District heating business models

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Drivers for local authorities to go for heat networks

- **Environmental** - for example, Woking - based on strategic approach to minimising climate change
- **Social** – for example, Aberdeen - driver was fuel poverty; alternative systems for tower blocks often very expensive to run
- **Economic regeneration** - long-term business case in evidence – our established networks grow year by year – Sheffield; newer schemes gather momentum – Birmingham
- **Energy security & fuel flexibility** – migration to renewables – for example, Barnsley has changed from coal to biomass; Aberdeen to integrate biomass.
Challenges for local authorities to go for heat networks

– Local authorities are the key ‘nerve centre’
– Strategic perspective across whole area
– Hold planning powers
– Know the potential actors in the market and the local stakeholders

– ... but they do not have money
– And they need informed staff and/or someone to provide ‘hand-holding’
– It is likely they will be working with the uninformed both in-house and externally.
Local authority ‘pinch points’ (1)

Getting started

- awareness of benefits has grown but:
- they often lack knowledge and experience of what’s involved
- so it’s difficult to get decision-makers on board
- and therefore difficult to secure the in-house resource
- unless there is a determined, well-informed and charismatic champion.

Comment: major scheme in Southampton got going because the champion actually was a senior decision-maker – and with a finance background!
Local authority ‘pinch points’ (2)

Evidence base and feasibility

- knowing how to gather the necessary evidence – where to start
- how to marshal the information gathered
- requires staff resource to coordinate
- important to get the right feasibility work done
- otherwise money is spent for a study that sits on a shelf!

Knowledge and confidence to refute building developers challenge on viability.

*Comment: DECC National Heat Map is valuable tool*
Local authority ‘pinch points’ (3)

Procurement; issues include:
- devising the preferred delivery mechanism
- availability of staff resource
- knowledge on developing tight specifications
- up-skilling staff to negotiate
- the right contract, tender procedure
- access to high quality legal advice
- obtaining the necessary finance.
Opportunities

- regeneration
- developers who must meet advanced ‘Code’ levels for buildings
- local heat resources that are already there
- low or no carbon plant installed already, sometimes not working
- being prepared – funding packages crop up from time to time!
Local authority types of scheme

– City centre schemes with several thousand dwellings, commercial centres, hospital, universities etc. Example: Sheffield
– London boroughs benefiting from assistance arising from the London Plan Example: Bunhill, Islington
– London boroughs, together with GLA implementing London Plan, where developer-driven new-build schemes are emerging. Example: Kings Cross
– Schemes based on linking existing islands together. Example: Leicester
– Forming a local ESCO to deliver island schemes that are being linked Example: Aberdeen
– Forming a local ESCO based on cheap capital from pension funds and recycling savings. Example: Woking
– Schemes based on available heat resource: Coventry, Swansea, Haringey
Existing city-centre heat network Example: Sheffield

- Rare UK example of relatively large already established heat network
- Large by UK standards, heat sales of 110,000 MWh and 45km of pipe
- Based on heat from in-city incinerator that operates in CHP mode
- Scheme integrates domestic and commercial loads including extensive city centre redevelopment
- Installed during a different era – direct replication potential zero
- Scheme continues to grow, so the business case for connecting to heat networks once they are established is clear...
- ... and there is no sign of stranded assets arising from zero carbon buildings!

*Opportunity: this network has substantial expansion plans*
London Boroughs benefiting from London Plan:
Bunhill, Islington

- New network in high density urban area
- Grants from London Development Agency + Homes & Communities Agency
- Fuel poverty objectives - strong support from local politicians
- Connecting 667 flats in 3 estates with communal heating + 2 leisure centres
- New energy centre - 2 MW CHP. Boilers on estates retained as peaking plant
- Connection to adjacent new residential development
- Launched 2012. First in series of heat networks to be developed in borough
- Planned extension to capture waste heat from London Underground and electricity switching station for City of London – largest in Europe!!

