

Environment Scrutiny Commission

Thursday 14 October 2021

7.00 pm

160 Tooley Street

Supplemental Agenda

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4.	Minutes To approve as a correct record the Minutes of the open section of the meeting on 13 July 2021.	1 - 7
5.	Energy Review: SE24 SE24 have provided the enclosed presentation.	8 - 20
7.	Energy Review: District Heating Networks Tom Vosper, Strategic Project Manager, will provide a verbal presentation followed by a question and answer session on: <ul style="list-style-type: none">• SELCHP expansion project• Water source heat pump project• Heat Networks Strategy• Heat metering	21 - 31

District Heating was considered by the 14 September cabinet, under item

13: Heat Networks Strategy. Appendix 5, Heat Network strategy development, is particularly relevant, especially pages 8-11. More

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information on the cabinet item can be found here:

<https://moderngov.southwark.gov.uk/ieListDocuments.aspx?CId=302&MId=7015&Ver=4>

The 19/ 20 Housing Scrutiny Commission wrote a report on District Heating and Heat Networks, details can be found below.

Scrutiny Report:

<https://moderngov.southwark.gov.uk/ieDecisionDetails.aspx?ID=7178>

Cabinet Response:

<https://moderngov.southwark.gov.uk/ieIssueDetails.aspx?Id=50024623&PlanId=0&Opt=3#A159107>



ENVIRONMENT SCRUTINY COMMISSION

MINUTES of the Environment Scrutiny Commission held on Tuesday 13 July 2021 at 7.00 pm at

PRESENT: Councillor Margy Newens (Chair)
Councillor Adele Morris (Vice-Chair)
Councillor Renata Hamvas
Councillor Graham Neale
Councillor Leanne Werner

OTHER MEMBERS PRESENT: Councillor Helen Dennis, Cabinet Member for the Climate Emergency and Sustainable Development

OFFICER SUPPORT: Chris Page, Climate Emergency Director
Julie Timbrell, Project Manager

1. APOLOGIES

Councillor Tom Flynn and Leo Pollak gave apologies for absence and Councillor Renata Hamvas gave apologies for lateness. Councillor James Coldwell attended as a substitute.

2. NOTIFICATION OF ANY ITEMS OF BUSINESS WHICH THE CHAIR DEEMS URGENT

There was none.

3. DISCLOSURE OF INTERESTS AND DISPENSATION

There were none.

4. MINUTES

The minutes of the meeting held on 29 April 2021 were agreed as an accurate record.

5. CLIMATE CHANGE STRATEGY

Councillor Helen Dennis, Cabinet Member for the Climate Emergency and Sustainable Development, presented and then took questions, with assistance from Chris Page, Climate Emergency Director.

Members raised the following issues:

- The cabinet lead agreed with members that assistance for private landlords to retrofit existing housing is an area that warrants more active exploration. There is a potential tool for the council to influence this through the Licensing scheme for rented property. Another opportunity is promotion and support for landlords' to make use of government green grants when they come online.
- It was clarified that the £101 million pounds referenced in the Climate Emergency Strategy refers to money already spent on capital projects, such as parks and active travel, to address the climate emergency to date. There is an additional £25 million committed, but as yet unallocated, to be spent on capital works, to address the Climate Emergency.
- The Greens Homes Grant is being used in a Southwark Tower block to retrofit and improve insulation, including double glazing. A Green Home Grant has also been successfully awarded for council street properties to do insulation. The Green Home Grant scheme has now closed but the council will be looking at further information and support if new programmes come online.
- The Climate Change Director was asked about the three biggest actions planned to tackle the Climate Emergency and responded that because everything is interlinked it is a challenge to separate out individual actions, however there is a big focus on less driving and getting gas out of people's homes. The method for removing gas boilers include bringing forward heat networks, with three pilot water sourced heat pumps networks in the pipeline, and linking more households to South East London Combined Heat and Power (SELCHP). The strategy sets out a commitment to reduce energy and encourages linking to renewable energy, as set out in the Greener Building theme and Renewable theme.

- Work on adaptation is to follow, with a planned strategy that will include flood defences. The plan is to eventually will bring the work on the Climate Emergency and Adaptation together, however the council's priority was tackling the Climate Emergency.
- The Cabinet lead said that the New Southwark Plan (NSP) amendments that are quite considerable. However the NSP will go further with an Energy policy, which is most significant. There is also a programme of work to include embodied carbon.
- Some commission members commented that the strategy was wordy, with a lot of 'exploring' and 'highlights', while other members praised the themes, clarity on where responsibility for emissions lies and the short, medium and long term goals. The rolling Action Plan was commended. The cabinet member was asked if there would be an increase in SMART targets, deadlines and a communication plan.
- The cabinet lead she had tasked officers with communicating the plan. The Climate Change Director added that there is an education strand, commenting that people tend to be interested and care about the environment but there are other demands on people's time and energy, so education can be about providing accessible tools. He said the council have found it easier to engage with some sections of the population rather than others. The cabinet member said she would take away the point on SMART objectives.
- Members commented that some of the green industrial jobs promised by the government, such as wind, may not come to pass and asked about local plans. It was explained that there will be a particular emphasis on ensuring there are jobs and capacity to deliver the retrofit programmes. The number of jobs to retrofit is massive and there is a skills shortage. Jobs are also expected with trees and reforestation. The construction industry is also significant and this is being made a centre for green recovery. The cabinet lead for the environment explained that she is working with the cabinet member for Jobs, Business and Town Centres, Cllr Ochere, on this agenda. The potential for linking up with local colleges and universities was discussed.
- Commission members were assured that retrofitting plans do include the Victorian houses, including those in conservation

areas, and there are plans for a Heritage SPD to facilitate this.

