

Item No. 10.	Classification: Open	Date: 24 January 2017	Meeting Name: Cabinet
Report title:		Borough-wide District Heating Strategy	
Ward(s) or groups affected:		All	
Cabinet Member:		Councillor Stephanie Cryan, Deputy Leader and Cabinet Member for Housing	

FOREWORD - COUNCILLOR STEPHANIE CRYAN, DEPUTY LEADER AND CABINET MEMBER FOR HOUSING

Southwark provides 17,000 council properties with heat and hot water through existing district heating systems and networks. These systems require a large investment to ensure that they are brought up to a modern standard, remain in good working order and are as efficient as possible.

The council want to provide sustainable heating solutions that provide for the needs of council residents and the wider community. To allow time for the opportunities for the district systems and heat networks to be fully explored, the council are agreeing a three year plan to tackle some of the current highest priority investment needs.

This three year plan addresses some of the key issues that residents have raised to members, such as the overheating problems at the Cossall Estate. The council is pleased to be able to commit to addressing these concerns and will continue to listen to residents in planning and carrying out the investment to our district heating systems.

The council cannot continue to maintain ageing district systems to the current levels and a step change is needed to ensure that a longer term investment strategy is found. A recent audit of the district heating systems across Southwark highlighted the optimum solution for each of our district heating systems and this report asks cabinet to recommend that the council undertake a wider strategic review of heat production in the borough.

The strategic review will be guided by a commitment to providing solutions that deliver a fair deal for residents, environmental benefits, as well as providing the levels of investment required to deliver modern heating solutions in the borough.

RECOMMENDATIONS

That cabinet:

1. Notes that 17,000 council properties rely on district heating systems that are in need of capital investment and modernisation. There is not the funding in the current plans and models to upgrade the systems to a modern standard.
2. Approves the interim three year investment plan, whilst the options for funding the modernisation of Southwark's heat network are fully explored, including bringing the Cossall estate district heating works forward from 2020-21 to 2017-18 to address the overheating issues experienced by residents.

3. Notes that a recent study into costs of modernising the boroughs district heating concluded that in most cases that the current district heating systems should be retained and modernised. There is an estimated £44m shortfall in prioritised investment funding over the next 10 years and £350m capital investment required over the next 40 years.
4. Notes the development of decentralised energy schemes and heat networks are embedded in the London Plan and in the preferred option for the Southwark Plan. These networks are seen as essential in reducing CO₂ emissions. Nearly half the UK's energy use is for heating and creating a low carbon source of heating homes is essential to meet climate change ambitions. Developing and modernising Southwark's networks can contribute to these aims as well as deliver a cost effective and effective solution for residents.
5. Notes that to fully explore the scheme viabilities and develop a funded strategic investment plan is expected to take approximately 3 years. Officers will provide an interim update in a year on the progress made exploring options and any earlier opportunities that are being progressed. The options will aim to deliver the modernisation of Southwark's heat network in a way that will deliver for customers and the environment, as well as leveraging in funding and expertise to enable this step change to be realised.

BACKGROUND INFORMATION

6. The council owns and operates 220 boiler houses and plant rooms which supply heating to over 120 separate district/communal heating networks. These range from small communal boilers supplying heat to a block of flats to a number of estates connected to South-East London Combined Heat and Power (SELCHP) providing heat and hot water from waste. These networks in turn provide heating and hot water to over 17,000 council properties consuming over 300 GWh of heat every year.
7. There has been some investment in these networks over the past 15 years but this has mainly focused on the central plant and underground distribution mains networks which were considered to be the worst performing parts of the systems.
8. There is an urgent need to develop a long term strategy for the district heating assets to ensure that the council invests in the most cost effective way in order to meet the needs of tenants and leaseholders.

KEY ISSUES FOR CONSIDERATION

Parsons Brinckerhoff

9. Consultants, Parsons Brinckerhoff, were commissioned by the council to undertake a review of the borough's heat networks and assess strategies for future heat supply across all the housing estates currently served by district heating systems.
10. The review was to:
 - Assess requirements and costs for the modernisation of Southwark's heat networks.
 - Determine the economic viability of modernising the heat networks, compared to an alternative of installing individual gas boilers in each dwelling currently served from a heat network.

- Develop a costed strategy for modernising Southwark’s heating delivery across estates currently served by a heat network.
11. The review considered 4 options:
- **Business as usual** – the existing heat networks are maintained, with replacement on a like-for-like basis of individual elements as required by the condition and expected life cycle of each element.
 - **District Heating (DH) good practice, no internal refurbishment** – boilers and balance of plant items are replaced in order to allow for efficient heat generation and distribution. DH pipework is replaced at the end of its life. Dwelling internals, including hot water cylinders, remain unchanged. Individual dwellings are provided with a direct Heat Interface Unit (HIU) board containing valves, a heat meter, timer-clock and thermostat for better supply regulation and metering in line with new *Heat Network (Metering and Billing) Regulations 2014* requirements.
 - **District Heating good practice, no internal refurbishment, addition of combined heat and power unit** – this option is as per the DH good practice option described above, but integrating a new combined heat and power plant (CHP) unit at the central plant, operating as lead boiler in conjunction with a thermal store.
 - **Individual gas boilers - no internal refurbishment** – the DH network is decommissioned and individual, non-combi gas boilers are installed in each dwelling. Dwelling internals remain unchanged – i.e. the non-combi boiler supplies the existing hot water cylinder coils.
 - In addition to these options, the potential costs and benefits of upgrading dwelling internal system were also evaluated for each estate in conjunction with the options above.
12. Parsons Brinckerhoff considered the whole life capital costs through time and these were input into a 40 year whole life cost model as required by the five options described above. The analysis was based on the detailed surveying of several estates plus information provided by the council to model the rest of the portfolio.
13. Only estates with partial heating would benefit in purely economic terms from dwelling internal system upgrades. The results showed that none of the other estates would benefit. However, it should be noted that internal upgrades would improve efficiency and comfort levels.
14. The analysis took into account disruption and likelihood of an improvement being accepted in any change to a system and therefore only recommends a change where there was a clear economic case.
15. Following the initial report there has been work to verify the model resulting in changes to the output to give a better picture of the need and future of the council’s heat network.
16. The analysis against the options for the whole life cost benefit found that:
- 19% of estates the best option was business as usual.
 - 14% of estates the best option was individual boilers.
 - 67% of estates the best option was district heating upgrade.
17. The analysis estimates that by making capital investment upgrading the district heating or, in limited cases, changing to individual boilers would save an estimated £210m at

