Low Carbon London

A smarter approach to managing London's electricity demand - involving customers and communities

Dave Openshaw

Head of Future Networks

HEAT & SHIFT Conference Expo
Cambridge, 2 December 2010

UK Power Networks

UK Power Networks

Homes and Businesses Served	8m
Service Area km²	29,165
Underground Network km	134,767
Overhead Network km	47,391
Energy Distributed TWh	89.4
Peak Demand MW	16,229
New Connections	130,768

'Low Carbon London' is UK Power Networks' winning LCNF Tier 2 bid

A smarter approach to managing London's electricity demand

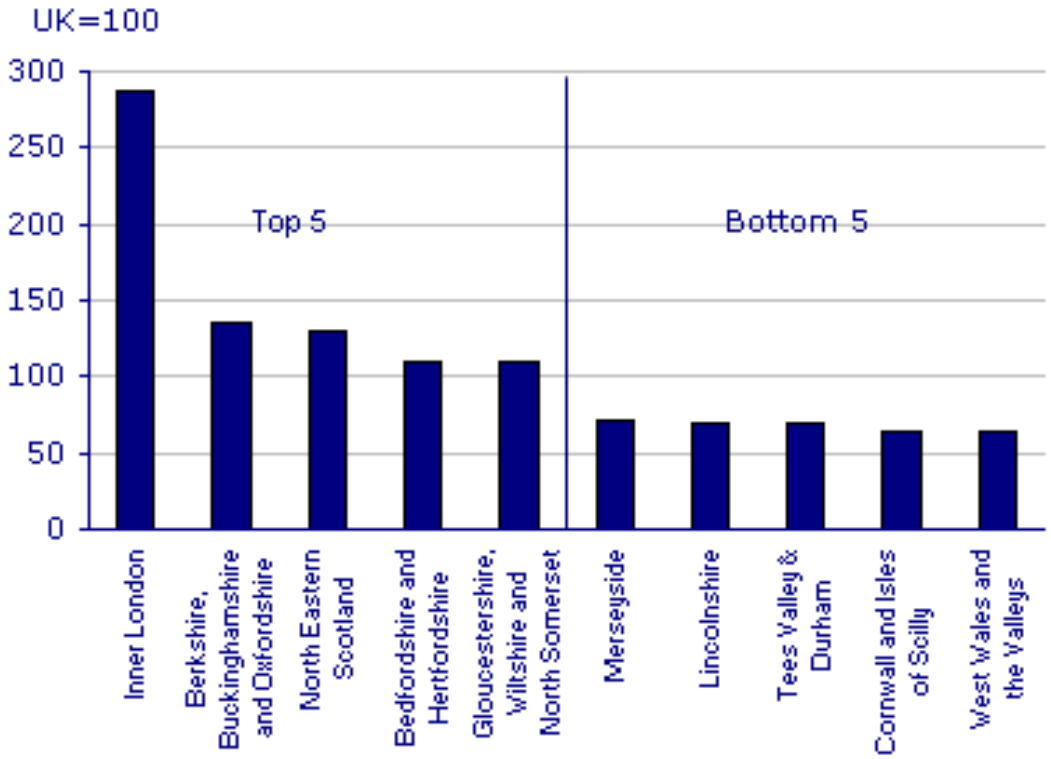
- Why London?
  - some compelling facts
- Why smarter?
  - some compelling reasons
- How will we engage with customers and communities?
  - key components
- What will we achieve?
  - key deliverables

Why London?

Critical to UK economy – 21% of GVA

Sub-regional GVA

Top and bottom 5 Gross Value Added per head indices



Inner + Outer London circa. £265bn contribution to GVA – 21% of UK

Source: ONS 2008 data

Highest CO_2 footprint of all UK major cities

47.5 million tonnes CO_2 emissions p.a.
Target – 60% reduction on 1990 levels by 2025