- The outlay for installing heat pumps was discussed, given the potential for carbon and financial savings, but significant installation costs. The council does not yet have a financial model in place to deliver this and is conscious of the financial impact on leaseholders.
- The commitment to Social Justice in the strategy was referenced with a query on its purpose. It was explained that this will be taken forward by thinking about co- benefits; to the environment and people, and reducing inequalities.
- Members sounded a note of caution on the plans to expand the burning of waste in SELCHP, with concerns about this creating a market for waste, and the associated emissions. The cabinet member undertook to keep an eye on this.
- Comments were made by a member that the food section in the strategy is thin on reducing carbon through practices such as going vegan, and the cabinet member agreed there is room to explore encouraging meat and dairy free diets.
- The timeline for food, garden collection and grey water being optimally utilised was touched upon, with a report indicated.
- Southwark's capacity to build to Passivhaus and generate solar through PV was discussed. The cabinet member said that there are plans to build to Passivhaus standards, however construction will only get so far unless there is a connection to an air or ground source pump or heat network. There is also an administrative cost to Passivhaus.
- The commission asked about the manifesto commitment to deliver Community Energy. The cabinet lead and officer said previously the figures did not stack up for housing without the Feed in Tariff (FIT), however this will be looked at again and include community buildings.
- There was a discussion on the Urban Greening Factor and importance of having the capacity to deliver this in planning as required by the London Plan.

6. ENERGY SPARKS

Dr Claudia Towner, Energy Sparks CEO and Programme Director gave a presentation virtually demoted from the website: www.energysparks.uk .

The chair then invited questions and the following points were made:

What schools can you work with?

- Energy Sparks can work with any school and have worked with a range of school types including Local Authority, Academies and Independent Schools.

How do you access energy consumption data?

- Energy data for Local Authority schools can be accessed through council officers. For academies sometime the data can be accessed through the Local Authority, other times via the Academy network.

How engaged are schools?

- There have been no schools dropping out, and there is ongoing work.

The virtual connection to the presenter was then lost and so Dr Claudia Towner provided the answers to the following outstanding questions via email:

Some schools had a 30% energy saving, whereas some didn't have much. Why was that?

- The savings potential for schools depends on how well they've managed their energy before joining Energy Sparks, and their building/estate infrastructure. Many schools have high levels of energy waste through leaving their heating running outside of school hours. These schools can easily save 20% simply by better heating controls. Other schools may already have effective heating controls in use, so they

will need to work harder to achieve more significant savings.

Could you say more about your research into Active Travel for school journeys and actions?

- This is a new area of development for Energy Sparks. This summer we've trialled a travel to school carbon footprint app and will be doing further development on this tool and accompanying resources prior to a wider rollout in spring 2022. The aim is to make students and school staff more aware of the carbon footprint of their journey to school, and then support schools and their students and staff to make more active and sustainable travel choices.

Energy Sparks also provided some additional information, including a flyer and some case studies, which provide an overview of Energy Sparks work in schools. These are published with the agenda.

7. SCRUTINY REVIEW REPORT: AIR QUALITY (PART 2)

The report was agreed.

8. SCRUTINY REVIEW REPORT: ENVIRONMENT AND PLANNING

The report was agreed.

9. WORK PROGRAMME

The commission considered the work programme for the year and the following points were made:

- Follow up on outstanding cabinet responses to the Air Quality reports of the last two administrative years would be beneficial, particularly the Emissions Based Parking policy and the proposal for a Borough Wide CPZ, while ensuring this commission covers new ground.
- Planning remains a concern, particularly implementing policy standards on the environment. Members questioned if councillors are collectively pushing hard enough for better carbon savings at planning committees or too readily accepting carbon offset payments.
- SELCHP's expansion as a source of heat and the associated increase in the use of waste, and emissions, ought to be scrutinised.

- The development of District Heating Networks, and in particular the pilot water source heat pumps ought to be explored, as well as capacity and costs associated with the installation of Air Source Heat pumps.
- SE24 will be attending the next meeting on Community Energy and it would be helpful to hear from a school with solar.
- Post FIT funding for Solar PV and Community Energy ought to be explored.
- Members also noted the substantial sums identified in the Climate Emergency Strategy that will be required to meet net zero and particular that certain groups, such as leaseholders, will need consideration on help available to meet capital costs.

The chair invited members to suggest stakeholders to take evidence from to support the review and potential co-optees with the right expertise to join the commission, noting the importance of diversity and inclusion.

The commission asked that thanks and appreciation be put on the record for Jeremy Leach's valuable contribution as a co-optee on the Environment Scrutiny Commission for the previous two years.

SE24 Presentation for Southwark Council Environment Scrutiny Commission

8

14th October 2021



This evening's agenda

- Introduction to SE24/Community Energy and its contribution to low carbon Southwark
- How can Community Energy contribute to Southwark's Climate Action agenda?
- What can the Council do to help facilitate that?

SE24: Who we are.

- Started in 2014
- Registered as Community Benefit Society in 2015
- Focused initially on community PV projects in SE London, mainly in Southwark.
- Now also delivering LED energy efficiency projects.
- Surplus revenue put into community fund to tackle fuel poverty.



SE24: What we've done...

