



Leicester's District Heating System

Housing Scrutiny Commission : 9th January 2023

Lead director: Chris Burgin | Matthew Wallace

Useful information

- **Wards Affected:** Abbey, Wycliffe, Spinney Hills, Castle, Stoneygate, Western, Saffron
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- **Report Version:** 1.0

1.0 Summary

1.1 Unprecedented market conditions, including the war in Ukraine, have put pressure on the gas supply market and pushed prices significantly higher. This includes the price of gas used to fuel the district heating network, with LDEC heat charges having increased by 86% for the year from April 2022 to March 2023.

1.2 It is currently forecast that the cost of gas being supplied to the network will increase by a further 214% in 2023/24.

1.3 The Council is forecasting a shortfall in income of £1.7m in 2022/23 as a result of increases in the price of gas not being matched by increases in charges to district heating customers. If charges to households remain unchanged then the cost to the Council is currently estimated to be in the region of £14.7m in 2023/24. This reflects the increased cost of gas, alongside other costs which are indexed to the price of gas.

1.4 69% of the dwellings attached to the network are Council tenancies and this proportion of the cost would need to be borne by the HRA, equating to £10.2m. In order for the HRA to set a balanced budget for 2023/24 a saving of £10.2m would need to be delivered through a significantly reduced capital programme. The provisional capital maintenance budget for the year is just under £14m, so this would need to reduce significantly.

1.5 The remaining 31% of dwellings are homeowners and a cost of £4.5m would fall to the Council's General Fund. The cost of this has not been reflected in the current draft revenue budget, and this would have an impact on the managed reserves strategy being adopted to address the wider financial pressures of the Council.

1.6 This district heating report provides detail about the District Heating system, including the physical network and the current contract and a historical look back about the system and existing arrangements in place.

1.7 The report also covers alternative existing forms of heating and hot water options and potential future new technologies that may be available subject to their development and roll out.

1.8 The report also picks up within it responses to questions drawn out by Councillors that came up during recent meetings on the matter.

1.9 While this report sets out proposed next steps, this report does not include a proposed way forward in relation to the district heating network and charges. This is because these options are still being actively explored with the intention of sharing these with the Commission and Councillors during January 2023 and in advance of the Housing Revenue Account budget for 23/24 report being submitted to the Commission on the 30th January 2023 and Full Council on the 22nd February 2023.

2.0 Recommendations

2.1 That the report is noted and the Commission and Councillors provide any feedback and comments.

3.0 Next Steps

3.1 Secure actual District Heating costs and charges for 2023/24 and calculate actual cost to Leicester City Council and individually to tenants and leaseholders

3.2 Contract meetings with LDEC on the 2023/24 District heating charges.

3.3 Use of the District Heating metering viability assessment to confirm a proposed metering installation solution and programme to be delivered and completed in 2023.

3.4 Housing Revenue Account budget to be re-drafted to include a proposed way forward for District Heating and associated charges for political consideration.

4.0 Background

4.1 What is District Heating?

4.1.1 District heating - sometimes also referred to as a heat network – is where heat and / or hot water is generated on a large scale at a central location and is distributed to domestic and non-domestic premises for their individual use.

4.1.2 The Leicester district heating scheme utilises combined heat and power (CHP) technology whereby electricity is generated, and the waste heat that results from the electricity production is utilised to heat water that is distributed to the buildings / homes via 14km of insulated underground pipework.

4.1.3 The Leicester scheme currently mainly uses gas-fired CHP, generating heat and power at the same time, and capturing and utilising the waste heat in this way reduces carbon emissions when compared to the conventional method of separately generating heat from a boiler and purchasing electricity from the grid (power station).

4.1.4 There are more than 5,500 district heating networks in the UK supplying over 160,000 consumers.

4.1.4.1 Examples of equivalent schemes are ;

Sheffield's City Centre District Energy Scheme meets the heating and hot-water needs of some 140 buildings in the city centre. The network serves offices, public buildings, hotels and around 2,800 residential households

Nottingham's community heating scheme serves around 5,000 homes and more than 100 businesses. Similarly to in Sheffield, the scheme's heat is produced by the Eastcroft Energy from Waste plant.

Southampton's community heating scheme supplies over 45 energy users in the private and public sectors including a hospital, a shopping centre, a university, residential buildings and several hotels.