today's prices (lifetime cost) against business as usual across all the estates.

18. The preferred options are estimates that are used to model the investment requirement across the district heating portfolio. Any decision on the best option for an individual system would need to be based on a further detailed cost/benefit analysis.
19. Based on prioritising the most important estates, where the maximum economic benefit can be realised a 10 year capital/replacement spend on preferred options is estimated at £100m (including on costs and inflation). There is a significant shortfall in both our short term and long term investment plans.
20. The current asset management strategy allowed for £56m investment in DH over the period leaving an estimated shortfall of around £44m required over the 10 year period, based on the current scenario. It should be noted that this only includes the cost of dwelling internal upgrades in partially heated estates or the few estates for which internal upgrades were recommended. Additional budget should be set aside for individual dwelling upgrades in estates where resident comfort levels and/or maintenance costs for the dwellings are unsatisfactory.

Wider strategic context

21. The report clearly demonstrates the need for a wider strategic consideration of the council's district heating systems to ensure they are upgraded to a modern standard. It is clear that it is not economically sound to continue to simply continue a piecemeal investment into gas powered district heating systems. Gas powered heating systems are not a low carbon option and the council needs to give a consideration of how it can develop its heat networks and also achieve the investment needed. Switching to individual boilers is still expensive, and although in some limited cases it may be the best option, it would limit any possible future switch to a low carbon heat source if a network may be available in the future.

National context

22. The UK government has set a target of reducing greenhouse gases by at least 80% by 2050. Nearly half the gas use in the UK is used on heating (The Department of Energy and Climate Change (DECC), 2012, Digest of UK Energy Statistics).
23. The DECC (now part of Department for Business, Energy and Industrial Strategy) sees the development of heat networks as a key part of its strategy for a low carbon future.
24. The government has been supporting local authorities to realise the potential of heat networks through the Heat Networks Delivery Unit (HNDU) to provide expertise that local authorities may not have in house.

Local context

25. The London Plan required Southwark and other London boroughs to embed support for decentralised heat networks within local plans. The London Plan committed to meet 25% of London's energy requirements through the use of decentralised energy by 2025 (expected to be predominantly through gas-fired CHP and heat networks). London Plan policies 5.5 and 5.6 support development of decentralised heat networks. Policy 5.6 is particularly important as it requires major developments to follow a hierarchical approach, starting with connecting to an existing heat network; then moving to a site wide CHP network where this is not feasible; or lastly opting for a communal heat

network.

26. The council aims to reduce borough-wide CO₂ by 22.4% by 2020 and 80% by 2050 and promote the use of CHP and district heating networks as the main means of tackling CO₂ emissions from buildings.
27. The Mayor of London's, London heat Network Manual states that: *'Large scale decentralised energy schemes incorporating heat networks offer an affordable way of achieving low carbon energy supply in densely populated areas such as London, meeting domestic, commercial and some industrial space heating and domestic hot water requirements. It achieves this through the supply of low cost low carbon sources of heat distributed in bulk via heat networks.'*
28. The preferred option version of the emerging New Southwark Plan (October 2015) supports the development of heat networks linked to a low carbon heat source. Policy DM56 states that planning permission will be granted for: *'Major development that connects to existing or planned decentralised energy networks. Where connection to an existing or planned network is demonstrated not to be feasible, major development should prioritise use of a site wide CHP communal heating system. Where CHP is feasible, the opportunity to oversize the CHP and extend the network to supply nearby buildings beyond the site should be evaluated and enacted.'*
29. The supporting text to the policy highlights that: *'Most carbon dioxide emissions come from heating, cooling and powering buildings accounting for 84% of emissions in Southwark. Reducing carbon dioxide emissions, especially through requiring zero carbon buildings, will contribute to objectives to reduce greenhouse gas emissions and tackle the effects of man-made climate change.'*
30. *'Decentralised energy networks provide an important opportunity for reducing carbon emissions and fuel poverty in dense urban areas like Southwark. The policy therefore seeks to encourage the expansion of existing decentralised energy networks within the borough and, where this is not practicable, the development of new networks.'*

Funding options to meet the investment need

31. Asset management looked at options to fund the gap or prioritise investment within the constraints of the overall financial Housing Revenue Account (HRA) business plan.
32. The maintenance costs will only increase without considerable investment; this will put mounting pressure on the HRA, adding to the pressures of the HRA from the reduction in rents, welfare reform and housing and planning act.
33. There are a number of funding options that were considered.

