



Decarbonising power and power systems

15th December 2020

Greg Chant-Hall, Square Gain

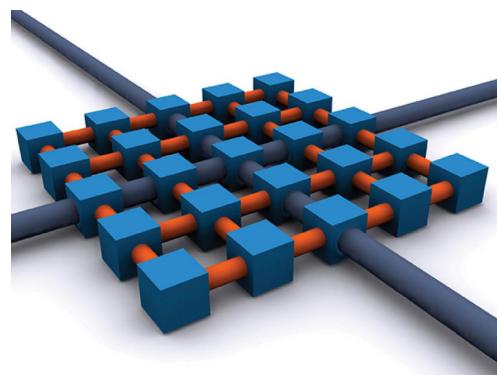
Greg Poole, Square Gain



Power



- Decarbonising energy and energy systems, renewable power for London, microgrids.
 - Introductory presentation
 - Case study and technology examples
 - Pragmatic actions
 - Costs and potential funding
 - Poll questions
 - Roundtable discussion



LEDNet, TEC joint statement



- 1. Retrofit London:** Retrofit all domestic and non-domestic buildings to an average level of EPC B. Programme timescale: 2020 – 2030.
- 2. Low-carbon development:** Secure low carbon buildings and infrastructure via borough planning. Programme timescale: 2020 – 2022.
- 3. Low-carbon transport:** Halve road journeys made by petrol and diesel via combined measures that can restrict polluting journeys and incentivise sustainable and active travel options. Programme timescale: 2020 – 2030.
- 4. Renewable power for London:** Secure 100% renewable energy for London's public sector now and in the future. Programme timescale: 2020 – 2030.
- 5. Reduce consumption emissions:** Reduce consumption emissions by two thirds, focusing on food, clothing, electronics and aviation. Programme timescale: 2020 – 2030.
- 6. Build the green economy:** Develop London's low carbon sector and green our broader economy. Programme timescale: 2020 – 2030.
- 7. Creating a resilient and green London**

Blueprint – relevant programme



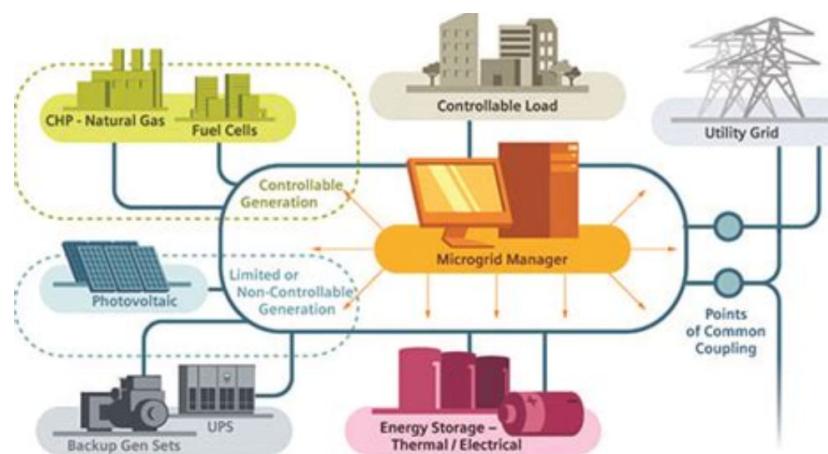
We are asking the Government to prioritise:

- 1. Invest in low-carbon and climate-resilient infrastructure**
2. Support reskilling, retraining and research for a net-zero well-adapted economy
3. Upgrade our homes to ensure they are fit for the future
4. Make it easy for people to walk, cycle, and work remotely
5. Accelerate tree planting, peatland restoration, green spaces and other green infrastructure



Decarbonising Power – what are the challenges?

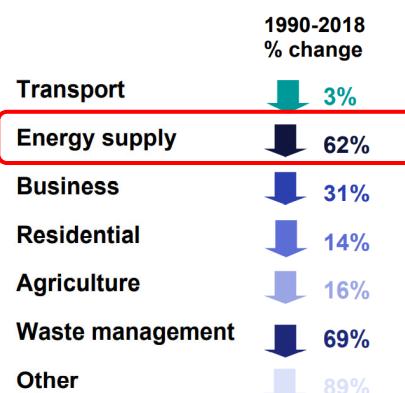
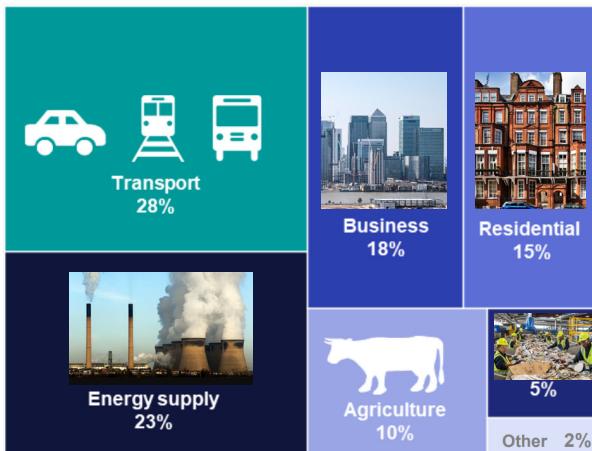
Reducing demand & decarbonising supply