4.1.5 The primary benefits of district heating are threefold. Lower energy costs, environmental (through the reduction in carbon emissions) and security of supply. For these reasons the UK Government have made district heat networks central to their energy plans.

"Heat networks form an important part of our plan to reduce carbon and cut heating bills for customers (domestic and commercial). They are one of the most cost-effective ways of reducing carbon emissions from heating, and their efficiency and carbon-saving potential increases as they grow and connect to each other.

They provide a unique opportunity to exploit larger scale – and often lower cost – renewable and recovered heat sources that otherwise cannot be used. It is estimated by the CCC that around 18% of UK heat will need to come from heat networks by 2050 if the UK is to meet its carbon targets cost effectively

4.2 How the system is configured.

4.2.1 Leicester's district heating network provides heat (and in some cases hot water) across six different areas across the city, although the network is considered to have four different schemes:

- i) The City Centre Scheme:
The Leicester District Energy Company (LDEC) installed 3,200 kWe of CHP (2 CHP engines) at the University of Leicester, with top-up / back-up boiler plant added including new boiler plant deployed at St Peters (7,000 kW), and two 1,500 kW boilers reprovisioned at the University. The new network was constructed to link St Peters and St Andrews with the University, 21 council buildings and 4 schools.
- ii) The Leicester North Scheme:
Consists of St Marks and St Matthews, where LDEC installed 1,000 kWe of CHP at St Marks and linked the two existing estate boiler houses.
- iii) Beatty Avenue Scheme:
LDEC installed a biomass boiler to supply heat to a small number of domestic properties.

iv) Aikman Avenue Scheme:
 The installation of CHP in a purpose-built facility adjacent to New College was delayed, and the domestic and non-domestic properties continue to receive heat and hot water generated from the existing boiler house. The scheme is operated by LDEC under a separate arrangement.

4.3 Proportions and numbers of residential and other premises covered

Heating Scheme	No. Domestic Properties	Annual Heat Consumption 2021/22 (kWh)	No. Non-Domestic Properties	Annual Heat Consumption 2021/22 (kWh)
City Centre	948	16 million	25	6.1 million
Leicester North	1450	35.5 million	6	1.1 million
Beatty Avenue	96	1.3 million	0	-
Aikman Avenue	387	9 million	5	3.1 million

No. of non-domestic connections for the City Centre scheme excludes the University of Leicester.

4.4 The history and development of the systems.

4.4.1 Leicester's district heating networks were constructed more than 50 years ago, and domestic and non-domestic consumers were provided with heat and hot water from gas-fired boilers in boiler houses sited across six estates in the city.

4.4.2 After an extensive procurement process the City Council appointed the Leicester District Energy Company (LDEC) as its preferred partner to deliver the low carbon district energy scheme. Contracts were signed in January 2011 with the University of Leicester following in March 2011 with an extension to the existing scheme of a new Combined Heat & Power system at the University. The scheme proposed to reduce carbon emissions in the city by 11,000 tonnes per annum.

4.4.3 The district heating project was driven by environmental outcomes and the contract was awarded to LDEC on the basis that it would make a cost-effective contribution to the city's climate change objectives. There was a financial requirement however, i.e. that the project and contract, in delivering its outcomes, should be cost neutral to the Council as a minimum and, if possible, offer financial savings, ensuring that heat is affordable.

4.4.4 It was expected that over the term of the LDEC contract the district heating scheme should provide a whole life cost saving of c. £2.5 million from the contract (25 years), the majority of which would be savings on capital.

4.4.5 The scheme spans 6 of the city estates – where the current boiler houses have been upgraded - as well as connecting the University of Leicester, 18 council buildings, schools, libraries and community centres via 14km of insulated pipes.

4.4.6 The Leicester District Energy Company invested almost £15 million in the city to upgrade our district heating systems and extended and connected them to create a joined-up and resilient community heating network across the City. The company installed combined heat and power units (CHP) which generate electricity for sale, with the waste heat used for the heating system. A biomass boiler was installed and is operational at Beatty Avenue from 2012.

4.4.7 The district heating networks provide reliable and affordable heat with heating charges to residents having been maintained below actual gas prices on the open market for over a decade.