Funding option 1: Savings in the HRA

34. The senior strategic business manager was asked to look at potential savings within the HRA which could be used to fund part of the financial shortfall on the district heating replacement programme.
35. Over the last 5 years individual budgets have been scrutinised against historical actual spend and anticipated future spend to realise savings totalling £33m for the period 2011-16. The HRA budgets and actuals for the last 5 years were looked at, but this clearly highlighted the savings that have taken place over the last 5 years and didn't

indicate any areas where significant savings could be made without affecting delivery. Any savings that could emerge would have to be provided through a fundamental review of housing service delivery but this is constantly looked at as evidenced by the staffing restructures in asset management and residents services. Even if any savings did emerge then the use of the savings would have to be prioritised by officers and members and not automatically used to fund the capital shortfall on the district heating programme.

36. The current Asset Management Strategy only allows for £56m investment in district heating over a 10 year period. The remaining programme cannot be reprioritised without affecting the programmes ability to deliver existing commitments including to maintaining decent homes, the kitchen and bathroom guarantee and providing external decorations.

Funding option 2: Looking at the rent and service charge to ensure we are adequately recovering costs for services and improvements

37. Homeowners pay a variable rather than a fixed service charge, based on the actual cost of fuel, together with repairs and maintenance in accordance with the terms of their lease, whereas for tenants, energy costs are pooled across the dwelling stock and standardised charges are set on a borough-wide basis for tenants, depending on the number of bedrooms and type of heating installation. And the cost for repair and maintenance forms part of the basic rent. At present, the heating account currently pays for remote equipment for monitoring usage and contribution towards the energy management team, as well as on-going investment in the infrastructure to increase energy efficiency/reduce consumption.
38. The heating account is ring fenced within the HRA and run on a trading account basis, with surpluses/deficits carried forward between years allowing pricing consistency. Although, the charges are reviewed annually. In 2014-15 the heating account expenditure was not fully met by income, requiring the drawdown of £0.48m from the heating account reserve, leaving an overall balance of £2.24m (shown below). In 2015-16, income exceeded expenditure and the balance carried forward was increased to £3.36m. Given that this is a trading account rather than an on-going surplus, there is limited capacity to fund any significant works.

	Notes	£
Electricity		835,213
Gas		10,737,046
Fuel Oil	A	63,588
Telephones	B	26,146
Energy Management	C	89,347
Total Expenditure		11,751,340
Tenant Contributions	D	(8,996,896)
Homeowner Contributions	E	(2,269,829)
Total Income		11,266,725
Net Expenditure		484,615
Balance brought-forward		(2,720,184)
Movement during 2014-15		484,615
Balance carried forward		(2,235,569)

39. There is limited scope for service charging other non heating items such as TV aerial maintenance, however in terms of this paper these items would not yield a significant income to the council to enable funding to be diverted to the district heating.

Funding option 3: Looking at external grant funding opportunities

Energy Company Obligation (ECO)

40. The Energy Company Obligation (ECO), a programme to deliver energy efficiency measures in homes across Great Britain, is due to finish at the end of March 2017. The 2015 spending review set out government plans to have a supplier obligation in place until 2022, with a focus on fuel poverty. A consultation from the DECC took place from 29 June 2016 to the 17 August 2016 and we await the outcomes.
41. The proposed scheme will be the primary vehicle through which government would meet its commitments to insulate homes, tackle fuel poverty, whilst making progress towards carbon budgets. It has an estimated funding level of £640m per year.
42. This consultation sets out proposals to allow all those living in social tenure housing with an Energy Performance Certificate (EPC) band of E, F or G to be eligible within Affordable Warmth funding. Also, given the high proportion of fuel poor households living in this housing and the general low income levels, it was proposed that additional eligibility criteria relating to the occupants of those properties is not required.
43. Void EPC data from 2012 to 2015 indicates that less than 10% of properties are a Band E or lower, which may limit the funding opportunities.
44. There are also proposals that local authorities would provide a declaration to energy suppliers that they had determined a private household, or a number of households, as eligible under Affordable Warmth funding with eligibility around low income and vulnerability.
45. Officers have met with British Gas to discuss funding opportunities and passed them six sample schemes in order to determine the likely funding available under the current obligations:
- D'Eynsford Estate
 - Cossall Estate
 - Canada Estate
 - Lettsom Estate
 - North Peckham Estate
 - Sceaux Gardens Estate.
46. British Gas estimated that the grant funding would cover less than 10% of the capital outlay estimated prior under the current obligations.
47. Although the limited grant funding available to the programme will help meet interim funding needs this does not resolve Southwark's long term funding issues or allow for a long term strategy to be developed.
48. However, for any projects going forward Southwark will look to maximise funding available through Affordable Warmth funding to deliver improvements to residents.

The London Energy Efficiency Fund (LEEF)

49. The London Energy Efficiency Fund (LEEF) allows access to loans of up to 10 years and interest rates from 1.65% to public and other bodies in the Greater London area if projects contribute to improved energy efficiency through reducing consumption and/or carbon emissions; and the funding requirement is between £1m and £20m. However, this money will need to be paid back and as Southwark currently passes on heating savings directly to residents there is no pay back period on the investment.

