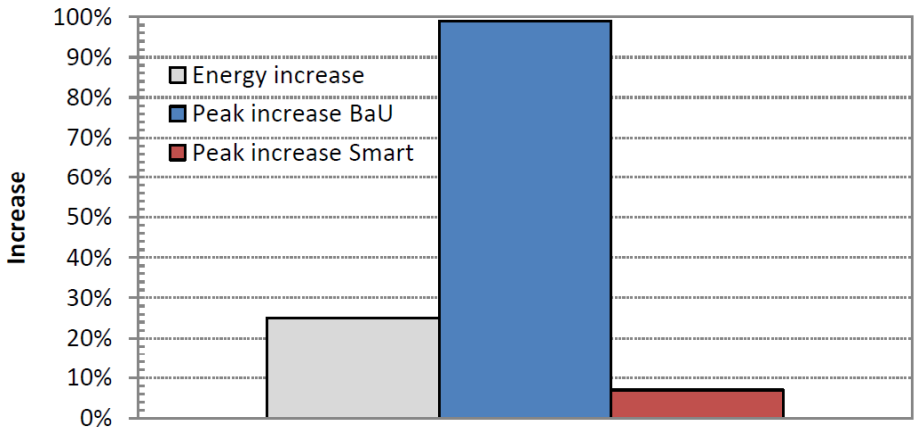
"Smart charging"

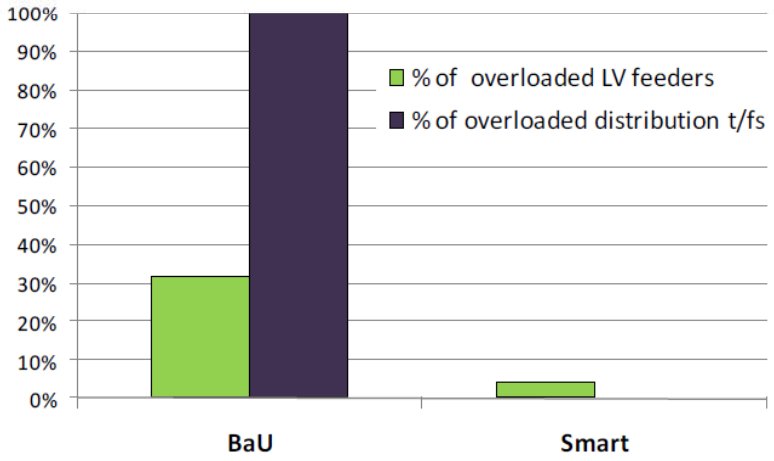


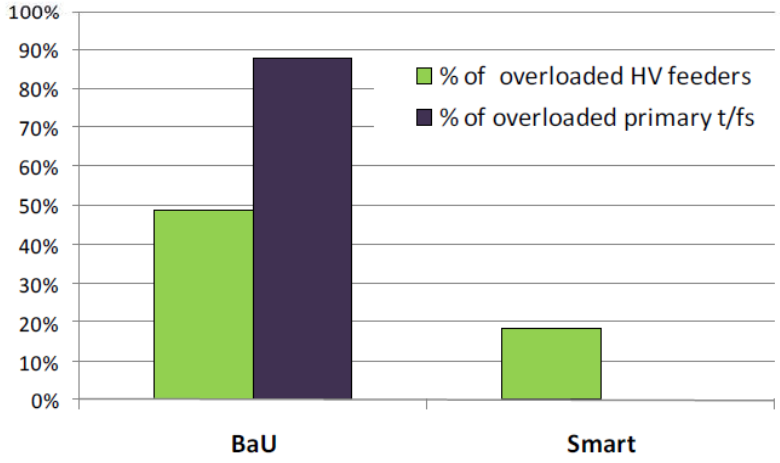
- Commercial district (1 km^2)
- Charging of 5,000 EVs following arrivals to work

Impact of EV work place charging

- **BaU** - increases network peak demand & degradation in network asset utilisation.
- **Smart charging** - critical to mitigate expensive network reinforcement.

