DELIVERING LONDON’S ENERGY FUTURE: THE ROLE OF DISTRICT ENERGY

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INTRODUCTION

• Smart district heating and cooling systems and their role in a city’s energy system

• London perspective
  • Drivers
  • Policy and Programmes
BACKGROUND

• Today’s challenge
  – Growing population
  – Growing energy demand
  – Climate Change
  – Security of supply
  – Finite natural resources

• Transition to a secure, low carbon & affordable energy system
  – Increase energy efficiency and generation at city level
  – Integration of heat and power networks
Mayoral Targets - 2025

- **60% CO\textsubscript{2} emissions reduction** (on 1990 levels)

  Interim targets
  - 2015 - 20%
  - 2020 - 40%

  \(\text{CO}_2\) emissions 1990 = 45.05 MtCO\textsubscript{2} p/a
  \(\text{CO}_2\) emissions 2012 = 40.75 MtCO\textsubscript{2} p/a

- **25% decentralised energy**
Supply 25% of London's energy demand from energy generated locally by 2025

This will:
• Reduce CO₂ emissions by 3.2 MtCO₂ p/a
• Deliver 12% of the total CO₂ savings

Over 50% of overall DE opportunity is from medium and large-scale heat networks

Combined Heat and Power will also play an important role

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REDUCING CARBON DIOXIDE – ROLE OF DISTRICT HEATING

Heat responsible for:
~47% of London’s energy demand
~ 30% of its CO₂ emissions

Energy efficiency - district and building level simultaneously
• Reduce demand for heat
• Reduce carbon intensity of the heat that is supplied

London’s secondary heat resource
• 24% of heat demand could be economically met from waste and environmental heat sources when distributed via district heating networks
DECENTRALISED ENERGY DEVELOPMENT METHODOLOGY

- Capacity Building
- Heat Mapping
- Policy Support
- Resourcing

Capacity Building
- Organisation, Awareness and Political Support
- Low carbon Evidence Base

Energy Masterplanning

Planning Framework
- Strategies and Planning Policies
- Development Management
- Financial Contributions

Project Definition and Delivery
- Feasibility Studies
- Business Planning
- Procurement
- Commercialisation

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THE LONDON HEAT MAP

An interactive tool allowing users to identify DE opportunities in London

• It is owned by the GLA since 2011
• Spatial intelligence on factors relevant to identification and development of DE opportunities, e.g. major heat loads and sources, heat networks, OAPFs, etc.
• It is publicly available

Completed in March 2012 for London Boroughs

• 31 Heat Map reports are available for download
DECENTRALISED ENERGY MASTERPLANNING PROGRAMME

Financial and technical support for production of local Energy Masterplans

- Identify new DE opportunities
- Long-term vision for heat network growth
- Develop planning policies to promote heat networks and connection of new developments

14 Energy Masterplans available to download at the London Heat Map website
- Another three are underway.
DECENTRALISED ENERGY PROJECT DELIVERY UNIT

DEPDU - Technical, financial and commercial advisory services to public and private sector

- Help others develop and bring to market large scale DE projects
- €3.3m funding (90% from the European Commission’s ELENA technical assistance facility, 10% from the GLA)
- Focus on heat networks supplied from CHP and waste heat
- Target: Help take projects with total investment of £60.5m to market by July 2014 (leverage ratio 25:1)
- To date GLA helped take over £62m of DE projects to market
- Actively supporting pipeline of 18 DE projects worth over £150m

Co-funded by the Intelligent Energy Europe Programme of the European Union

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GOSPEL OAK DH - CAMDEN COUNCIL

- Heat network supplied by heat from a new 4.6MW gas turbine CHP at the Royal Free Hospital
- 3.5MW GT heat recovery system
- 1.3km heat network supplying about 1,500 units on existing housing estates
- CAPEX: £5.7m
- Project commissioned in 2012
- CO₂ savings: 2,890 t/year
- DEPDU role: assist LB Camden with initial feasibility, design and energy supply contract preparation

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South Kilburn DE – Brent Council

- Regeneration project - 2,400 new homes, related facilities and infrastructure
- Brent Council is procuring a £15m site-wide heat network through an ESCo concession agreement
- OJEU notice issued in 2011 and 3 bidders selected to be taken to the Invitation to Tender (ITT) stage
- Expected construction start date: 2015
- 3.1km heat network
- 1.5MWe / 2.5MWth CHP
- CO₂ savings: 835 t/year (estimated)
- **DEPDU role**: assisting the LB of Brent with initial feasibility study, ESCo procurement process and development of a concession contract

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**London Green Fund**

- **£100m Investment Fund - £50m ERDF**
- Supports *waste, energy efficiency* and *decentralised energy projects*
- Aims to deliver *job creation*, *reduced carbon* and *waste* to landfill, and *financial return*

**Projects**
- **£18m**
  - London Waste & Recycling Board
  - Greater London Authority
  - European Regional Development Fund
- **£32m**
  - London Green Fund
  - £100m
  - Managed by EIB
- **£50m**
  - Foresight Environmental Fund
  - London Energy Efficiency Fund
  - Greener Housing Fund

**Private Investors**
- Min £25m
- Min £50m

**Projects**
- Waste to energy
- Recycling
- Retrofitting
- Decentralised energy*
- Retrofitting social housing
- New Affordable Housing**

***Only using EIB funding***

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LONDON’S SECONDARY HEAT RESOURCE - 2013

Focus:
- Identify availability and cost of secondary heat sources
  - Waste and environmental heat
- Issues with integrating into heat networks

Objectives:
- Inform policy development
- Market opportunity for sources
- Identify project opportunities

Conclusions:
- 24% of London’s heat demand could be economically met when distributed via local heat and power networks

Figure 1 - Available secondary heat supply (kWth/m2) for all sources. Note that air and river sources are capped at a heat pump capacity of 20MW.

Figure 3 - Delivered heat by source showing heat pump energy requirements.

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IDENTIFYING OPPORTUNITIES: HEAT MAPPING IN ISLINGTON COUNCIL

2008

2009

2013

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BUNHILL HEAT AND POWER

Owned and managed by Islington Council

Phase 1
- 1.9 MW CHP plant
- 1.4 miles of heat network
- 850 homes and 2 leisure centres
- Reduction in heating bills
- 1,800 tonnes CO₂/year
- Approx. 60% CO₂ savings

Phase 2 – Extending heat network & integrating waste heat
- £3.7m CAPEX - £2.7m from Islington Council and £1m from the EU
- Extend heat network and connect at least another 500 homes
- Working with GLA, London Underground and UK Power Networks
- Waste heat from tube ventilation shaft and electricity sub-station
- Integrated into heating network using heat pumps
BUNHILL PHASE 2:
CAPTURING WASTE HEAT
CONCLUSIONS

District Energy has an important role to play in:

• Reducing carbon emissions
• Energy efficiency
• Security and resilience of supply
• Affordability of supply
• Integrating renewable energy and grid balancing

London’s Journey:

• Policy Framework - Planning and Energy Strategies
• Heat Map - Understand heat demand and heat sources
• Energy Masterplan - Prioritise areas for heat networks
• Project Development Team – Technical, financial and commercial support to projects
• London Green Fund - Understands nature of investment and associated risks and attracts private sector investment

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Thank you

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