Department for Business, Energy and Industrial Strategy

50. The DECC's Heat Networks Delivery Unit, now part of the Department for Business, Energy and Industrial Strategy has been supporting local authorities to explore heat network opportunities since 2013.
51. HNDU funding has been available for early stage development support, with the last round (round 6) funding available published in April 2016 with further funding expected to be announced later in the financial year.
52. HNDU grant funding can provide up to 67% of the estimated eligible external costs of early stage development studies. The funding covers identification and prioritisation of heat network project opportunities through feasibility to detailed design and commercialisation.
53. Due to the London Heat Mapping Work carried out by 2010 for Southwark it would be advisable to target any funding around a recap of this work for the early stages and a feasibility study into scheme specific options.
54. The Heat Network Investment Project (HNIP) aims to provide £320m of capital support by March 2021 to increase the volume of heat networks being built, deliver carbon savings, and help create the conditions necessary for a self-sustaining heat network market to develop. This funding is to contribute directly towards the construction costs of heat networks, and help stimulate a self-sustaining heat network market. The initial funding pilot is open for local authorities and other public sector bodies excluding central Government Departments to bid for a pot of £39m funding by 28 November 2016. The council would need to explore development options possibly utilising HNDU funding so that it would be in a position to bid for HNIP funding in later rounds.
55. One of the aims is to '*...build capability among local actors to develop optimised heat networks that will meet local needs. Seek to support the type of heat networks with the following technical, contractual and financial characteristics that would not have been developed without Government support: will have explored a suitable range of technical options and are efficient heating and cooling systems that are technically future-proofed; are commercially future-proofed; and will operate with no customer detriment in comparison to the likely alternative heat supply.*'

Other funding streams

56. Prudential borrowing (in the case of a council led delivery model), however, this would clearly increase the short term debt burden on the council and means the council carries the risk should the payback and other benefits not be realised.
57. Other developer contributions such as section 106 funding.

58. The Greater London Authority (GLA) are also providing a framework that is currently being evaluated to fund the consultancy work under a support agreement. The framework should be available early in 2017.

Funding Option 4: Looking at the priorities, especially in the short term, so we can balance the investment need with the resources available

59. Southwark engaged the RE:NEW team who are a team employed through the GLA to reduce carbon emissions and energy bills in London's homes. This team helps organisations such as Southwark and other local authorities, housing associations, and universities to implement retrofit projects and alleviate fuel poverty.
60. RE:NEW carried out some analysis of estimated fuel usage across the boroughs district housing stock. This showed the usage at D'Eynsford and Cossall per property was amongst the highest across the borough.
61. RE:NEW also provided contacts for some of the case studies and helped set out options for possibilities for the future delivery of the heat networks, including funding and delivery vehicles.
62. The analysis has been used alongside existing information on the systems to revise a programme.
63. Following the Parsons Brinckerhoff study and work by RE:NEW, a three year delivery programme has been put in place pending a longer term strategic review of the boroughs heat networks.
64. Since 2012, there have been many reports of overheating in dwellings from residents on Cossall Estate, coinciding with the last major works programme which included for replacement windows. The existing heating system provides heating and hot water to all properties on the estate (392 properties) and is served from a central boiler house. The main boilers and internal pipework is the original and around 35 years old. However, the main underground pipe work supplying each block was replaced in 2002 and is thought to be in reasonable condition.
65. Council officers attended a number of resident meetings to understand the extent of the problems that residents are encountering. Residents requested that a number of options were explored to reduce/remove the overheating problems in their homes.
66. Officers agreed to commission an independent feasibility study into the root cause of the overheating and to recommend costed solutions. It was agreed to share the report with residents. Officers engaged a specialist consultant, PCM, to investigate and carryout the feasibility report. PCM reported back on 18 December 2014.
67. Some residents voiced a strong opinion to move to individual boilers but the consultation carried out in 2015 on the options had such a low return it was inconclusive.
68. It is recommended that further consultation is carried with residents with a view that a costed solution is worked up to begin in 2017-18 rather than in 2020-21 as currently planned in the asset management strategy.

Funding option 5: Look at the models for service provision to district heating

69. Below is a list from Parsons Brinckerhoff potential commercial arrangements possible for public-private partnerships that have been undertaken to date. Sometimes different forms of arrangements are used throughout the life of a project.

Description	Funding	Construction	Ownership	O&M	Potential application
Public Sector - traditional	LBS funds Grant funding Other public funds	Public procurement of construction contracts by LBS	LBS direct	LBS internal or public procurement of O&M contract	LBS procure schemes. The heat is then sold on to heat customers. Full LBS control. LBS take all the risk and benefit.
Public sector – arms length organisation	LBS funds Grant funding Other public funds ALMO Borrowing	Public procurement of construction contracts by ALMO	ALMO	ALMO direct or public procurement of O&M contract	As above but LBS set up an ALMO to manage the delivery and operation of the scheme. Potential to avoid public procurement rules and engage in commercial markets. Full LBS control. LBS take all the risk and benefit.
Public Private Partnership – JV company	Part as Public Sector plus private sector equity plus private sector debt	Public/private sector procurement of construction contracts (depends on JV structure and partner capabilities)	JV Co Ltd	JV Co direct or Public/private sector procurement of O&M contracts (depends on JV structure and partner capabilities)	LBS and a partner as shareholders of a single entity. LBS able to exert influence over priorities such as reduction of fuel poverty, CO2 reduction, prioritising connection of future developments. Shared risk.
PPP – split responsibilities (e.g. energy supply private – infrastructure public sector)	Part as public sector plus private sector equity plus private sector debt	Split public/private procurement with interface management	Split public/private	Split public/private procurement of O&M services. Public O&M potentially packaged with private sector partner	LBS and partner with different roles, e.g. LBS procure pipe network, partner funds EC and customer interfaces. Benefits as with JV option, i.e. LBS retain maximum possible influence. Risk is shared in part, but can be weighted heavily in one direction (e.g. network construction risk if LBS fund the network installation would sit with LBS).
Private sector – direct energy services contract	Private sector debt/equity Grant funding – limited availability Supported by contract for services	Public procurement for energy services (heat, power) – fixed scope Private sector construction contracts	Private sector – reversion to public after defined period	Private sector	Infrastructure ownership reverts to public sector once the contract for services has repaid the private sector debt/capital spend. Risk sits with private sector until asset is transferred.
Private sector – concession	Private sector debt/equity Grant funding – limited availability. Supported by concession	Public procurement for concession – fixed area/service variable scope. Private sector construction contracts	Private sector – reversion to public after defined period	Private sector	As with direct energy services contract option above, but the concession covers a fixed area rather than a fixed set of loads. Typically this would be for a new development area where specific requirements can be placed on developers to connect to a network. Risk sits with private sector until asset is transferred.