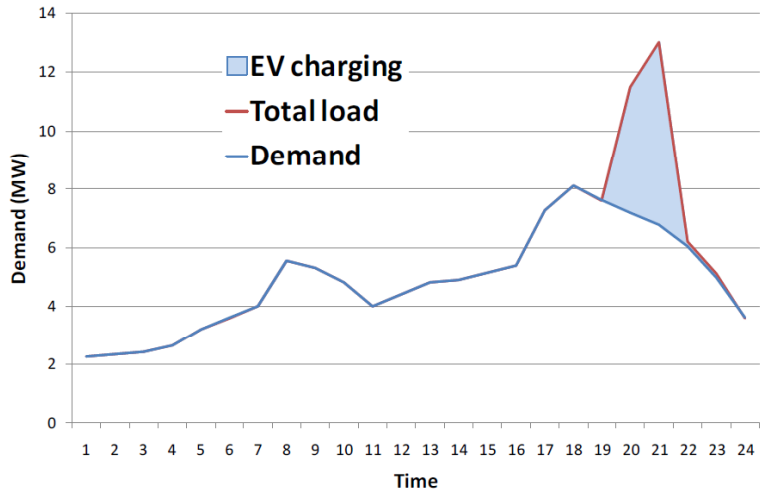




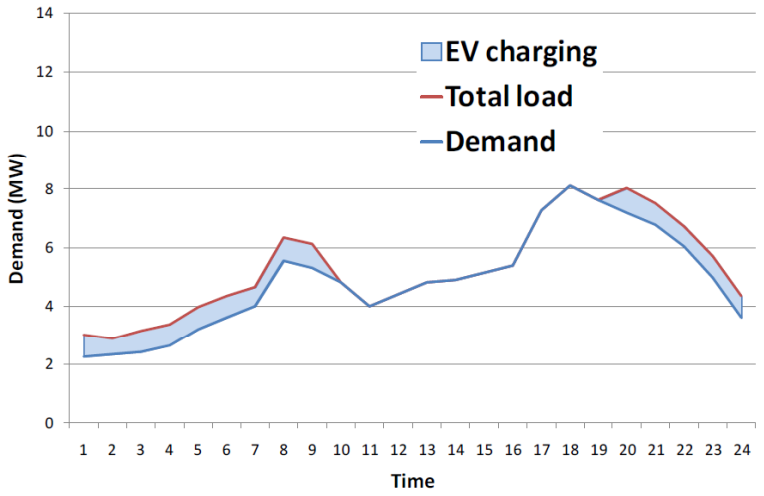


Impact of EV home charging

"Business as usual (BaU)"

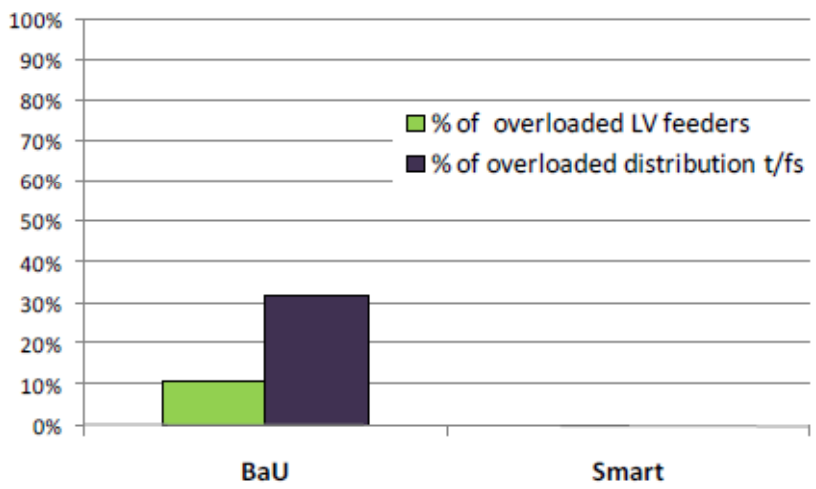


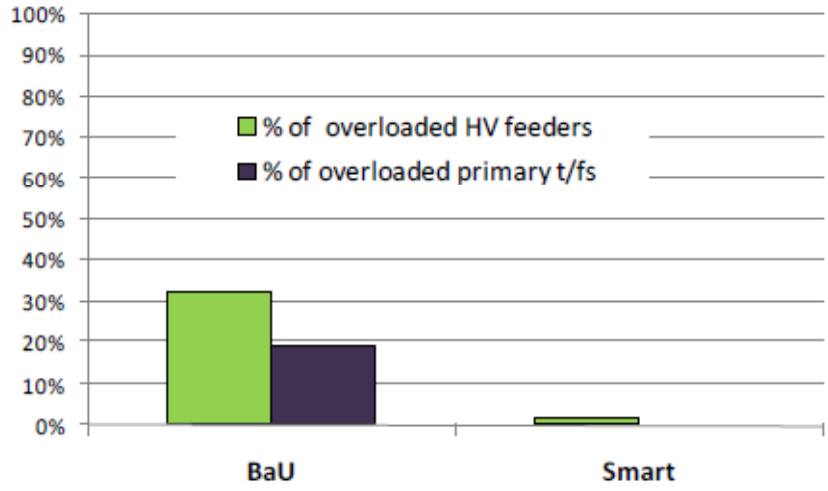
"Smart charging"