PV PROJECTS:

2016: Herne Hill Methodist Church Hall (10kWp)

2016: Herne Hill United Church (10 kWp)

2018: St Christopher's Hospice (50kWp)

2018: Dulwich College Lord George (60kWp)

2018: Dulwich College Sports Centre (60 kWp)

2019: Walworth Methodist Church (25 kWp)



SE24: 2021 Projects...

PV PROJECT:

- The Charter School, North Dulwich (117kWp)



LED PROJECTS:

- The Charter School, North Dulwich
- Charles Dickens Primary School, Borough





SE24: PV Funding Model

- Early PV projects funded through combination of community share offer and UCEF grants. Investors paid back over 20 years with income from FIT generation and export payments and energy sales to sites.
- Now, post-FITs, PV projects funded through combination of community share offers and London Community Energy Fund grant. Investors paid back over 16 years with income from energy sales to site and exports to grid. Projects need to be larger in scale with high levels of site consumption to be viable.
- Sites benefit from a) capital savings b) low energy costs and c) maintenance over concession period.
- Agreement underpinned by 16-year rooftop lease and power purchase agreement.



SE24: LED Funding Model

- Projects funded through combination of community share offer and London Community Energy Fund grant. Investors paid back over 10 years with income from sharing electricity savings with the site
- Agreement with site underpinned by 10-year Lighting Services Agreement.
- Site benefits from capital savings and a share of the electricity savings.
- After initial 3-month warranty period, no further maintenance responsibility for SE24.

The impact of SE24 on community and climate



6 rooftop solar projects producing renewable electricity in South London

Around 185 MWh/a produced, equivalent to \approx 60 households



More than 20 local fuel poor households supported via our Community Fund

c. £ 6,000 in funds disbursed



CO₂ emissions avoided, helping to combat global warming

Some 74 tonnes of CO₂ avoided per year, equivalent to taking 41 vehicles off the road



Lifetime Energy Cost Savings delivered for local residents, schools, churches and hospitals

Around £150,000 of lifetime savings from current projects



Key priorities for effective climate action in Southwark

- Housing – including the large Social Housing portfolio held by Southwark
- Other buildings – e.g. Council offices, schools, health, leisure and other community services
- Transport – both private and public
- Most of these are areas in which Community Energy has made or can make a contribution



Southwark will need to leverage available funding, e.g.

- The Energy Company Obligation – c. £1bn/pa financed by energy suppliers. This scheme aims to focus on the fuel poor/vulnerable and the least energy-efficient housing.
- The Social Housing Decarbonisation Fund – now expected to do the ‘heavy lifting’ in the LAHA sector. Said to be worth up to £3.8 bn over 10-year period.
- The Public Sector Decarbonisation Scheme - of which NHS has been major beneficiary.
- The Green Gas Levy – intended to support the substitution of bio-methane for natural gas.
- The Clean Heat Grant – funding for residential heat pumps. Initially proposed at £4,000/home; may now be increased to £7,000 (tbc).



How can Community Energy best contribute?

- Bring energy expertise and funding to areas/projects which commercial market would probably ignore because of size.
- A low cost of capital, based on access to grants and socially committed Community investment.
- Attention to ongoing maintenance performance (e.g. solar) and not just installation.
- Engaging with our communities, which is essential for sustained decarbonisation and behaviour change.
- Community Benefit Societies which re-route financial surplus into community action, with strong focus on the fuel poor and vulnerable
- Not just solar – Community Energy organisations in London and SE are now engaged in LED lighting, heating controls, heat pump projects, battery storage of electricity, energy efficiency advice and EV charging facilities.



How can the Council help?

- Recognise role/contribution of CE in Climate Action Plans.
- Provide funding support: e.g. a Borough Community Energy Fund (as in Islington, Lewisham) or use of Council Carbon Offset funds.
- These funds used to build CE capacity and create a more sustainable business model (e.g. paid employees and less reliance on volunteers)
- Ensure Council officers, local schools and others are well informed about contribution of CE – past, present and future - including providing legal and other briefing documentation to streamline CE project delivery.
- Consider role that CE can play in helping to decarbonise the public estate – helping Southwark to secure a larger share of national funding.
- Encourage CE participation in low-carbon transport initiatives – e.g. solar plus battery storage at council offices, schools etc.
- Regular Council meetings with CE groups – at least quarterly.



Questions?

Appendix 5 – Heat Networks Strategy Development

This appendix provides a summary of the background work undertaken in development of the Heat Networks Strategy. It includes sections on the following topics:

- Challenges to meeting the objectives
- Technology review – which technologies provide the best fit with the objectives
- SELCHP and Water Source Heat Pumps project updates, including how and why these projects can help the Council meet its objectives

CHALLENGES

1. The table below describes the challenges to operating the Council's heat networks in a manner which consistence meets the stated objectives of reliable, affordable and low carbon.