Description	Funding	Construction	Ownership	O&M	Potential application
Private sector speculative	Private sector debt/equity Grant funding – limited availability. Underwritten by supply contract	Private sector	Private sector	Private sector	LBS has no influence over the connected loads, receives none of the commercial benefits but takes none of the risk. Still contributes towards some of LBS's drivers – CO ₂ reduction etc., but risks being at odds with LBS social agenda.

Other models

70. There are other models in the energy sector including Mutual Energy which is a mutual company which manages strategic energy assets in the long term interests of Northern Ireland's energy consumers. Mutual Energy is a company limited by guarantee with no shareholders, commonly known as a mutual.
71. Co-op Energy is a co-operative, owned and run by their members. When they make a profit, members and communities see the benefits.

Energy Services Company (ESCO)

72. An ESCo refers to a commercial structure that has the purpose of selling energy services to end customers. An ESCo may be set up to produce and supply energy usually in the form of heat to customers. A full ESCo would finance, design, install, maintain and bill, delivering an end to end energy service.
73. ESCos can be developed and owned by a public authority, a privately owned businesses or a mixture of the two.
74. Public ESCOs are set up of public sector organisation to sell heat to public buildings or estates often through a separate company. Private ESCOs hold service contracts with clients in order to generate profits but also often guarantee energy savings. Joint public/private ESCOs allow the public body lever in capital investment whilst ensuring environmental benefits and benefits to residents and sharing the risks.
75. A public ESCo has the advantage of being fully owner and controlled by the council. However, the council would have to borrow or invest directly to deliver capital investment and all the risk would be placed on the council. The heat network competes directly with other funding priorities.
76. A private ESCo has the advantage of transferring risk from the council, however, the council would also be surrendering control and less able to protect customers except through contractual arrangements.
77. A joint public/private ESCo would allow the council to lever in private investment into delivering the heat network whilst ensuring environmental benefits and benefits to residents and sharing the risks. This would be structured through special purpose vehicle and allow public and/or private funding.
78. The ESCo would work by providing and investing in a heat network and selling on the heat to residents at a rate favourable or equivalent to the market price they could obtain as an individual purchaser. The model works where there is a surplus in producing energy to allow an eventual return on any capital outlay, allowing the ESCo

to operate. The ESCo should also work to improve efficiency thus reducing costs and customer consumption. With private investment, the return would go back to the private sector or could be shared in a mixed funding arrangement.

79. The establishment of an ESCo and selling heat directly to customers would require a licence.
80. Nottingham City Council has successfully established Robin Hood Energy, which is a not-for-profit company that supplies electricity directly to customers. Similarly the Mayor of London is establishing Energy for Londoners, a not-for-profit company providing a comprehensive range of energy services. Energy for Londoners has applied for a Licence Lite. They predict that it could help bring in more than £300 million of investment for 22 new heat and power projects in London.
81. There is unlikely to be private interest in an ESCo based on district heating replacement of gas boilers and upgrades. An ESCo is more likely to be an option for a combined heat and power plant.

Opportunities for investment

82. Southwark currently pays on average around 2.2p per kWh for gas through the LASER consortium (an energy buying consortium). In addition, the price the council pays for heat from the SELCHP heat network is significantly lower than to LASER as a result of specific financial arrangements with our waste PFI partner, and part owner of SELCHP, Veolia Environmental Services Southwark Ltd (VESS). These charges are passed onto residents through a fixed service charge for tenants or leasehold service charges and amount to approximately £10.7m for gas. An individual customer can expect to pay in excess of 3.7p kWh on the open market. It should be noted that although the prices paid are low the current networks are generally old and inefficient meaning that consumption is high particularly on some estates.
83. The analysis by Parsons Brinckerhoff identifies that on a number of the larger estates the addition of CHP as part of the system upgrade would deliver value over the alternative options. These could be further explored to look at wider loads available locally. The savings generated through technology could be used for investment depending on how the investment was structured, the cost at which heat was sold and the overall viability of the scheme.
84. Parsons Brinckerhoff suggests as a local authority, the council has the potential to provide certainty to the market in a way that the private sector cannot. This ability should enable Southwark, should the council wish to, to attract a private sector partner to help develop opportunities on the basis of anchor load customers based around key estates and other council owned loads. However, further work is needed to explore the viability of these opportunities.
85. Parsons Brinckerhoff, also caution that a piecemeal approach could risk the best opportunity areas being 'cherry-picked' and put forward that a borough-wide partnership arrangement may represent a possible way forward, if there appears to be sufficient potential across the wider portfolio of estates. The viability of this proposition remains to be tested, with the alternative route being a division of approaches, where the smaller, less easily 'connectable' estates continue to be operated by LBS alone, and a partnership arrangement is developed for those sites with greater opportunity for forming part of a wider area network.