Edinburgh

Glasgow

Manchester

Birmingham

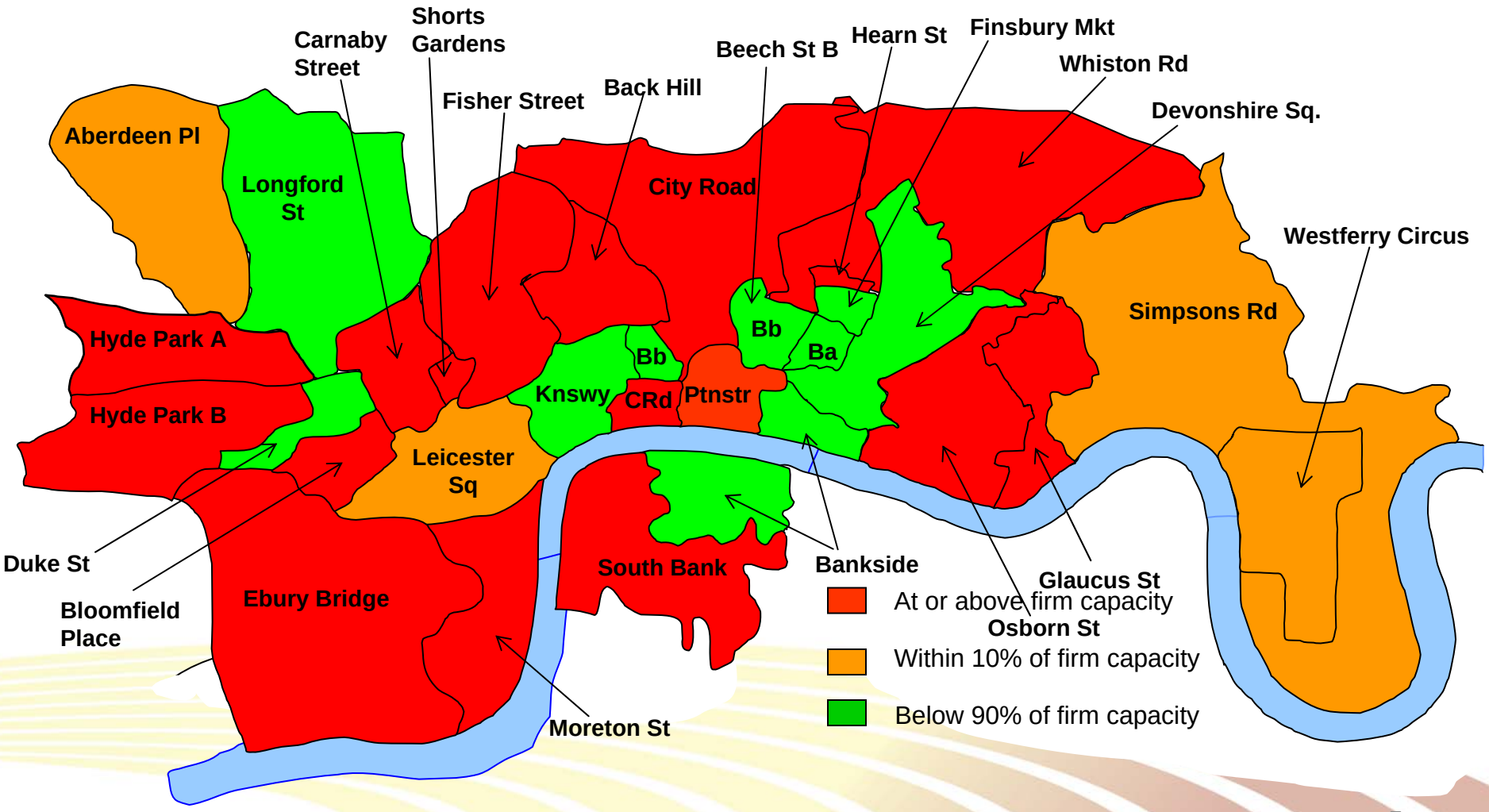
Total CO_2/km^2 (kt CO_2/km^2)

- 0.0 - 10.0
- 10.0 - 50.0
- 50.0 - 100.0
- 100.0 - 150.0
- 150.0 - 550.0

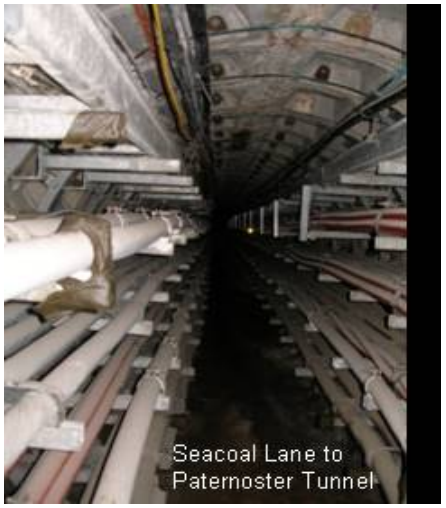
Sources: AEA Energy & Environment (AEA)
The London Plan