	Effective and reliable	Affordable	Low carbon
Heating technology and other central plant	<ul style="list-style-type: none"> • Central plant often affected by poor water quality, which in turn is often a result of leaks in the system being replaced with untreated water. 	<ul style="list-style-type: none"> • There can be a tension between low carbon and affordability. Gas is no longer considered low carbon but it is still one of the cheapest options for both installation and running costs. • Central plant items tend not to be the most expensive items to replace in a network when compared with the distribution elements. 	
Buried distribution pipework	<ul style="list-style-type: none"> • The buried pipework is the hardest to know what condition it is in, and therefore failure can occur without warning. • Some of the Council's buried mains have leak detection systems to give early warning but most do not. 	<ul style="list-style-type: none"> • Expensive to replace and can lead to expensive charges being passed on to leaseholders • The Council may not have sufficient capital budget to allow replacement of all distribution pipework that is at end of life • However, it can have extremely long operational life if water quality is maintained. 	<ul style="list-style-type: none"> • Well-insulated buried pipework can have very low heat losses • The distribution network is the key element to allowing a variety of low carbon technologies to be deployed that would not be viable in individual systems
In-building distribution pipework	<ul style="list-style-type: none"> • The in-building pipework is easier to inspect for condition than buried pipework but replacement can be just as disruptive or even more so due to working within residential buildings. 		<ul style="list-style-type: none"> • Well-insulated pipework can have very low heat losses but in-building distribution can suffer from poor design and elevated losses.
In-dwelling systems	<ul style="list-style-type: none"> • The radiators, warm air units, pipework, valves and other elements are difficult to inspect due to being within occupied dwellings. Replacement is 	<ul style="list-style-type: none"> • Most tenants in the borough pay a flat rate for heat regardless of consumption. This spreads the cost of high and low consumers and helps to protect the most vulnerable. • But it doesn't encourage energy efficient and carbon saving behaviour or allow residents to 	

	<p>disruptive.</p> <ul style="list-style-type: none"> • The main operational issues are air locks and valves becoming stuck. 	<p>make savings through life-style choices.</p> <ul style="list-style-type: none"> • Moving to a system of heat meters while protecting the most vulnerable and avoiding unintended consequences will be an important operational development
Control and monitoring system	<ul style="list-style-type: none"> • Many of the Council's networks have remotely accessible Building Management Systems (BMS) which allow engineers to see how the main elements of the systems are working. • This early warning system helps to improve reliability and efficiency but isn't installed in all cases. 	<ul style="list-style-type: none"> • While the existing BMS systems allow remote visibility and early warning of problems, there is more that could be done to optimise network efficiency, which would improve affordability as well as carbon emissions.





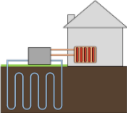


2. The key challenges to consider in relation to both existing and new heat networks in the borough are therefore as follows.
3. **Water Quality** – The Council has long been aware of the importance of water treatment to protect pipes and boilers from corrosion, but as leaks have increased in ageing networks, the cost and time involved in maintaining good water quality has also increased. If water quality is allowed to degrade, however, the rate of corrosion increases and thus leaks become even more likely and the situation becomes a downward spiral. It is important that the Council is utilising the most appropriate water quality testing and treatment regime for each network. Some situations may justify higher capital cost treatment systems that have lower ongoing costs in the long term, while others would not warrant high upfront investment. Robust testing and, critically, the analysis and monitoring of test results will allow water quality to be monitored over time. This will help the Council to identify issues early and react quickly before damage is done.
4. **Building Management System (BMS) and optimisation** – The Council is in the relatively unusual position of having a working and remotely accessible BMS installed in many of the boiler houses and plant rooms around the borough. These allow real-time remote visibility of temperatures and pressures and can raise automatic alarms when problems occur. The Council has invested significant time and money installing and maintaining the BMS systems and they have been extremely valuable as an early warning system and helped to improve reactive maintenance. However, many sites do not have remote connectivity or do not even have a local BMS controller. Where BMS systems are in place, there is additional functionality that could be used to optimise system performance. Roll-out of further BMS controls and system optimisation are an important ongoing work stream requiring further investment.
5. **Charging models (heat metering)** – Charging tenants by a flat rate “pool charge” is simple to administer and easily understood by residents, but does not encourage efficient behaviour. Charging homeowners for a share of the cost also does little to encourage efficient behaviour. Moving to a metered charging model would encourage

all users to consider how much heat they are using. As discussed in paragraphs **Error! Reference source not found.-Error! Reference source not found.**, the regulations covering heat metering have been amended. Prior to wider roll-out of heat meters to existing properties, it will be important to structure heat tariffs to minimise any unintended consequences. This will be covered in a future paper.

6. **Asset condition visibility:** It is often very difficult to inspect distribution pipework even when it is above ground, due to its location in service ducts or ceiling voids or due to the presence of asbestos. This makes monitoring condition and planning investments ahead of time very difficult. Even when a condition survey is carried out, full visibility is not always possible and decisions need to be made with limited information.
7. **Investment models to reduce homeowner charges** – One of the messages from the Heat Networks Residents Working Group, and other communication channels, is that leaseholders and freeholders often struggle with high capital charges related to expensive works to the heating systems. This could be from replacement mains, new boilers or complete system renewal.
8. **Adopting new heat networks successfully** – The Council is aiming to 2,500 by 2022 (completed or started on site) and many of these homes will be connected to site-wide or district-wide heat networks. New heat networks often experience different challenges to older networks and to ensure they are as reliable, affordable and low carbon as possible, the Council has recently reviewed its Employer's Requirements documents relating to new networks. This will ensure contractors know from the outset how we want them to achieve best practice in terms of design and delivery.

TECHNOLOGY REVIEW

9. This section considers how a selection of heating technologies compare in terms of their ability to meet the Council's heat network objectives to help guide the selection of technologies going forward. It is not an exhaustive analysis and there are likely to be exceptions to the rule.