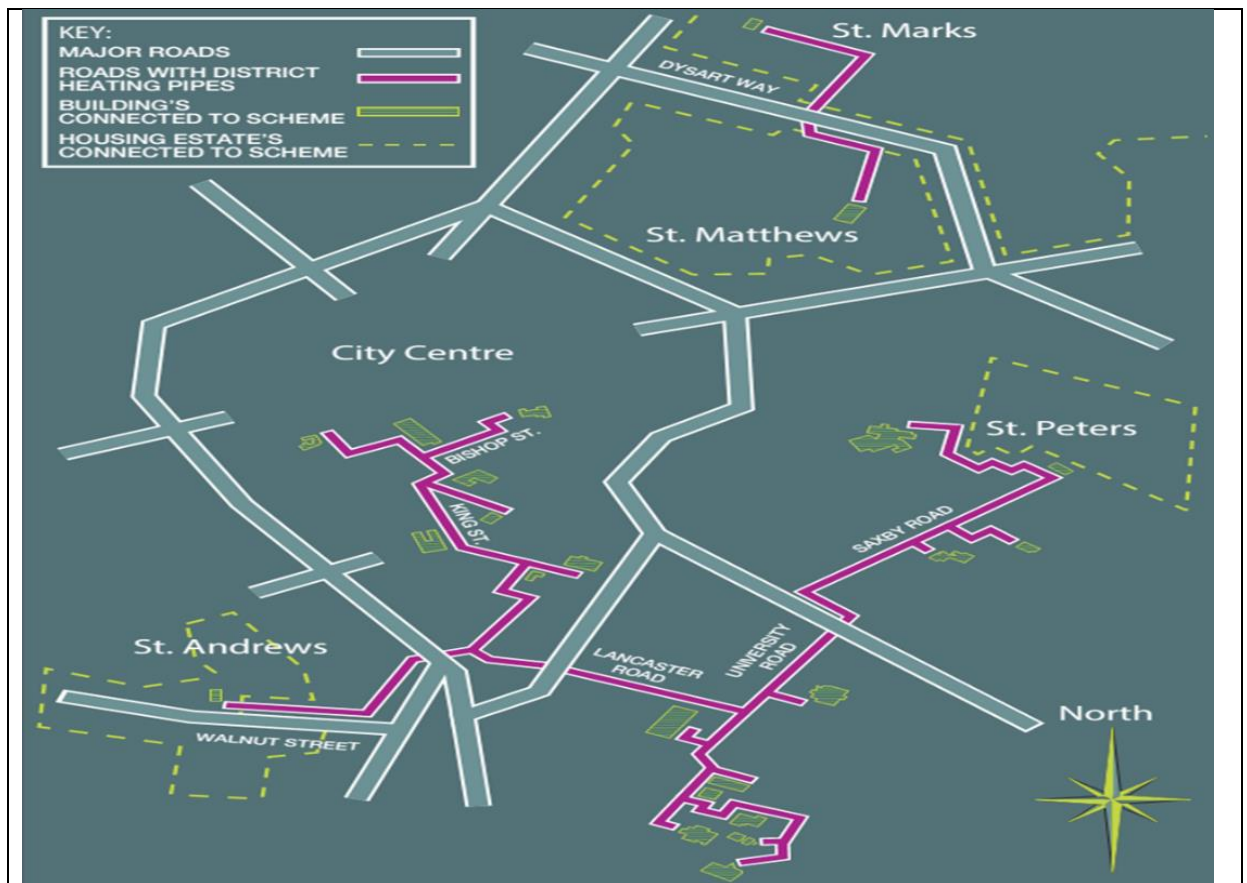
4.4.8 The network has saved more than 80,000 tonnes of carbon since its implementation in October 2012.

4.5 The different sections of our system – how each is fuelled, and the numbers and types of properties served

4.5.1 LDEC is responsible for primary heat production with the Council retaining only the secondary systems (Aikman Avenue hot water, substations at St Matthews and pre-existing underground pipework) as well as in-home repairs and maintenance for the domestic properties on district heating.

4.5.2 LDEC are responsible for the primary network, this includes all the underground pipework linked to the city centre network and the energy centres (boiler houses). The HRA is responsible for secondary network, which includes all the underground pipework from the energy centres to the blocks of accommodation, including all substation on the housing network ,and the internal pipework in the blocks and the individual homes.