Decarbonising heat



Causes of carbon - UK



Causes of carbon - London



**2000-2017
% change:**

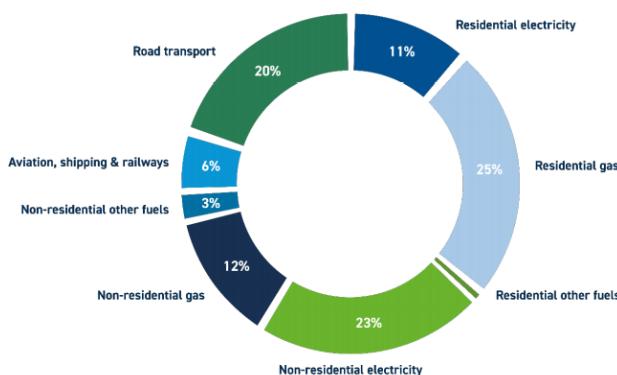
Transport **-9%**

Business **-54%**

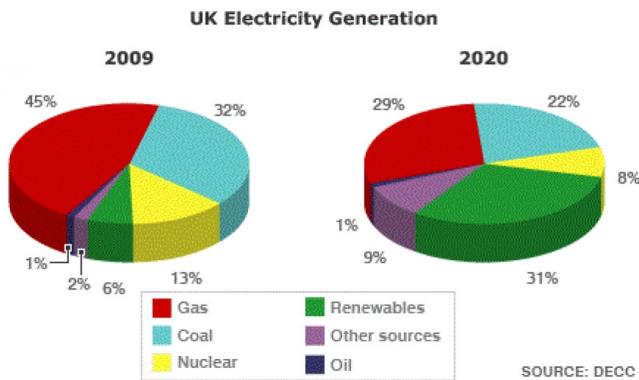
Residential **-35%**

Need to decarbonise all the power

Figure 1: London greenhouse gas emissions by sector: London Energy & Greenhouse Gas Inventory (LEGGI) 2017³.

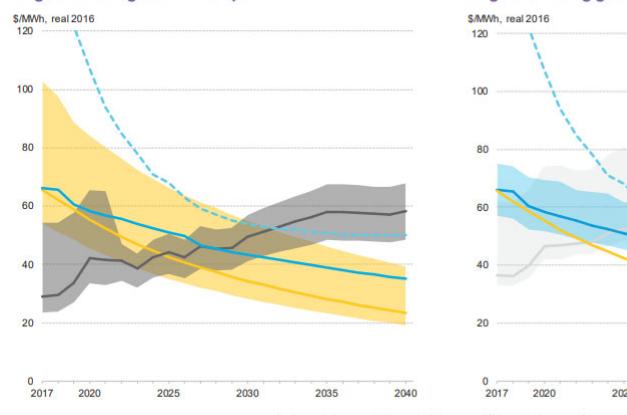


UK energy mix

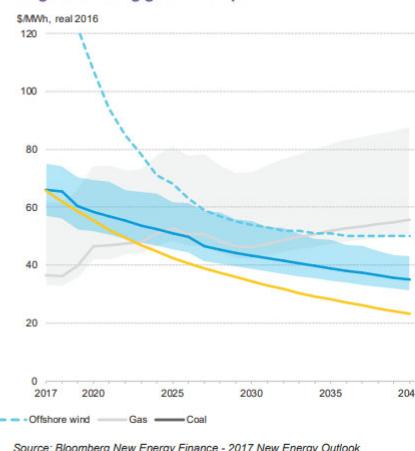


Falling cost of renewable power

LCOE forecast for wind and PV, and generation cost range of existing coal in Europe

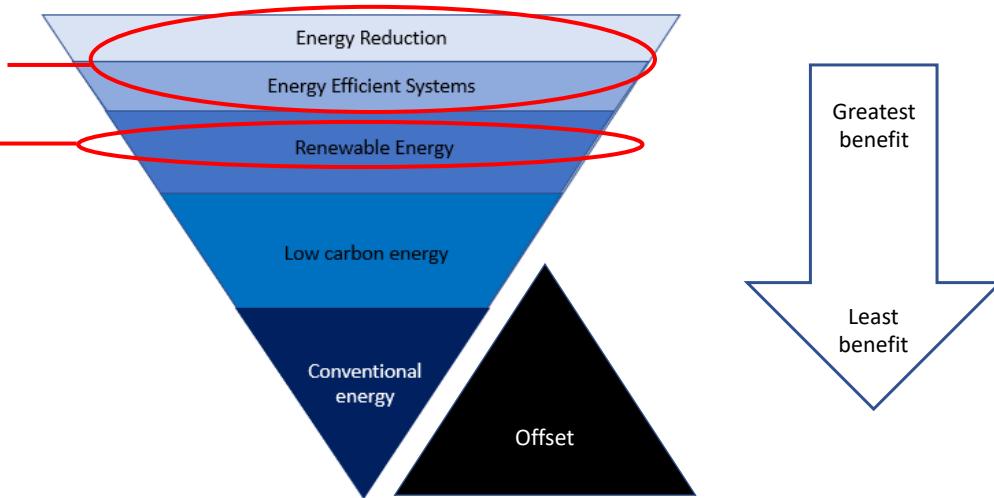


LCOE forecast for wind and PV, and generation cost range of existing gas in Europe