Heating technology	Effective and reliable	Affordable (Capex / Opex)	Low carbon (Short / long term)
 Gas boilers	✓	✓ / ✓	✗ / ?
 Gas CHP	~	~	✗ / ?
 Energy from Waste	✓	~ / ✓	✓ / ?
 Hydrogen	?	?	Depends on source
 Heat pumps	✓	~ / ~	✓ / ✓
 Biomass	~	~ / ~	Depends on source
 Solar	~	~ / ✓	✓ / ✓

Key: ✓ = compatible; ~ = may be compatible; ? = unknown at present; ✗ = not compatible

10. The Council is committed to reducing its reliance on fossil fuel gas as it moves towards net zero carbon. Gas boilers are a mature technology with extensive supply chains for installation and maintenance, and strong national and international infrastructure supporting the fuel supply. Both capital and running costs are relatively low compared to the other technology options. However, natural gas is a fossil fuel and its combustion produces carbon dioxide emissions locally as well as, to a much lesser extent, other emissions such as oxides of Nitrogen (NOx). The sheer dominance of this heating technology within Southwark's estate means that gas boilers will continue to play a role in providing heat for many years. The carbon factor of gas is a currently a challenge but

there is some potential to synthesise methane from non-fossil sources to create renewable biogas. At present there is a relatively small quantity of biogas produced in the UK and the degree to which this can be increased (thus reducing its carbon footprint) will affect the long-term future of gas boilers.

11. Gas CHP can have exactly the same carbon arguments made about it. It used to be considered low carbon because the combined output of heat and electricity shared a lower carbon balance between them than using heat from a gas boiler and electricity from a power station. As the carbon intensity of the national electricity grid has come down this argument has weakened. Add to this the higher capital and maintenance costs associated with small scale CHP systems and some historical reliability issues, and this technology is not seen as likely to play a major part in Southwark's heat networks in the short to medium term. Exceptions to this may well exist where site specific factors support it, for example using it in hybrid configuration with heat pumps as an economic enabler.
12. Energy from Waste (specifically SELCHP) is considered a major opportunity in the east of the borough due to the existence of the SELCHP waste incinerator. Since the Council first started receiving heat from SELCHP in 2014 reliability has been exceptionally good with 100% availability from SELCHP combined with the backup gas provision and 93% of heat coming from SELCHP itself. The long-term Heat Supply Agreement between Veolia and the Council allowed the combination of capital costs, operation and running costs to be cheaper even than the gas boiler counter-factual. The system also operates with a very low carbon factor of around 58 grams CO₂ per kWh of heat compared to around 250 grams for a gas boiler. Increasing the use of waste heat from SELCHP is a significant opportunity for Southwark's heat networks in the medium and long term.
13. Hydrogen is still a relatively unknown quantity in terms of its commercial use as a heating fuel. Very few hydrogen boilers are available on the market, and currently the only way of sourcing hydrogen is to buy it in bottles or by the tanker load. With its current absence from the commercial heating market, it is impossible to comment on its affordability. It has the potential to be low carbon if made from other sources of low carbon and renewable energy. Low carbon or not, given the lack of hydrogen boilers, maintenance supply chains and fuel logistics, combined with an unknown level of affordability means that hydrogen is unlikely to comprise a major heating technology for Southwark's heat networks in the short to medium term.
14. Heat pumps capture low grade heat from the local environment and elevate its temperature to a useful level. Heat pumps are a mature technology with their essential components featuring in fridges, freezers and air conditioning systems all over the world. Their application in the UK for heating is less common than for cooling but is nevertheless still thoroughly developed with household names such as Dimplex, Mitsubishi, Samsung and Worcester Bosch among the major manufacturers. With proper maintenance, they are just as reliable as gas boilers, and supply chains are maturing all the time. The capital cost is still substantially higher than for gas boilers, and running costs are normally higher as well due to the electricity required to run the compressor pump, so this currently holds the technology back on the affordability front. Heat pumps are lower carbon than gas boilers already and will decarbonise still further

in line with electricity supplied through the national grid (see Figure 1 below). While challenges remain on the capital cost, running cost and maintenance cost, it is expected that heat pumps of various kinds will play an increasingly important role in Southwark's heat networks in the medium term.