- City Centre – Gas-fired CHP including the University of Leicester and St Peters and St Andrews estates as well as buildings such as De Montfort Hall, Moat College and the African Caribbean Centre.
- Leicester North – Gas-fired CHP connecting St Matthews and St Marks boiler houses and including Taylor Road and Catherine Street schools.
- Beatty Avenue – Biomass boiler serving a small number of residential properties.
- Aikman Avenue – Gas-fired CHP not installed to date, with LDEC operating the scheme as part of a separate agreement.



NOTE: This map shows the North and the City Centre parts of the network

4.6 The contract and its main conditions and responsibilities.

4.6.1 In January 2011 Leicester City Council signed a 25-year contract with Cofely District Energy. To deliver the contract Cofely (now Equans) established a special purpose vehicle – the Leicester District Energy Company (LDEC) – responsible for designing, building, financing and operating the scheme. The University of Leicester signed a separate contract with LDEC.

4.6.2 The Council decided on a private sector approach as the preferred delivery mechanism in order to minimise capital and ongoing operating costs and reduce risk to the Council.

4.6.3 One of the key drivers of the project was its contribution to the City’s climate change objectives, and the contract was awarded on the basis that it would deliver a reduction in CO2 emissions in excess of 11,000 tonnes per annum, and that the annual cost of providing heat would not increase to users and to the Council (i.e. the project and running costs would be cost neutral for the Council - baselined in January 2011).

4.6.4 In addition to carbon savings, the contract was anticipated to deliver a number of other benefits including:

- A receipt of more than £1 million for the district heating assets as part of the transfer of ownership to LDEC
- Annual CRC UK Government Energy Efficiency Scheme cost savings of c. £23k per annum (based on £12/tonne carbon) to the Council

- Whole Life Cost savings of £2.5 million (over the 25 years) mainly through reduced capital investment by the Council
- A value for money carbon reduction scheme (one of the most cost-effective projects for reducing carbon) benefitting the City and the climate.
- A potential profit share for the Council (50% of “super-profits” generated by new connections)
- Making it possible to assure council house tenants and leaseholders on district heating that they would pay no more for gas than residents buying from domestic utility companies.

4.6.5 LDEC is contracted to ensure that they provide an efficient, reliable and resilient heat service - to domestic and non-domestic users - that reduces carbon emissions. Reliability of their performance is measured against the contracted output specification that sets out service delivery targets and deductions for failure to achieve those targets. The delivery of heat has been extremely reliable, and where there has been failure it has been remedied within the contracted timescales. This means that there has never been occasion to make any deductions.

4.6.6 LDEC is responsible for primary heat production with the Council retaining only the secondary systems (Aikman Avenue hot water, substations at St Matthews and pre-existing underground pipework) as well as in-home repairs and maintenance for the domestic properties on district heating. This means that the capital and revenue expenditure by Housing on operating and maintenance has reduced significantly, (£2.5m over the life of the contract) when compared to the period prior to the LDEC contract.

4.6.7 Estates and Building Services is responsible for the council’s own equipment in each of the non-residential buildings’ plant rooms.

4.6.8 Throughout the contract procurement process a robust programme of community engagement was undertaken including:

- Community and tenant / leaseholder representative meetings with Ward Councillors
- Survey of residents to identify key concerns
- Information leaflets being distributed (as requested by representatives)
- Residents’ questions forming part of the evaluation process
- Information events held in the first week in December 2010.

4.6.9 Residents were generally in support of the scheme and the metering pilot.

4.6.10 The contract allows for a review of the costs of the scheme every five years from operational start date or at any point when the Council believes that there has been sufficient material change in the costs to warrant such a review. This has now been triggered by the Council. This process can be triggered by either party of the contract with the trigger culminating in negotiations over the increased costs with the aim of securing agreement between the parties over charges.

4.7 Who pays for what? Residents/council/other organisations.

4.7.1 The Council now buys heat - rather than gas - from LDEC (on behalf of residents and non-residential buildings) and this will continue for the term of the contract (25 years ending 2037). The heat is provided by LDEC utilising the gas (and biomass) boilers and/or CHP engines at both the Housing-owned boiler houses on the residential estates and the University of Leicester-owner boiler houses on the University site on University Road.