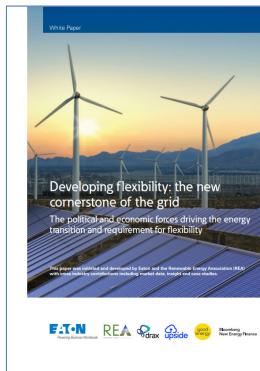


Energy hierarchy & zero net carbon

- Planning
- Procurement
- Procurement
- Demonstration projects
- £ support



Pragmatic strategy



Green industrial revolution?

10 point plan:

1. offshore wind power;
2. hydrogen;
3. nuclear power;
4. electric vehicles;
5. public transport, cycling and walking;
6. shipping and aviation;
7. improving the energy efficiency of buildings;
8. carbon capture;
9. nature conservation; and
10. innovation and finance.



Green Industrial Revolution



Offshore Wind

Advancing offshore wind could deliver...

Support for up to 60,000 jobs in 2030	Around £20bn of private investment by 2030	Savings of 21MtCO ₂ e between 2023 and 2032, or 5% of 2018 UK emissions
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Green Industrial Revolution

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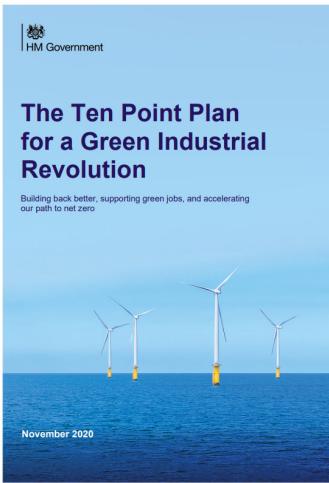


Carbon Capture

Investing in carbon capture usage and storage could potentially deliver...		
Support for around 50,000 jobs by 2030 ¹	Up to £1.bn of public investment by 2025	Savings of around 40MtCO ₂ e between 2023 and 2032, or 9% of 2018 UK emissions

Green Industrial Revolution

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Hydrogen

Driving the growth of low carbon hydrogen could deliver...		
Support for up to 8,000 jobs by 2030, potentially unlocking up to 100,000 jobs by 2050 in a high hydrogen net zero scenario	Over £4bn of private investment in the period up to 2030	Savings of 41MtCO ₂ e between 2023 and 2032, or 9% of 2018 UK emissions

Green Industrial Revolution

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Nuclear

New and advanced nuclear power could deliver...

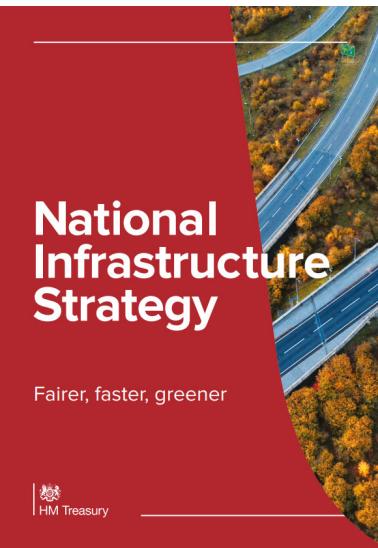
A large-scale nuclear power plant will support a peak of around **10,000 jobs** during construction

Government support could unlock significant private investment, up to £300m for development of small modular reactors alone

Each GW of nuclear power generation is enough to power **2 million homes** with clean electricity

National Infrastructure Strategy

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Energy White Paper

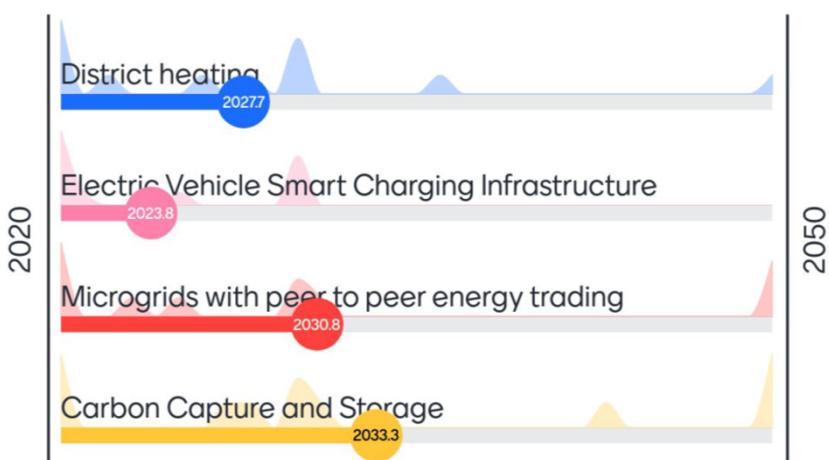
- Published yesterday - 14th December 2020