86. There are various other options that can be explored, as part of a wider and more strategic view of the councils portfolio of district heating and potential heat networks.

Background to existing heat networks and plans

87. In May 2010 Ramboll carried out heat mapping for Southwark as part of the London Heat Map study which identified seven focus areas for further study.
- Canada Water (High)
 - North Southwark (High)
 - Bermondsey Spa (High)
 - Southampton Way (High)
 - Camberwell (Medium)
 - Surrey Gardens (Medium)
 - Peckham (Medium).
88. It was recommended that further feasibility studies be carried out to determine what buildings could form part of a network and the heat production facility. As well as a study on how the boroughs heat energy needs can be met from low carbon sources.

Canada Water

89. In February 2016 the council began sharing the draft masterplan for Canada Water. These sites cover an area of 46 acres, making it one of the most significant opportunities in London and has opportunity for a major new town centre.
90. The Canada Water Energy Study has assessed the opportunities for the generation and supply of low carbon and renewable energy across the AAP area and identified a significant opportunity to establish a district heating network. There would be several options to achieve this. The first would be to establish an energy centre in the area and link infrastructure on individual sites to create a network. However, in terms of cost to amount of carbon saved, district heating which utilises waste heat from the SELCHP plant in Lewisham would be the most cost effective district heating option. Both options would provide a significant opportunity to incorporate housing on Southwark's estates within the network.
91. The council has entered in to a contract with Veolia Environmental Services Southwark Ltd (VESS) to supply heat and hot water from SELCHP to Southwark homes to the south of the action area.

Old Kent Road

92. The emerging draft Old Kent Road Area Action Plan includes Policy 24 which requires major new developments to support the development of heat networks in the Opportunity Area (OA) and to evaluate the feasibility and viability of providing an energy centre to serve other developments. This policy is supported by an Old Kent Road Decentralised Energy Strategy that was delivered by AECOM. The council is currently working with the GLA to scope out further decentralised energy feasibility work in the Old Kent Road OA, to be funded by the GLA's new heat network fund (launching in early 2017). This will provide additional support to the development of heat networks in two key emerging clusters of development sites and would also seek to demonstrate to the government's Heat Network Investment Project a good case for capital investment to help deliver this network.

93. The action plan states: *'Research into the potential for developing a decentralised energy (DE) network in the opportunity area has indicated that, given the significant growth proposed, delivery of a district heat network is feasible and viable. There are several options for delivering this including a phased network with a single large energy centre, a variant of the first option with three smaller energy centres, or a single energy centre which is connected to the SELCHP Energy Recovery Facility located in Lewisham. Where connection to an existing or future DE network is feasible and viable, a commitment to a connection will be secured via Section 106 planning obligations.'*
94. *Where a major development is expected to be completed before the Old Kent Road Heat Network (OKRHN) is able to supply it with heat, but there are firm plans that would enable connection within a five year period, then we would expect developments to be fitted with temporary boilers. Where there are no firm plans, developments should be future proofed to enable connection at a later date. We will use the design standards and specifications for DE networks and secondary heating systems set out in the London Heat Network Manual (2014, or as updated) and the CIBSE/ADE Heat Networks: Code of Practice for the UK (2015, or as updated) in the implementation of this policy.'*

Elephant and Castle

95. A community energy centre is being delivered as part of Lendlease's redevelopment of Elephant and Castle's Heygate Estate, which it calls Elephant Park. Generating plant for the centre, which will include two combined heat and power boilers (263kWt and 985kWt), will be based on the building's ground and first floors. The boilers will not be switched on until there is sufficient thermal demand – this is defined as 3GWh or the occupation of 823 dwellings for the first boiler, and 7GWh or the occupation of 2,064 dwellings for the second boiler. A temporary energy hub has been installed in a containerised facility north of Heygate Street to ensure the initial heat demand is met before the practical completion of the permanent energy centre and the first CHP boiler becoming operational.
96. The centre will be operated by energy firm E.ON UK plc. Originally aiming to connect at least 1000 homes off site to the heat network (commitment secured via section 106 agreement on the planning application), the modular energy centre will now have capacity to supply the equivalent of an additional 3,346 dwellings in the surrounding area over and above the 2,469 dwellings in the Elephant Park development and 235 dwellings in the adjacent Trafalgar Place development.

Peckham and Nunhead Area Action Plan

97. The energy action plan requires major developments to evaluate the feasibility of connecting to existing heating and cooling networks and CHP systems. Where a new CHP system is appropriate proposals should also assess the feasibility of extending the system beyond the site boundary to adjacent sites. Where practical and viable, developments will be required to connect to existing or future networks.
98. The energy study (2012) for Peckham and Nunhead demonstrated how this could be delivered. This includes the potential to link developments to a decentralised energy network which could provide heat. It also considers linking different sites together to create a heat and power network. The energy study demonstrates that a district heat network in the Peckham core action area would be feasible and deliverable.

99. In accordance with our sustainable design and construction supplementary planning document, where a development will be completed prior to the completion of the district CHP/Combined cooling, heating and power system(CCHP) system, an efficient gas or bio-fuel boiler system should be used temporarily. The development should be designed so that it can quickly switch to the public CHP or CCHP system once it is completed.

Aylesbury Estate

100. The February 2015 Aylesbury Estate energy strategy was produced for Notting Hill Housing as part of the Aylesbury Overall Masterplan. It is proposing a site wide district heating network including two energy centres at the site, the first serving the first development site and a second to be included in Phase 2 of the Masterplan to be completed in 2023. SELCHP extension was not considered feasible due to the current distance from the current network.