4.7.2 The LDEC charge to the Council covers: a) the cost of gas which, under the terms of the contract, can change monthly; and b) the capital and revenue costs of running and maintaining the plant which are, under the terms of the contract, reviewed annually in October.

4.7.2.1 The majority of the gas that goes in to the system is purchased from ESPO through the ESPO heat and power framework that is procured by the council. For the city centre scheme - that includes the university - the gas is purchased by LDEC directly from the wholesale market. LDEC's procurement approach is agreed by the Energy Purchasing Board (membership of the council, UoL and LDEC).

4.7.3 Heat consumption from the network is usually around 65 - 70 million kwh per annum, of which around 90% is related to domestic use. The figures have remained reasonably stable for the last decade (based on consumption records going as far back as 1995).

4.7.4 Leaseholders receive annual invoices with most opting to pay monthly by direct debit, whereas tenants pay for their heat as a fixed weekly service charge included as part of their rent. Payments can be made on-line via the Council's website, by direct debit, or at the Post Office.

4.7.5 Council tenants are charged a set weekly amount for their District Heating dependent on the size of their property and have the choice to pay by direct debit, the Council's website or using local pay points. The frequency of payments can be weekly up to a calendar month.

4.8 Legal constraints – particularly on HRA and General Fund.

4.8.1 The HRA is designed as a specific pot within the GF, with it's own set of rules as to what is credited and debited to/from it. There is no general discretion to breach the ring-fence so a matter should be properly attributed to either of the GF or HRA pots with the principles underlying the administration of the HRA are rooted in apportioning costs fairly between tenants (HRA) and council tax payers (GF), meaning no cross-subsidy.

4.8.1.1 There are multiple examples of unlawful use of HRA funds and cross subsidy including Nottingham City Council which become the third council in 2021 to issue a section 114 notice, acknowledging that it has acted unlawfully by using housing revenue account money to prop up its general fund.

4.8.2 The HRA is a landlord account containing the income and expenditure arising from a housing authority's landlord functions; (ii) The 1989 makes it clear that the HRA is an account set up to deal with our *provision of housing*; (iii) this phrase (*provision of housing*) does not apply to *land, houses or other buildings disposed of by the authority*; (iv) *disposal* is defined in section 74(5) and our RTB sales would count as a disposal.

4.8.3 Guidance states the large number of flats and maisonettes sold under right to buy now means that many local authorities have a sizeable proportion of leasehold property within their HRAs. The costs of services provided to leaseholders under supervision and management, repairs and maintenance and special services need to be recovered from leaseholders. The council does not have the option of subsidising the energy costs of leaseholders via the Housing Revenue Account

4.8.4 The council's standard Right to Buy lease requires leaseholders to pay on demand 'a fair proportion of the costs (reasonable or estimated) of any services incurred or to be incurred by the lessor in observing and performing...' the services provided under the lease.

4.9 Realistic cost comparisons with other forms of heating –

4.9.1 The following cost comparators are purely based on the average yearly consumption of energy for delivering heating and hot water for an average 2 bedroomed property, the rates for gas and electricity are based on having no cap.

Comparison	Annual Charge forecast for 23/24	Estimated Capital Costs & associated new service charge	Comments
District Heating	£2,385	£1,250 £250pa	Current Charge is £733, with meter install and a 30% reduction in usage to 16,800kwh (assumed from metering pilot) and cost increase the average charge would equate to £2,385 annual DH cost
Gas Boiler	£2,856	£4,000 £800pa	Assumes average use of 16,800kwh @ 17p per kwh Not safe for Tower block properties (300)
Full Electric System	£6,720	£10,000 £2,000pa	Assumes 40p per kwh @ 16,800 Grid Capacity issues – a sub station costs £500k and this cost would be passed on from National Grid to LCC
Air Source Heat Pump	n/a	n/a	Not technically feasible for these properties currently It would be very difficult to retro fit heat pumps on our estates due to the configuration of the properties, if it were be considered a communal heat pump solution would need to be investigated.

4.10 Other technological options to District Heating

4.10.1 A domestic gas boiler: **this would only be an option in low rise blocks, we do not want to be installing gas in our high-rise blocks (300 units) due to the risk of explosion.** It would require the removal of all the existing pipework and radiators and the installation of a new domestic system, including a standalone gas combination boiler. This would cost, on average, £4k per property (based on our current contracted rates). The capital cost for this, excluding the tower blocks would be £10,180m (2,545 x £4k) there would also be ongoing revenue costs for repair, service and replacements. It would also need to be established that gas boiler could be fitted in all of the low-rise properties connected to the network due to venting regulation etc.