- No new home gas connections
- All homes EPC C or better
- Electricity demand will double
- Green Homes Grant extension
- Four low carbon industrial clusters



Poll question 1

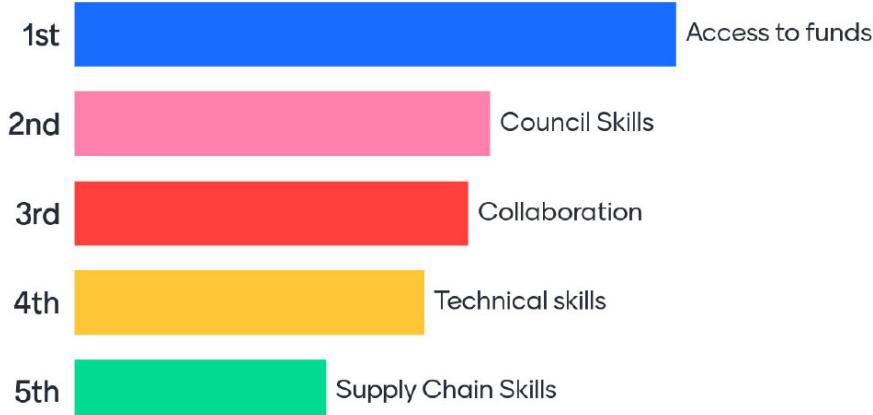
By when is your council planning to take action on:



Poll question 2



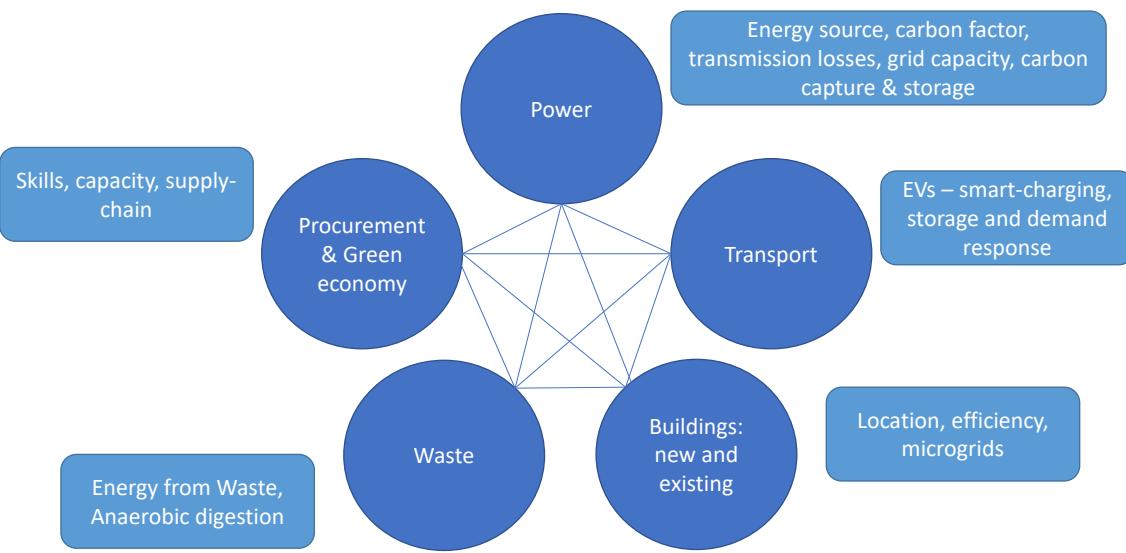
How can London councils best take forward the decarbonisation of power?