- Residential area (8,000 properties)
- Charging of 5,000 EVs when people return from work

Impact of EV home charging





Under a Smart operating regime, a large increase in peak demand (and hence a massive network reinforcement cost) can be avoided

Low Carbon London – A Learning Journey

MAYOR OF LONDON

Transport for London

SIEMENS

Imperial College London

logica

smarter grid solutions

ENERNOC

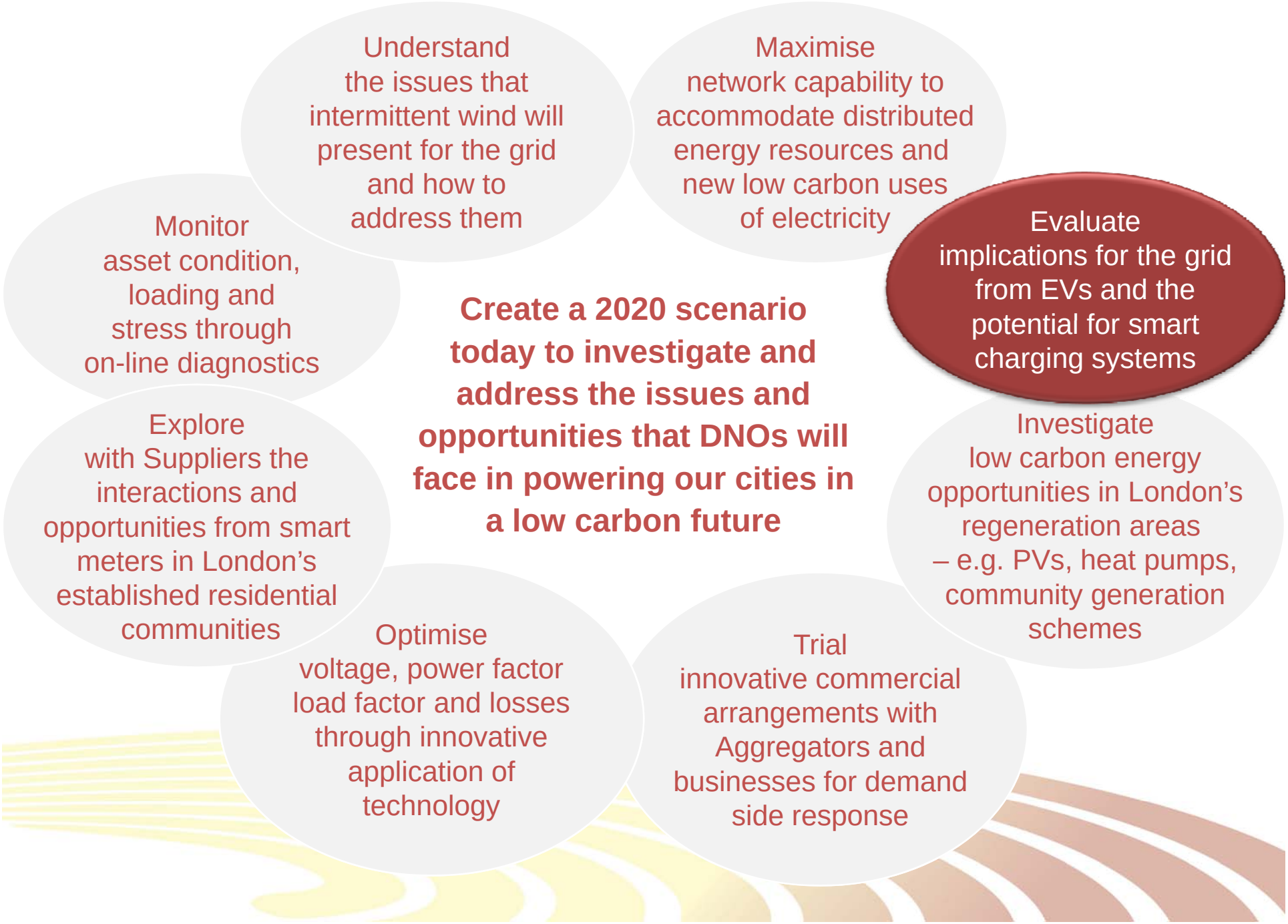
EDF ENERGY

flexitricity

nationalgrid

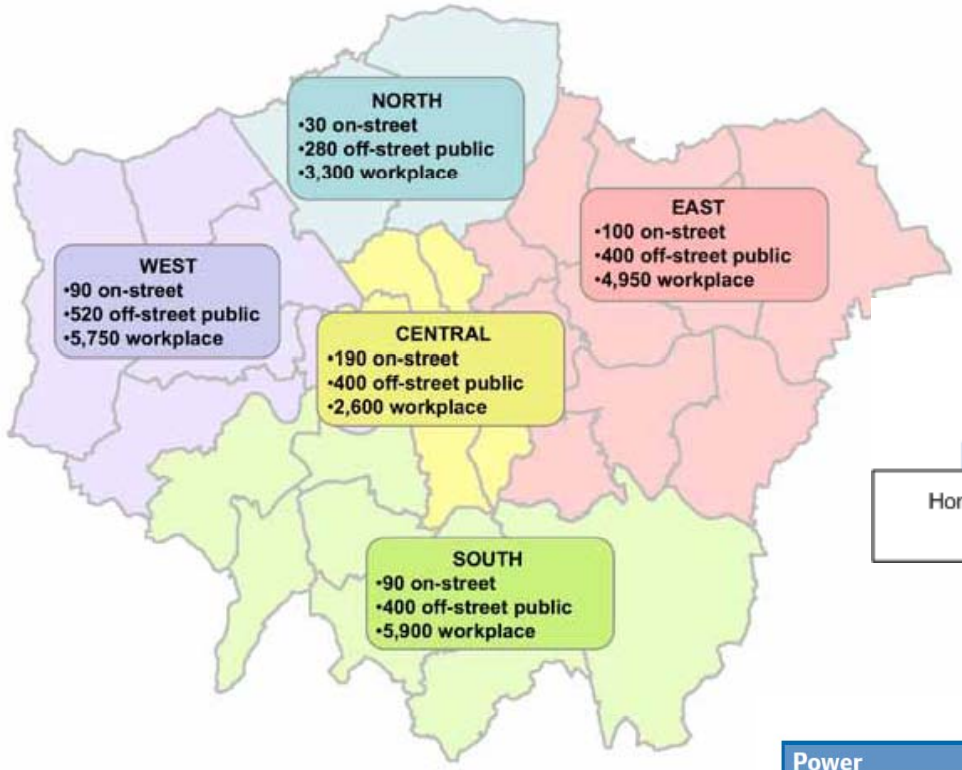
Thames Gateway Institute for Sustainability

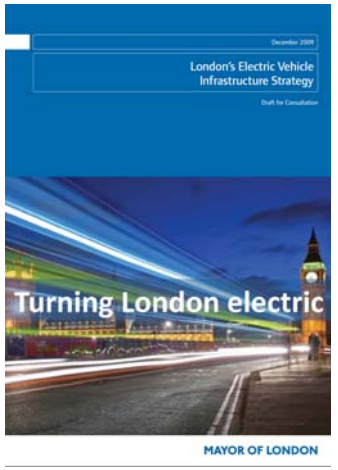
A project for London… learning for all Great Britain

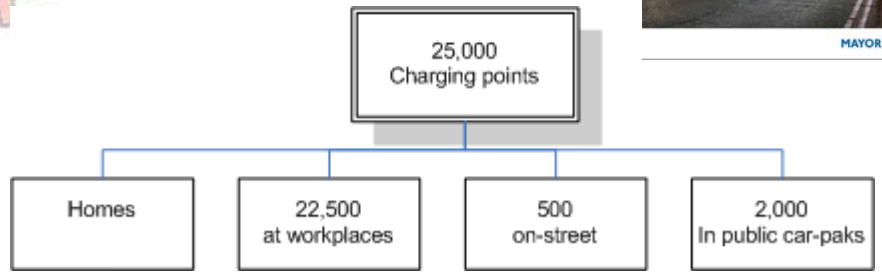

Understand the issues that intermittent wind will present for the grid and how to address them
Maximise network capability to accommodate distributed energy resources and new low carbon uses of electricity
Monitor asset condition, loading and stress through on-line diagnostics
Evaluate implications for the grid from EVs and the potential for smart charging systems
Create a 2020 scenario today to investigate and address the issues and opportunities that DNOs will face in powering our cities in a low carbon future
Explore with Suppliers the interactions and opportunities from smart meters in London's established residential communities
Investigate low carbon energy opportunities in London's regeneration areas – e.g. PVs, heat pumps, community generation schemes
Optimise voltage, power factor load factor and losses through innovative application of technology
Trial innovative commercial arrangements with Aggregators and businesses for demand side response