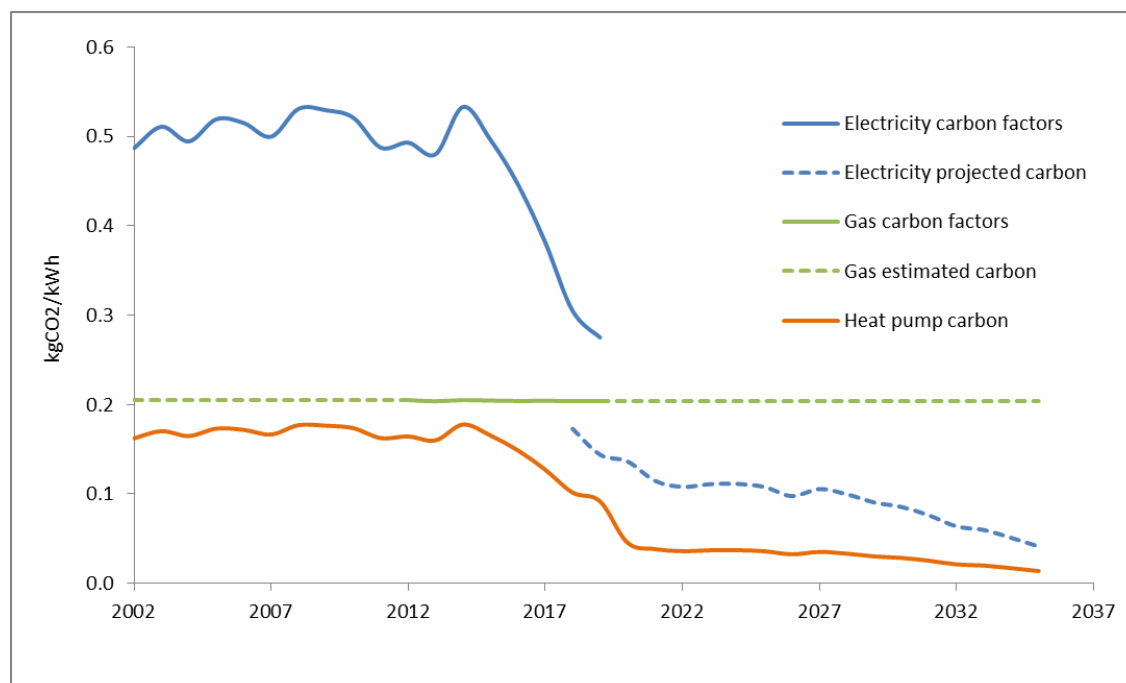


Figure 1 – Change over time of gas and heat pumps carbon factors

15. Heat pumps can capture heat from a variety of sources in the local environment. Air source heat pumps capture heat from the outdoor ambient air. Ground source heat pumps can be “closed loop” meaning they capture heat from the ground itself or “open loop” meaning they draw in warm water sitting within the ground and capture heat from that (these are technically water source heat pumps and are the type being installed at Consort, Newington and Wyndham estates). Other water source heat pumps are used to draw heat from rivers or lakes. Exhaust air heat pumps capture heat from warm stale air being expelled by ventilation systems. Sewer source heat pumps capture heat from warm waste water flowing through our sewer networks.
16. Air source heat pumps are the most common system because they are cheaper to install and don't require a local water source, large areas of ground or specific ground conditions. While still and excellent low carbon technology, air source heat pumps are not quite as efficient as other types, because the air from which they draw their heat is coldest in the winter when building heat demand is at its highest.
17. The Council commissioned some detailed research and modelling to explore the potential for implementing open and closed loop ground source systems and sewer source systems. This work looked at Thames Water's main sewer network in the borough and geological features that influence ground source heat potential. Overall the borough has very good geology from a ground source heating perspective and a few opportunities where sewer source heating might be worth pursuing. The new map layers resulting from this work (e.g. Figure 2) will help to inform decisions regarding the best

source of low carbon heat to pursue in different parts of the borough.

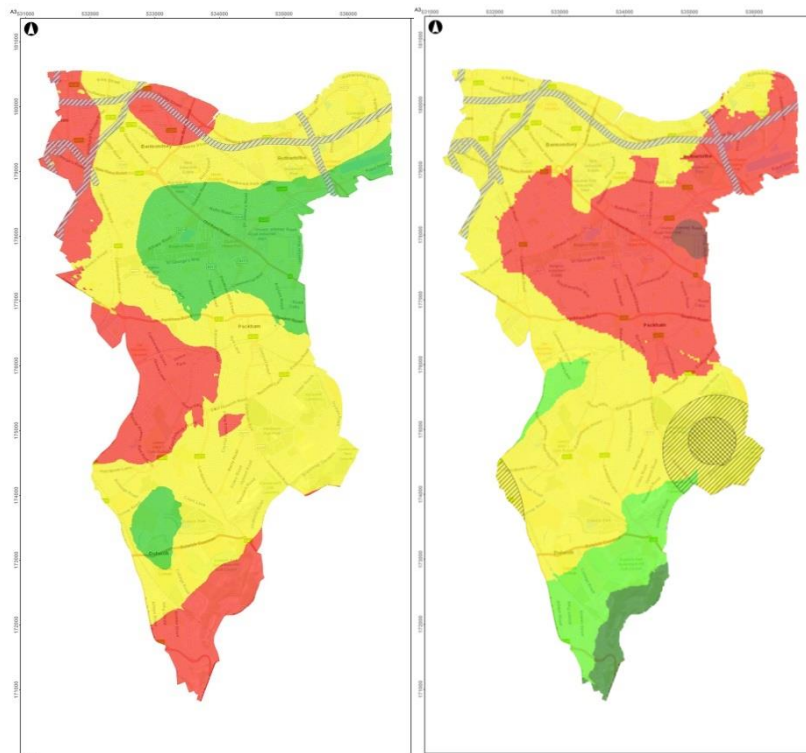


Figure 2 – Closed loop GSHP potential (left); Open loop GSHP potential (right). Red represents the highest potential

18. Biomass heating can be effective and reliable if the correct operation and maintenance regimes are employed. Biomass fuels are generally more expensive than gas, so affordability can be a problem compared with business as usual. Fuel supply chains are not as well established in city centre locations where space for fuel delivery and storage can be a significant constraint. A further challenge with biomass systems in urban areas is the air quality impact from PM₁₀ and NO_x emissions. The whole of Southwark is a designated Smoke Control Area and vast majority falls within an Air Quality Management Area, so while biomass is a renewable energy that can be low carbon, it is unlikely to be a suitable choice for Southwark's heat networks in the short to medium term.
19. Solar energy can be used to produce electricity or simply to capture heat. Some countries have managed to successfully integrate solar thermal collectors into their heat network infrastructure, but to do this in a meaningful way requires quite a lot of space. While the use of solar energy in Southwark's heat networks may be possible in the longer term, it likely to be only as a secondary heating source, to reduce the consumption of other fuels.
20. In conclusion then the key technologies for heat networks in Southwark in the short to medium term are likely to be gas boilers, Energy from Waste (expanding the Council's use of heat that is currently rejected at SELCHP), and heat pumps utilising a variety of heat sources (while being mindful of their capital and running costs and the impact of this upon affordability). Gas boilers will continue to be part of the mix for many years

because the Council has so many currently. New gas boilers will not be the first choice when replacements are needed due to carbon emissions and in most cases should only be installed in a supporting capacity unless other options have been shown to be unviable or where exceptional circumstances exist.