Pragmatic action and common pitfalls



Joined-up action is vital



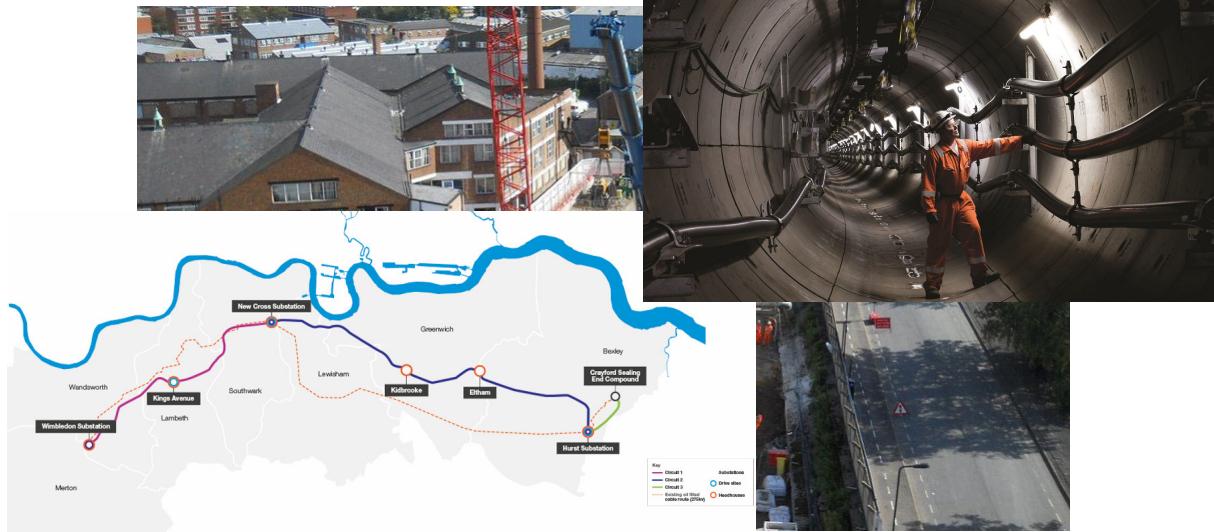
Scale – Large

- Mega scale – only few players
 - Big 6
 - DNOs (Distribution Network Operators)



London power tunnels

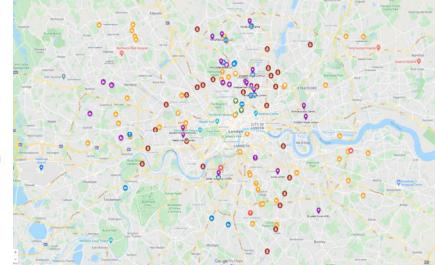
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Scale – District & Community

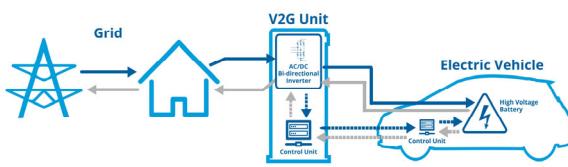
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- District scale
 - heat networks
- Community scale
 - smaller heat networks, microgrids