SELCHP

101. The council has entered in to a contract with Veolia Environmental Services Southwark Ltd (VESS) to provide heat and hot water to estates. SELCHP began to provide heat and hot water from waste from February 2014. The estates connected to SELCHP are: New Place Estate (Four Squares), Keetons Estate, Rouel Road Estate, Abbeyfield, Pedworth Estate, Westlake and Tissington.
102. Currently there is 30MW installed capacity (1 x 10MW and 1 x 20MW heat exchangers) at SELCHP with the capacity to add a further 1x 10MW heat exchanger. Currently the peak off-take has been 10MW, meaning there is capacity to deliver further heat.
103. VESS are happy to discuss further opportunities.

Case studies of what others have done

Enfield Council

104. Enfield Council has set up *energetik*, a wholly-owned subsidiary, aiming to be a different kind of energy company. With feasibilities first starting in 2010, the first 40 homes were planned to be supplied in late 2016. The company want to supply environmentally friendly low carbon decentralised energy in the form of hot water. Ultimately it aims to supply 12,000 new homes and businesses across Enfield through the community heat network. This includes 10,000 new homes and businesses at Meridian supplied through the Lee Valley Heat Network. The Lee Valley Heat Network will initially use heat and steam from the Energy from Waste (EfW) facility at the Edmonton EcoPark.
105. *energetik* is to be commercially viable but the cost to the end customer has been a key consideration at all stages. Investment has come from direct investment, the European Investment Bank and London Energy Efficiency Fund.
106. Robin Hood Energy was the first council owned energy company launched in September 2015. As a not for profit supplier it seeks to provide gas and electricity at the lowest possible price by using locally produced energy as well buying from the market.

Pimlico District Heating Network (PDHN)

107. PDHN came into being in 1950 with approx. 2500 homes built on the site of a redundant dock. Heating and hot water was supplied communally via waste heat generated from Battersea Power Station on the other side on the River Thames.
108. Battersea power station closed in 1980 and heat generation then started to come from a stand alone gas fired boiler house on the power station site. This was not a long term solution as eventually the power station would be re developed.
109. It was decided to switch to communal boilers on the Pimlico site in the early 2000's together with two gas fired Caterpillar combined heat and power engines which generate electricity.
110. This required the heat network to apply and register as a energy supply company to sell on electricity. The income generated from electricity sales covers over half the cost of running the network where proportion of the savings are passed to the residents and is allowing the network to expand to supply private dwellings, commercial and public buildings.
111. There are on site engineers maintaining the system with a large importance placed on planned preventive maintenance to assist longevity and reliability.
112. The original idea of this network was to supply cheap heat and hot water to some of London's poorest residents in homes built to encounter abject poverty during slum clearance following the Second World War. By following this principle PDHN appear to have brought this network into a modern efficient communal heating system and power generator.

Birmingham City Council

113. District energy is part of Birmingham City Council's long held a vision to develop large scale sustainable energy infrastructure across the city and reduce its CO₂ emissions. The Birmingham District Energy Scheme is owned and operated by Cofely District Energy, working in partnership with Birmingham City Council, Aston University and Birmingham Children's Hospital, under the name of Birmingham District Energy Company Ltd (BDEC), an ESCo. Cofely District Energy was selected as the preferred partner and has signed 25 year energy supply agreements for Eastside and Broad Street. These systems use large scale combined heat and power systems with conventional boilers. Further expansion of the network is planned. Charges are indexed to market prices to guarantee savings.

Newcastle City Council

114. In 2010 Newcastle City Council appointed New and Renewable Energy Centre (Narec) as the energy masterplanner for the city. In 2012 a masterplan was produced that set out a strategic direction and actions for the next 20 years. This set out a strategy with the following objectives: carbon reduction, affordable energy, community energy, ESCo development, renewable energy technologies, partnerships and finance. In 2013 the council carried out technical and financial feasibility, heat mapping and identification of financially viable schemes.
115. This was to be developed with a tendered 40 year partnering agreement to jointly develop district energy projects in Newcastle with the council, with two projects at an

advanced stage of development and the potential for future potential public-sector led projects for inclusion in the partnership.

Denmark

116. Denmark embarked on changing its reliance on imported fuels following the oil crisis of the 1970's. Danish district heating systems now provide heat to 6 out of 10 Danish residents and more than half of the country's electricity needs comes from combined heat and power plants.

Billing and metering

117. Under the Heat Network (Metering and Billing) Regulations 2014 Southwark is required to prepare information on each district heating scheme and once viabilities are carried out assess if individual meters are viable. The original viability tool was suspended in 2015 and Southwark awaits a replacement in order to be able to carry out the viability and act on the regulations. These assessments and, where viable, any resulting installations were to be completed by 31 December 2016.
118. The cost effectiveness tool is currently being revised by BEIS. Therefore, pending the revision of the tool it is advised that no further assessments should be undertaken.
119. BEIS is working towards launching a public consultation in early 2017 on a revised methodology for assessing the cost effectiveness of metering for district and communal heat networks. The consultation will also seek views on some additional areas where the regulations could benefit from clarification following the first two years of implementation.
120. Following the planned public consultation, BEIS intend to launch the new cost effectiveness tool and accompanying regulatory amendments later in 2017.
121. A cross department working group has been developed to look at the impact and practicalities around metering and charges to residents.