Highly utilised network

2014/15 headroom capacity *without investment*



High costs of conventional reinforcement



- Limited land for new substations
- Unavailability of open-cut cable routes (service density)
- Geographical barriers (River Thames, railways, canals)
- Construction and outage window constraints

Why do we need a smarter approach?

Continued demand growth

Heron Tower 8MVA 2010

The Pinnacle 12.5MVA 2010

The Shard 11MVA 2012

Ambitious targets for decentralised generation

Targets for installed electricity capacity generated from renewables

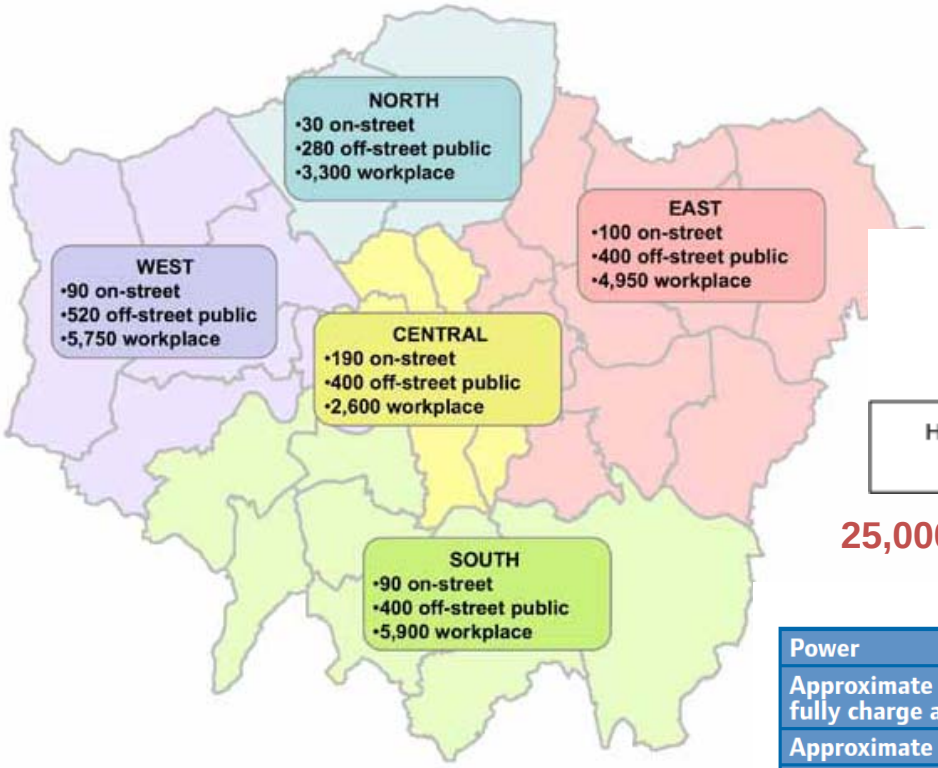
	2010			2020		
	Number	Total Installed Capacity (MW)	Total Output (MWh)	Number	Total Installed Capacity (MW)	Total Output (MWh)
Offshore Wind Farms	–	–	–	–	–	–
On-Shore Wind Farms	–	–	–	–	–	–
Single Large Wind Turbines	6	15	26,280	18	45	78,840
Small Stand-Alone Wind Turbines	50	10	13,140	150	30	39,420
Building Mounted Micro-Wind Turbines	2,000	5	3,066	6,000	15	9,198
Biomass Fuelled CHP / Electricity	8	24	126,144	24	72	378,432
Hydro Power	–	–	–	–	–	–
Solar PV (domestic) (MWp)	7,000	15	10,500	21,000	45	31,500
Solar PV (commercial) (MWp)	250	12	8,400	750	36	25,200
Tidal Energy	–	–	–	–	–	–
Wave Energy	–	–	–	–	–	–
Anaerobic Digestion[a]	4	1.2	9,460	25	7.5	67,050
Sewage Gas[a]	2	10	31,124	6	30	93,372
Gasification/Pyrolysis[b]	1	6.8[c]	42,048[c]	11	94.6[c]	662,957[c]
Total	**9,321**	**99**	**228,114**	**27,984**	**375.1**	**1,385,969**