21. The two key low carbon technologies, both lend themselves particularly to district and communal heating scenarios rather than individual heating systems. With Energy from Waste, this is due to the cost of the distribution pipework that is buried underground to carry heat from SELCHP to the properties. Connecting to a single point with a large heat load (e.g. an existing boiler room) is far easier to deliver and more cost effective than making individual connections. The same is true of many types of heat pump. While small Air Source Heat Pumps can be installed to serve individual properties, ground, water and sewer source heat pumps all require significant infrastructure with high capital cost and this is best delivered on a communal or district scale.

SELCHP NETWORK EXPANSION

22. As noted above, July 2019 Cabinet approved the further investigation of the opportunity to expand the existing SELCHP heat network to increase the quantity of heat captured and supplied to Council housing estates and to new developments in the vicinity.
23. Since then the feasibility study has been completed which concluded that utilising heat from SELCHP would provide maximal environmental and economic benefits for new developments in the Old Kent Road regeneration area, as well as present a positive economic case overall for new and existing housing developments compared to the Business as Usual counterfactual options.
24. To assist developers and their consultants in undertaking energy and sustainability strategies, the Council and Veolia organised a workshop, and have subsequently worked with the Building Research Establishment (BRE) to assist in production of a Technical Briefing note. This provides carbon factors and modelling methodologies which can be used when undertaking the energy and carbon modelling calculations required by planning and building control.
25. Expanding the SELCHP heat network is easily the largest opportunity in the borough for providing low carbon heat to new and existing heat loads. Various network routing options have been modelled based upon the major existing and planned heat loads, while taking into account constraints such as major roads, railways and areas of congested underground services (e.g. gas and water pipes, electricity and telecoms cables etc.).
26. Figure 3 shows the current expected network route, though this is subject to change. The estates currently being considered for connection (shown in red in Figure 3) are Brimington, Acorn, Cossall, Leontine, Neville, Hoyland, Pelican (Heron & Crane), Sceaux Gardens, North Peckham. This list equates to 2,928 properties. In addition there is also potential for the Tustin estate and Ledbury estate to connect as and when final decisions on these projects area reached as these are on or near to the planned heat network route. The projected carbon saving from switching the Council's housing

networks to SELCHP heat is 9,800 tonnes CO₂ per year.