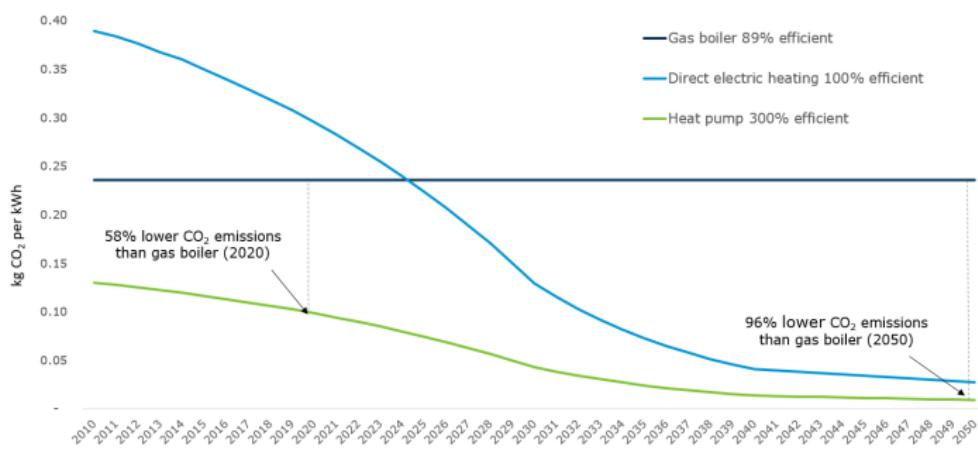
Scale - Micro

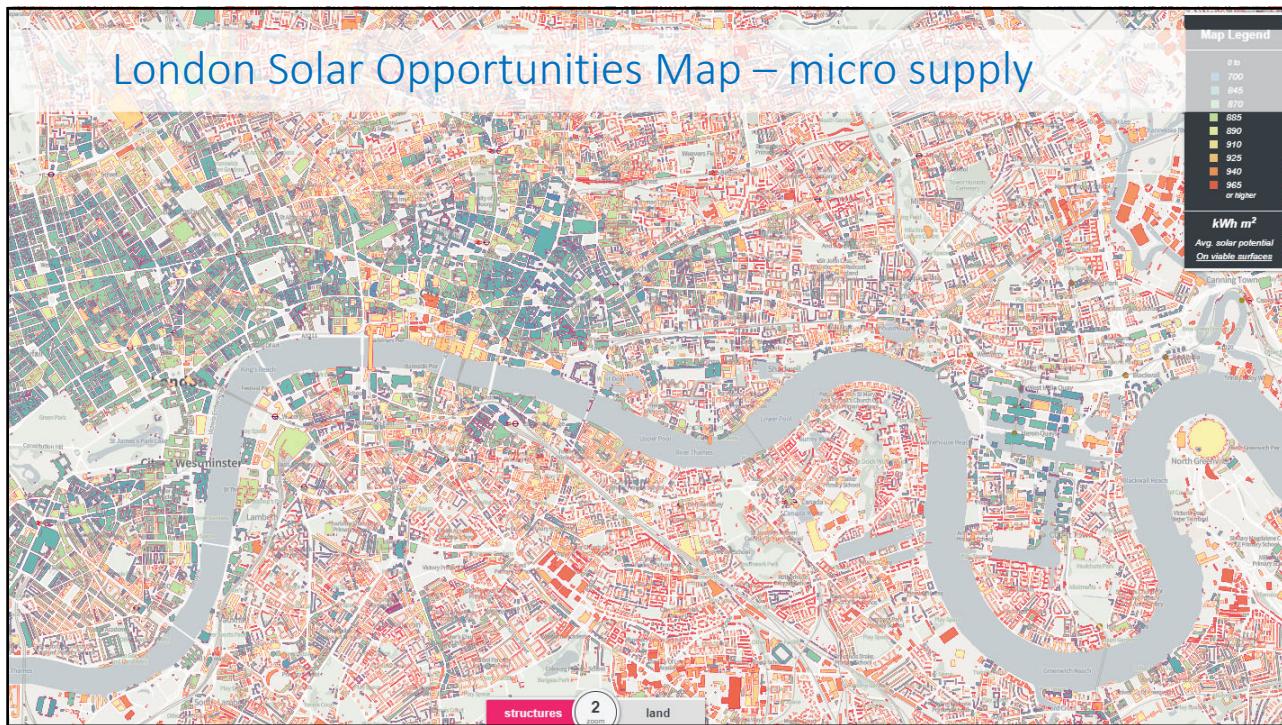
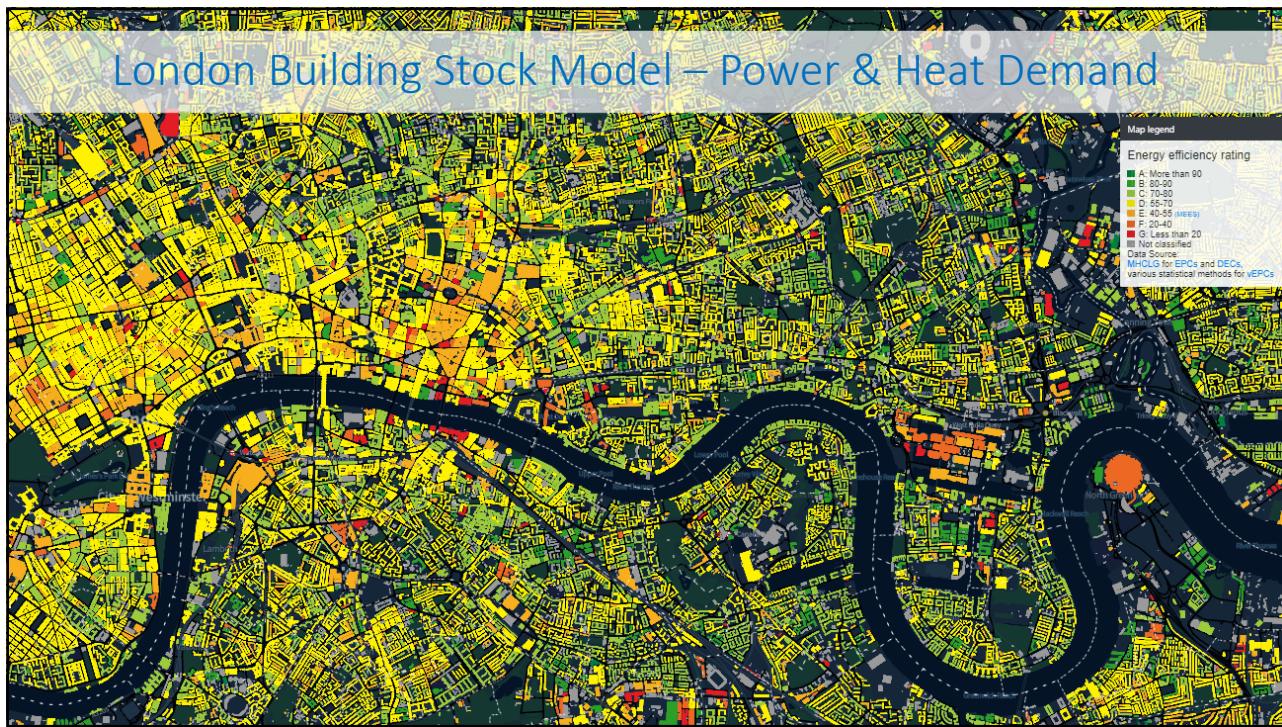
- Micro-scale – individual buildings/sites
 - Microgrids
 - Heatpumps
 - Flexibility
 - Vehicle to Grid electric vehicles