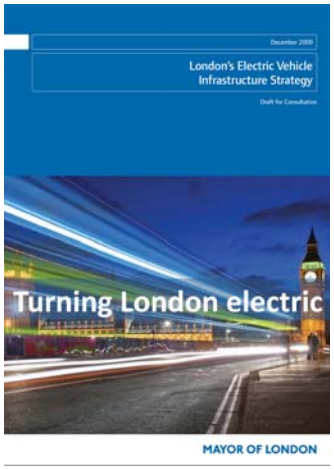
Target – 25% from decentralised energy by 2025

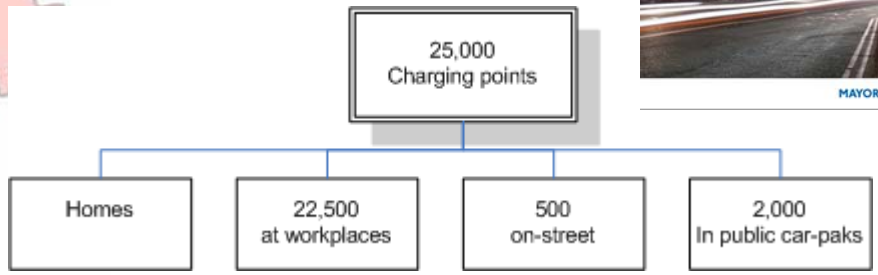
Source: The London Plan

Plans for electric vehicle charging infrastructure …

London's 2015 EV Infrastructure Strategy





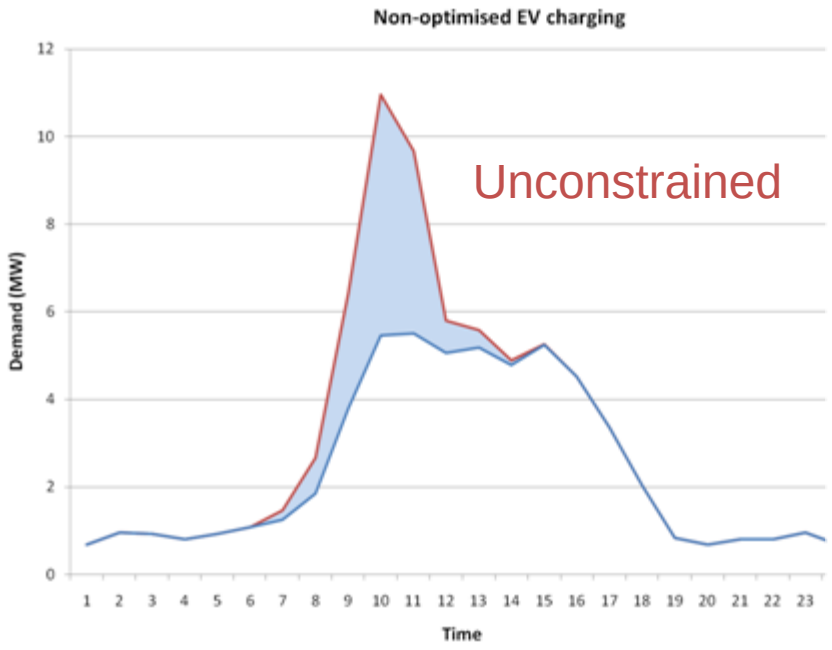


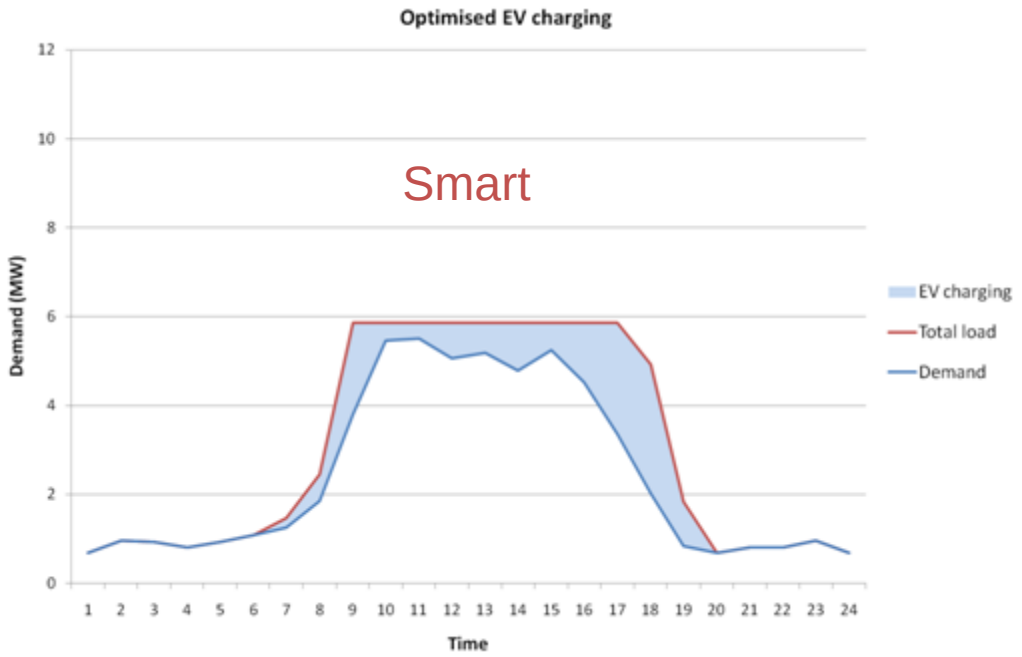
25,000 publically accessible EV charging posts by 2015

	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

… mean that we'll need a smarter approach to electric vehicle charging





Source: ENA / SEDG

How will we engage with customers and communities?

We'll Bring together a rich consortium of partners …

We'll build bridges with stakeholders

Working with real London communities and businesses served by our distribution network

Exploring the most efficient and cost-effective ways to run the future electricity grid in order to support a low carbon economy

Applying commercially innovative approaches to manage load and voltage profiles and enable customers to benefit financially from new tariffs

Providing additional incentives and benefits for customers who are prepared to manage consumption at times of peak network demand

We'll work with our partners and the local communities to …

- Retrofit low carbon energy efficiency and renewable measures in homes, public buildings and local businesses
- Implement community engagement and behaviour change initiatives
- Establish smart meters, time of use tariffs and electricity demand management solutions
- Enable new low carbon technologies such as electric vehicles and micro-generation to help deliver London's ambitious CO_2 targets