Opportunity: this network has substantial expansion plans and replication
Private developer new-build projects driven by London Plan: Kings Cross, Camden

- Europe’s largest city centre regeneration project – 67 acre site behind Kings Cross station
- Nearly 1m m² commercial space in 25 buildings, 1,900 homes, university
- Progressing despite severe challenges of 2008 financial crisis
- 30 year development programme
- New 2km site-wide heat network
- New energy centre 3 X 2MW gas-fired CHP + 10MW back-up boilers
- Development began with temporary boiler, each CHP deployed in phases
- Plans for future connection to adjacent public housing estates.

Opportunity: this network has opportunity for replication on other regeneration projects
Schemes based on linking existing islands together: Leicester

- New network in high density urban area
- Delivered by private sector partner over 25 year term
- Links together existing district heat networks serving 4 housing estates
- Serves 3,000 homes
- Includes 15 civic buildings, university and prison
- 5MW gas-fired CHP + biomass heat-only boilers
- 7km new heat network
- Launched 2012
- Phased development, university & prison connected in 2nd phase
- Council encouraging island heat networks in new developments and regeneration areas.

Opportunity: this network has opportunity for expansion and replication in other cities
Forming a ESCO to deliver linked island schemes: Aberdeen

- New network in high density urban area
- Fuel poverty objectives - strong support from local politicians
- Council establishes arms length not-for-profit ESCO to deliver & operate
- Innovative financing mechanism blending public and private capital
- Convert clusters of high rise blocks from electrical to communal heating
- Connects clusters together with district heating networks
- 1,500 flats and 9 public buildings connected
- 2 new energy centres + use of existing plant room
- 5 MW gas-fired CHP + 10 MW heat only boilers
- City centre extension under construction connecting civic, educational, health and commercial buildings
- Launched 2002. Planned conversion of further estates to communal heating
- Alternative energy sources under investigation – biomass, geothermal, AD

Opportunity: network has opportunity for expansion & replication in other cities
Forming a local ESCO based on cheap capital from pension funds and recycling savings: Woking

- New network in town centre location
- Heating and cooling network with private wire network connecting 5 buildings
- Carbon reduction objectives - strong support from strategic directors.
- Trip switch ensures ‘island mode’ operation when grid fails
- Energy centre in town centre multi-level car park
- 1.4 MW gas-fired CHP, HoB boilers, absorption chillers + 163 m² thermal store
- Established as Joint Venture between Council (19%) and Danish ESCO (81%) due to central Government capital constraints on local government
- Council progressively buys out ESCO when constraints lifted – now 100% Council owned
- Island projects with micro-CHP + PV on other Council owned buildings
- Project replicated by Council-owned ESCO in Milton Keynes.

**Opportunity:** Replication of model in other medium-sized towns
Schemes based on available heat resource: Coventry

- Existing municipally-owned EfW plant
- Previous heat offtake lost when Peugeot closes factory
- Benefits from £2.2m Homes & Communities Agency grant
- Public tender won by commercial ESCO for 25 year term
- Further investment of £3.2m private sector investment
- Innovative network ownership model - ESCO purchases heat from EfW plant and retails to 9 city centre buildings
- Council buildings, art gallery and cathedral amongst customers
- Carbon and price stability objectives for Council

*Opportunity: Extension of scheme to serve city centre regeneration*
Swansea
Swansea
Summary of local authority routes to heat network development

– Private route: Planning requirement on private developers eg (London Plan & Kings Cross)
– Municipal route: Project to address fuel poverty eg Bunhill, Islington
– Mutual route: Project to address fuel poverty eg Aberdeen
– Franchise: provide civic & public buildings and existing island heat networks as anchor loads for private sector ESCO under franchise eg Leicester
– Joint Venture with private ESCO to provide carbon savings & energy security eg Woking
– Project to capture available waste heat via private ESCO (Coventry) Municipal ESCO (Haringey).