London's EV charging network

London's 2015 EV Infrastructure Strategy







25,000 EV charging posts by 2015

	Standard Charging	Fast Charging	Rapid Charging
Power	3kW	7kW-43kW	50-250kW
Approximate time to fully charge an EV	6-8 hours	30 minutes – 3 hours	15-20 minutes
Approximate unit cost	£0 – £3,500	£3,500 – £5,000	£25,000-£50,000
Typical locations	Homes, workplaces, train stations	Supermarkets, town centres, entertainment venues	Motorway service stations, supermarket car parks
Driver behaviour	Leave vehicle and return after several hours	Leave vehicle and return after short time	Remain with vehicle; charging point may be supervised by operator

Source: GLA

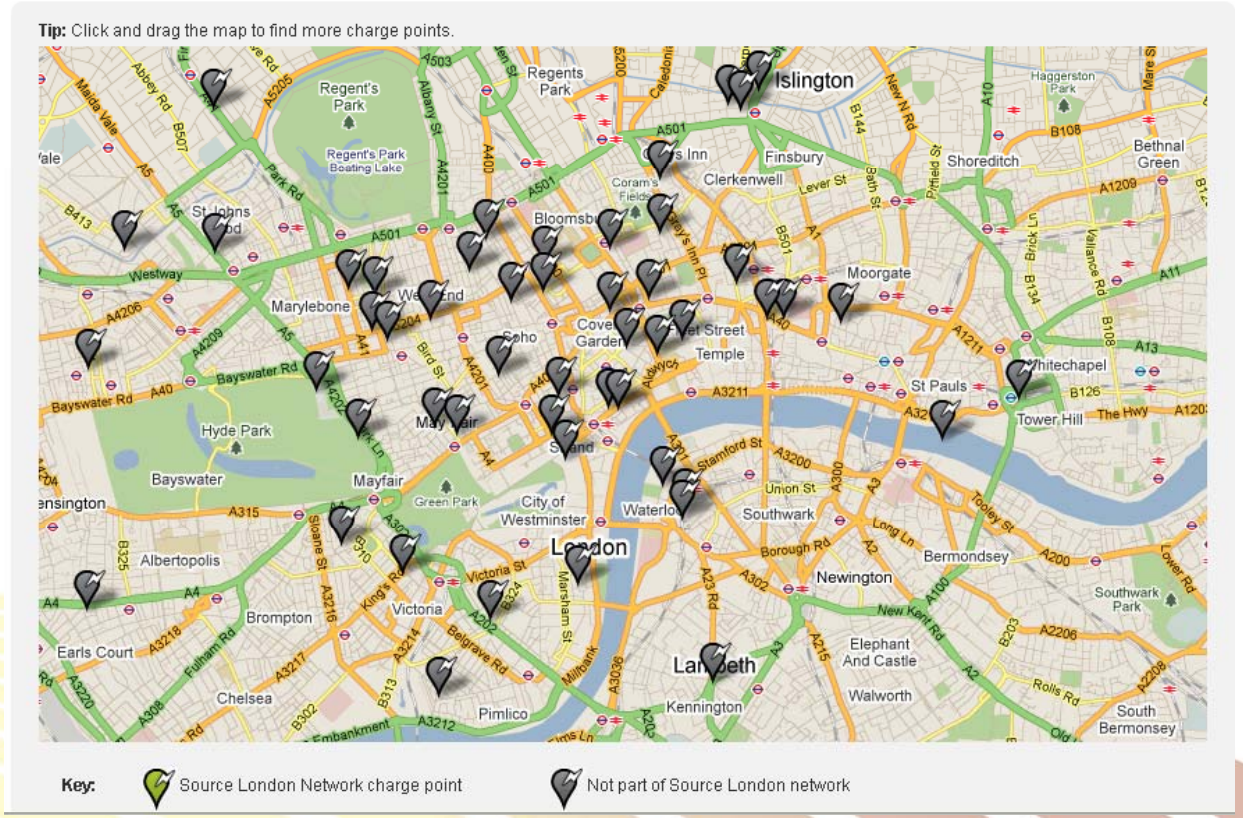
London’s EV charging network - Source London