- Enable real reductions in energy bills, particularly significant as many Low Carbon Zone households are low income

What will we achieve?

We'll encourage energy efficiency in the Mayor's 10 Low Carbon Zones …

Map legend

1. Muswell Hill - LB Haringey
2. Archway - LB Islington
3. Queen's Park - LB Westminster
4. Barking – LB Barking & Dagenham
5. Ham and Petersham – LB Richmond
6. Wandle Valley – LB Merton
7. Hackbridge – LB Sutton
8. Brixton – LB Lambeth
9. Peckham – LB Southwark
10. Lewisham – LB Lewisham

Source: GLA

Explore sustainable energy opportunities within the Green Enterprise District …

Source: London Thames Gateway Development Corporation

Leverage responsive demand opportunities with major businesses in Central London

Focus on I&C customers with flexible demand – esp.

- air cooling load
- industrial scale refrigeration
- standby generation

Ideal applications for services to NG

- Fast Reserve
- STOR
- Frequency Response

But we can leverage similar applications for network support

- improve network security
- fast response during unplanned outages at times of peak demand
- potential to defer network reinforcement

In summary …

- UK Power Networks will help London to reduce its transport and energy-related carbon emissions …
- by applying innovative new technologies and commercial frameworks …
- and in the process …
  - help London's communities reduce their energy bills and build their own low carbon future …
  - provide an example for others in the energy industry to follow …
  - and establish sustainable communities where:
    - people want to live and work
    - companies want to do business
    - other cities look to for inspiration

Thank you