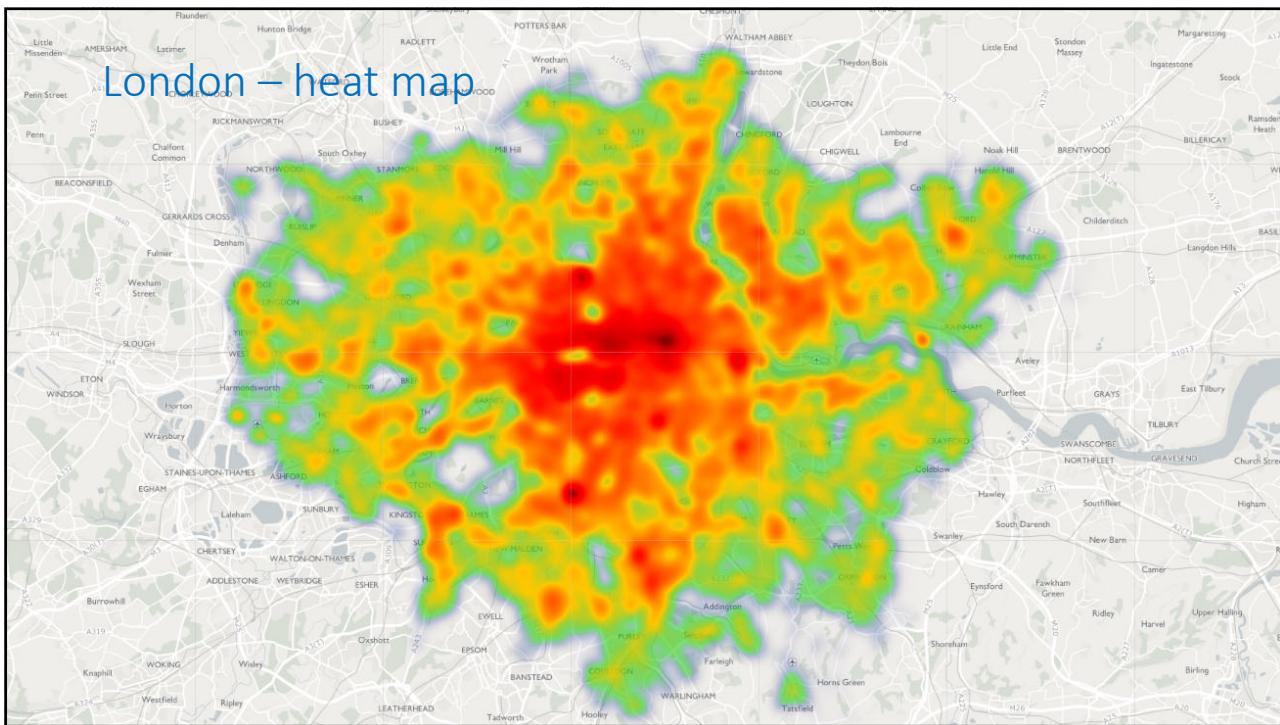


Heat pump retrofit

Figure 2: Carbon intensity of gas boilers and heat pumps⁴ at different efficiencies: 2010-2050⁵







Case study examples

District heating

Greenwich Peninsula Low-Carbon Energy Centre

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Citizen CCHP system

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Islington and TfL

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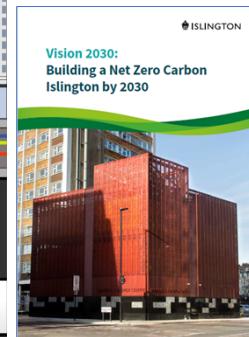
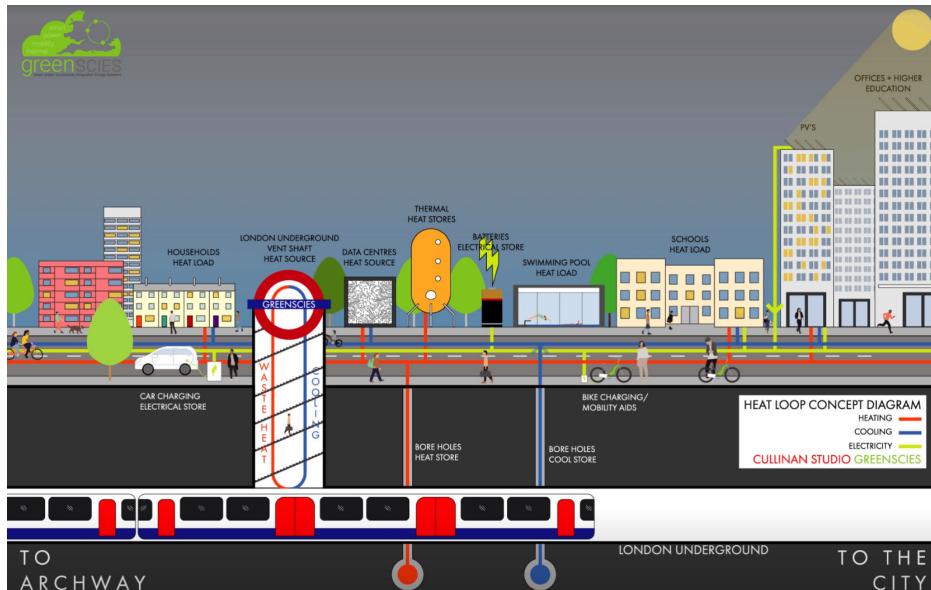
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Brooklyn microgrid