From 2011, there will be a phased installation of **1,300** public charge points on:

Residential streets

&

Off-street locations:
- supermarkets,
- public car parks
- shopping and leisure centres



London Carbon London
What are we going to do? – LCL EV fleet

Passenger Vehicles:

• There are currently about 1,700 passenger EVs in London claiming a congestion charge exemption

Commercial Vehicles:

•**AG Barr**: 10 Smith Newton (7.5 Tonne).
•**Amey**: 8 Modec Vans
•**Office Depot:** 6 electrically assisted cargo cycles and 5 Smith vans
•**TNT**: 6 Smith Newton (3.5 and 7.5 Tonne)
•**Sainsbury's**: 51 Edison 3.5 Tonne electric vans
•**GLA family of vehicles**: TFL and the Fire Brigade Smith and Modec vehicles

Inductive Charged EV:

•Halo IPT will supply an Electric Citroen C1 fitted with an inductive charge receiver. During the course of the LCL trial Halo IPT expects to make available two more EVs.

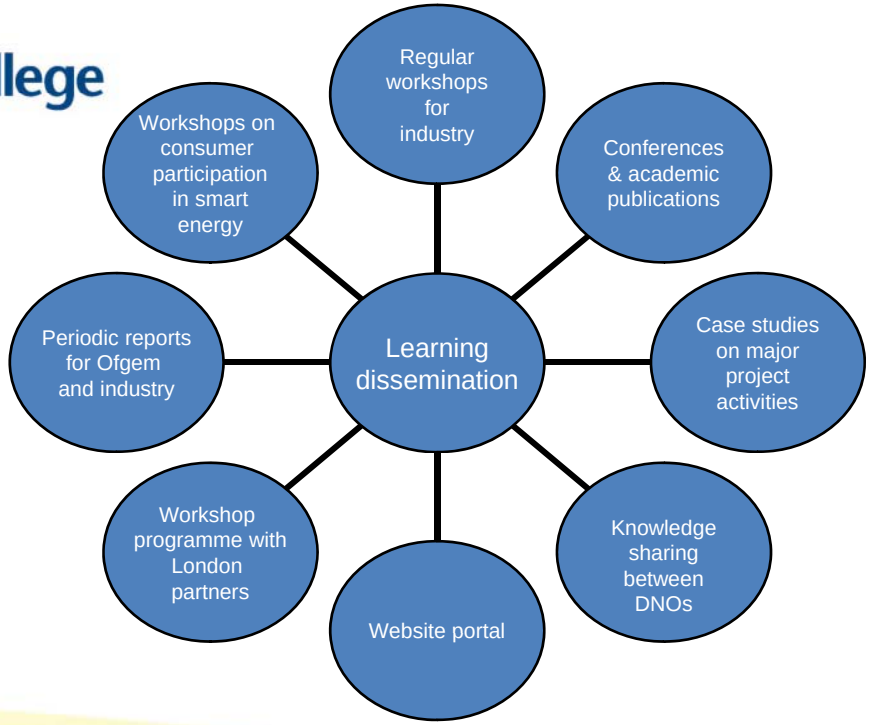
London Carbon London
What are we going to do? – LCL EV trials

- Identify and measure the charging profiles of different types of EV and their impact on the distribution networks
- Investigate what level of EV uptake will create network constraints
- Understand how well EV charging behaviour can be anticipated
- Extrapolate to high levels of EV uptake
- Understand how coincident EV charging profiles are with demand for electricity
- Implementing ToU tariffs to encourage diversity in EV charging and charging during off-peak periods
- Implementing the control functionality to actively manage EV charging
- …and many, many more…

London Carbon London
What are we going to do? – Open invitation

A dedicated Learning Laboratory…

Imperial College London



- Real & virtual learning showcase
- Open to all
- Conducting / analysing results of trials

… a 'learning innovation laboratory'
– a hands on learning experience for all

THANK YOU!

Dr Cristiano Marantes MSc(Hons) PhD
Low Carbon Networks Development Manager

Barton Road
Bury St Edmunds
Suffolk IP32 7BG

Office: +44 (0) 1284 726793
Mobile: +44 (0) 7875 111117
email: cristiano.marantes@ukpowernetworks.co.uk