Conclusion

122. 17,000 council properties rely on district heating systems that are in need of capital investment and modernisation. There is not the funding in the current plans and models to upgrade the systems to a modern standard. It is clear that Southwark needs to take a wider strategic view of its district heating systems and heat network in order to deliver a sustainable investment and reductions in borough-wide CO₂ by 22.4% by 2020 and 80% by 2050.

Policy implications

123. The London Plan committed to meet 25% of London's energy requirements through the use of decentralised energy by 2025.

Community impact statement

124. 17,000 residents rely on the council's district heating systems. Without further plans to seek the funding to upgrade the systems residents will be disadvantaged. Vulnerable residents will be particularly disadvantaged by increasingly unreliable and inefficient district systems particularly affecting disabled, very young and older residents.

125. Fuel poverty should remain a key consideration for any future solution. A modern and efficient system should decrease fuel usage, particularly when internal controls are introduced. However the cost of providing heat to residents should remain a key consideration alongside the overall efficiency of their homes.
126. Improving all aspects of housing in Southwark is central to the council's wider plans to create a fairer future for all.
127. The three year investment plan takes account of the work undertaken to identify those systems in most need of investment.
128. With regard to locations where the decision is taken to proceed with investment in heating systems, those living in properties may experience some inconvenience and disruption in the short-term, while works are taking place but communities as a whole will benefit in the longer term.
129. In local areas, the effects will be mitigated by working closely with residents on the delivery process and using experience gained on a significant number of recent projects. Residents will continue to be at the centre of and involved in works that take place. Where financially viable other positive community impacts will also be included as part of the works.
130. The works will provide a better standard of heating for residents and contribute to improved general health and well being. Due consideration will be given to those tenants with specific needs both during works and after completion.
131. The public sector equality duty requires public bodies to consider all individuals when carrying out their day to day work, in shaping policy, in delivering services and in relation to their own employees. It requires public bodies to have due regard to the need to eliminate discrimination, advance equality of opportunity and foster good relations between different people when carrying out their activities.

Financial implications

132. This report has no financial implications as all the current budgets for district heating are contained within the Asset Management strategy.
133. Costs around developing proposals with a partner will need to be given further consideration once these have been explored.

Consultation

134. A summary of the new three year plan and an accompanying paper will be sent to tenant council and home owners council.

SUPPLEMENTARY ADVICE FROM OTHER OFFICERS

Director of Law and Democracy

135. This report requires cabinet to approve an interim three year investment plan for the heat network (including works at Cossall Estate) whilst the options for funding modernisation of that network are explored and to note a number of matters in relation to the district heating strategy. Pursuant to Part B of the council's constitution, the cabinet is responsible for

formulating the council's overall policy objectives and priorities and to approve key strategies and they are therefore asked to approve this plan and will receive the funded strategic investment plan once developed.

136. There are no specific legal implications arising regarding the recommendations noted in this report. However, in considering these recommendations, the cabinet should have regard to the council's obligations to carry out its duties in accordance with the principles of best value and to ensure its functions are exercised having regard to a combination of economy, efficiency and effectiveness. In developing the plan, the council is under a duty to consult on the options to inform the report recommendations. This should include residents where the district heating work will impact. Officers should ensure that such consultation is updated on a regular basis for the purpose of monitoring the effectiveness of the interim plan and to assist future decision making in this area.
137. The cabinet must continue to take into account the public sector equality duty (PSED) general duty under the Equality Act 2010 and when making decisions, to have regard to the need to (a) eliminate discrimination, harassment, victimisation or other prohibited conduct, (b) to advance equality of opportunity and (c) foster good relations between persons who share a relevant protected characteristic and those who do not share it. The relevant characteristics are age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex and sexual orientation. The PSED general duty also applies to marriage and civil partnership but only in relation to (a). The PSED general duty is a continuing duty and potential equality considerations should be considered at the different stages of the programme. Cabinet is specifically referred to the community impact statement at paragraphs 124-131 of the report, which sets out the consideration that has been given to equalities issues for this programme.
138. The report highlights a number of options that will be considered as part of the longer term plan. Officers from legal services will provide legal advice, when required, on the models for service provision considered, some of which may have procurement implications.

Strategic Director of Finance and Governance

139. This report recommends an interim three year investment plan for the council's district heating systems and the development of a funded strategic investment plan in the longer term. The costs arising from the interim investment plan will be contained within the existing housing capital investment programme. The financial implications of proposals developed as part of the longer term strategic investment plan will be considered when they are put forward.

BACKGROUND DOCUMENTS

Background paper	Held at	Contact
Asset Management Strategy	Southwark Council Major Works Housing and Community Services Department Hub 3, 3rd Floor PO Box 64529 London SE1P 5LX	Richard George 020 7525 3293
Link: (copy and paste into browser) http://modern.gov.southwark.gov.uk/documents/s60406/Appendix%205%20Asset%20Management%20Strategy.pdf		

APPENDICES

No.	Title
Appendix 1	Asset Register of District Heating Systems
Appendix 2	3 year programme

AUDIT TRAIL

Cabinet Member	Councillor Stephanie Cryan, Deputy Leader and Cabinet Member for Housing	
Lead Officer	Gerri Scott, Strategic Director Housing and Modernisation	
Report Author	Dave Markham, Director of Asset Management	
Version	Final	
Dated	13 January 2017	
Key Decision?	No	
CONSULTATION WITH OTHER OFFICERS / DIRECTORATES / CABINET MEMBER		
Officer Title	Comments sought	Comments included
Director of Law and Democracy	Yes	Yes
Strategic Director of Finance and Governance	Yes	Yes
Cabinet Member	Yes	Yes
Date final report sent to Constitutional Team		13 January 2017