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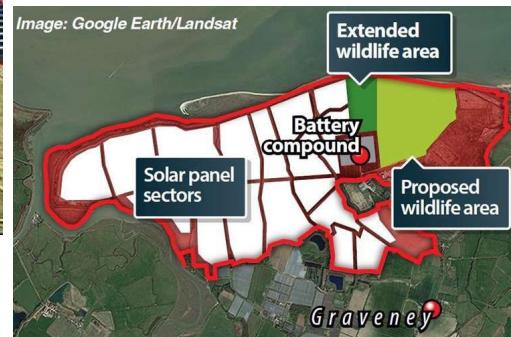


Battery storage

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Using EVs for Vehicle to Grid (V2G)

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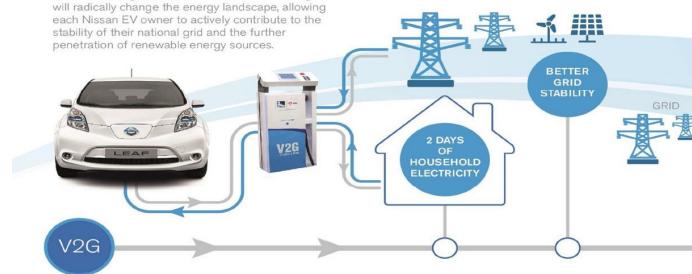


POWER TO THE PEOPLE

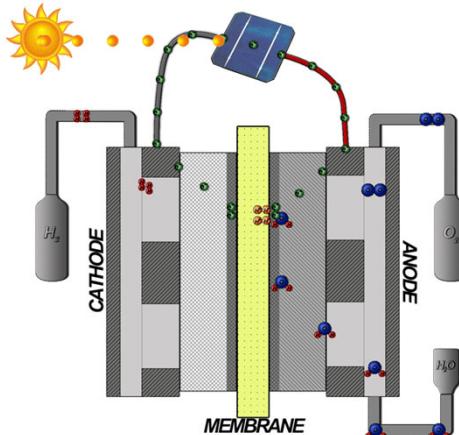
NISSAN'S VISION FOR THE ENERGY GRID PUTS THE POWER IN YOUR HANDS

VEHICLE-TO-GRID

The smart integration of electric vehicles in the grid will radically change the energy landscape, allowing each Nissan EV owner to actively contribute to the stability of their national grid and the further penetration of renewable energy sources.



Hydrogen



Procurement

Solar Together

- Brent
- Camden
- Ealing
- Enfield
- Hackney
- Islington
- Kensington and Chelsea



- Kingston upon Thames
- Lewisham
- Merton
- Newham
- Sutton
- Waltham Forest

London Energy Project



Image: Camden Council/ Vitali Energ

Power Purchase Agreements



CORPORATION
OF LONDON



Carbon capture and storage

Carbon capture and storage

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Anaerobic Digestion and Energy from Waste

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Anaerobic Digestion

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Energy from Waste

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Costs and potential funding

Micro scale

Renewable Heat
Incentive (RHI)



Smart Export
Guarantee
(previously FITs)



Green Homes
Grant, and
Warm Home
Discount
Scheme



Net Zero Infrastructure Bank

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Roundtable Discussion

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forum
www.greenRecovery.co.uk

Greg Chant-Hall www.squaregain.co
Square Gain gregchanhall@squaregain.co

Next workshops



Dates and times:

- Core training x 3 sessions
 - Optional sessions:
 - Existing buildings
 - New buildings
 - Transport
 - Power
 - Procurement, consumption and waste
 - Green economy
 - Measurement and reporting
- | | |
|--------------------------------|---------------------------|
| 1, 2, 7 October, 10:00 – 11:00 | 20 October, 10:00 – 11:00 |
| 17 November, 10:00 – 11:00 | 1 December, 10:00 – 11:00 |
| 15 December, 10:00 – 11:00 | 12 January, 10:00 – 11:00 |
| 2 February, , 10:00 – 11:00 | 9 March, 10:00 – 11:00 |

Feedback and immediate actions



- Feedback forms via Survey Monkey – <https://www.surveymonkey.co.uk/r/WT7KFSJ>
- Register for the next workshops
- Visit the LEDNet Climate forum



forum

www.greenRecovery.co.uk

Blog

FAQs

Session recordings

Slide handouts

Climate e-learning

End.