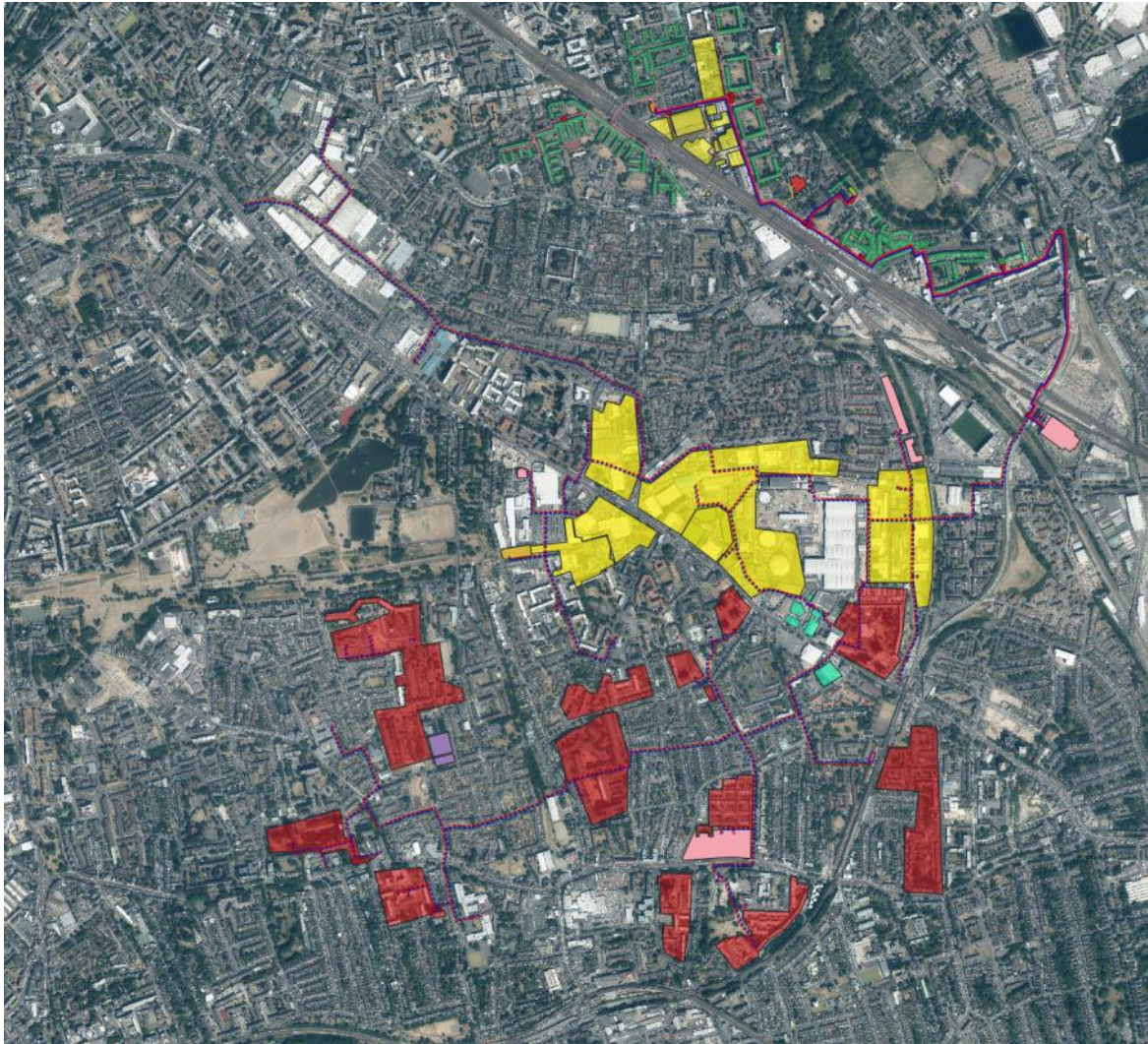


Figure 3 – Current expectation of expanded SELCHP heated network

(Key: Green is already connected loads; Yellow is proposed new developments to connect and red is proposed existing housing estates to connect)

27. Given that Veolia is the operator of the waste facility, and that the Council has an existing heat network contract with them for the first phase of the SELCHP network, the common sense approach to delivering the expansion is to vary the existing contract rather than starting from scratch. It is inconceivable that another party would be able to offer comparable terms to Veolia because no-one else has access to such a large source of low carbon waste heat.
28. The Council instructed a legal firm to check if the network expansion could be undertaken by Veolia through a variation to the existing contract, rather than going through an unnecessary procurement exercise. The expert advice received was that a contract variation would be legally permissible.
29. The Council has therefore been working exclusively with Veolia to develop the detailed design and commercial proposals. These will be checked by the Council and its independent consultants to ensure value for money is being achieved.

30. Commercially, the intention is to replicate the current Heat Supply Agreement whereby Veolia brings the capital cost for the network and the Council pays Veolia a standing charge which covers repayment of capital as well as operation and maintenance.
31. Next steps: With support from the Council, Veolia has now applied to the Heat Networks Investment Programme (HNIP) for commercialisation and capital grant funding and is waiting to hear if a grant will be awarded. If successful, it is anticipated that commercialisation activities will progress through to March 2022 when the capital grant would need to be drawn down to commence construction. If not successful, further grant applications are likely to be made, particularly in consideration of the upcoming Green Heat Network Fund.
32. Homeowner consultation is ongoing. Due to the nature of the contract, it will not be possible to follow the standard Section 20 consultation process and so the Council intends to apply for First Tier Tribunal dispensation from needing to follow the standard process. This is the process followed by the Council when it set up the initial Heat Supply Agreement with Veolia.
33. In terms of approval of the contract variation this would be dealt with through a Gateway 3 report. Section 6.6.3 of the Contract Standing Orders says "if the value of the proposed Variation is a Strategic Procurement, the decision must be taken by the cabinet or cabinet committee, after consideration by the CCRB of the report". Strategic Procurement includes non-works contracts with values of £4 million or more. It is therefore the intention to bring a Gateway 3 paper to cabinet for the approval of a variation to the SELCHP Heat Supply Agreement with Veolia.

HEAT PUMP INSTALLATIONS

34. The July 2019 Cabinet approved the further investigation of the opportunity to install water source heat pumps at certain of the Council's housing estates, using the London aquifer as the water source. Following this approval the Council undertook a detailed feasibility study for five estates: Brandon, Consort, Newington, Sydenham Hill and Wyndham.
35. Brandon and Sydenham Hill were found not to be viable at this time due to a combination of technical and economic factors ranging from aquifer potential and plant room space to enabling work costs.
36. Consort, Newington and Wyndham were all found to be both technically and economically viable. The project involves installing a 1,000 kW heat pump at Consort, 2 x 600 kW heat pumps at Newington and 2 x 600 kW heat pumps at Wyndham. Carbon savings are projected to be 3,848 tonnes CO₂ per year.
37. The procurement for the project, in the form of a mini-competition through the Council's major works framework took place in February 2020 and after a delay due to the start of the Covid-19 pandemic the design and build contract was awarded in June 2020. The

design phase took place from June to August and work commenced on site in September 2020. Works have progressed well with all bore holes drilled, tested and finalised and all heat pumps installed. Commissioning should be completed by November 2021 at Consort and Wyndham and in early 2022 at Newington.

38. The project is not funded through the capital works budget but through separate approval with funding from a Mayor's Energy Efficiency Fund (MEEF) loan, which would be repaid over the lifetime of the heat pumps with income from the Renewable Heat Incentive (RHI). This approach is possible because of the associated carbon savings. The RHI grant income associated with the project has meant that the Council has not had to charge homeowners for the works and the cost of heat on the estates will stay the same.
39. Due to Covid-19, the RHI scheme was extended but is still due to close in March 2022. There is limited information available regarding the government's proposed successor schemes - the Green Heat Network Fund and the Clean Heat Grant. Until more information is available, it may be hard to justify further heat pump projects. Without the RHI, the projects described here could have caused heating charges to increase which contradicts the 'affordability' criteria even though they would simultaneously save carbon, improve air quality and increase heating resilience. The Council should monitor government support programmes to ensure it is well placed to benefit from future schemes, and where appropriate use its influence to guide and shape the direction of such schemes.