4.10.2 Electric heating and hot water system: it would require decommissioning and the removal of all existing pipework and radiators. The electrical systems in each property would need to be upgraded, based on a 5-radiator system it is estimated that the average cost per house/flat would be circa £10k, this would mean a capital cost of £28m. It would also need to be established that the existing electricity network could accommodate the potential additional load. If this was to be taken forward as a potential option, we would need to engage with the network provider.

4.10.3 Other future fuel options such as hydrogen may be alternatives in the creation of electricity and the by product of the heat used in the district heating system but this is not a global viable solution although is due to be trialled on a very small scale in 2023.

4.11 Government support to households

4.11.1 In 2022 tenants and leaseholders will have received a £150 council tax energy rebate and a £400 energy rebate from government through their electricity supplier to help offset energy price increases which means Leicester City Council tenants and Homeowners (Leaseholders) have received these benefits without facing increased gas costs.

4.11.2 As the £400 energy rebate applies to all households with electricity meters, it is being distributed by the electricity suppliers by applying a discount directly to household electricity bills, with those on pre-payment meters receiving vouchers to redeem. Whilst this money has been distributed through the Electric its purpose was to support electric and gas increasing costs.

4.11.3 The £150 council tax energy rebate has already been distributed in the form of vouchers that can be exchanged for cash at the Post Office

4.11.4 Low-income households (those in receipt of Universal Credit and some other benefits / tax credits) are also eligible for a £650 payment to assist in the general rise in the cost of living – applicable to 34% of households on district heating. These payments will be made in two lumps of £326 and £324 in the same way as the benefits and / or tax credits are paid. This information is not directly available to LCC

4.12 Metering

4.12.1 The Pilot

4.12.2 LDEC agreed to pay for a metering pilot (to include 56 properties) in 2014 in order to support work previously underway to clearly establish the costs and potential benefits of introducing residential heat meters in properties with district heating. The heat metering pilot had several objectives:

- To identify whether the installation of residential heat meters is likely to influence behaviour, i.e. whether, when given the opportunity to do so, residents on district heating would reduce the amount of heat consumed in order to reduce their heating bill
- Based on behaviour during the pilot, to identify whether the installation of residential heat meters in the future is likely to provide a financial benefit to residents in the form of cost savings and an environmental benefit to the city in the form reduced carbon emissions
- To assess whether a financial investment in the installation of residential heat meters would be cost effective for the Council and to identify the anticipated pay-back period.

4.12.3 The Pilot Process

4.12.4 Whilst not all properties were suitable for installation of a heat meter, 900 residences were identified as potential pilot sites and tenants and leaseholders received a letter from Housing to notify them of the opportunity to participate in the heat metering pilot.

4.12.5 A total of 119 residents responded expressing an interest and following consultation with tenants and leaseholders about the purpose and length of the study, 56 volunteer households were selected to take part across the St Andrews (10 volunteers), St Matthews (20 volunteers) and St Marks (26 volunteers) estates.

4.12.6 Suitable volunteers were selected with a view to including a cross-section of households based on the following factors:

- Geographical split across estates
- Mix of tenure (tenants and leaseholders)
- Property size
- Property location within the block (e.g. north and/or south facing);
- Whether the property has internal heating controls (such as Thermostatic Radiator Valves).

4.12.7 Each of the 56 properties was surveyed prior to installation of a heat meter and as, issues with meter positioning in five households in St Matthews meant that the meter could not be installed, the problem-residences had to be replaced with five other comparable volunteers.

4.12.8 The pilot study commenced on 1st June 2012 and ran for 12 months concluding at the end of May 2013. Heat consumption of the 56 volunteers was recorded by the heat meter and monitored centrally by the council's Energy Services team.

4.12.9 Although volunteers were charged for their heat in the same way as usual – via the block charge paid weekly with their rent – they were advised that should the amount of heat they consumed during the pilot period be less than the amount anticipated then they would be refunded the difference in cost. However, if heat consumption was higher than anticipated then no additional charge would be made.

4.12.10 Throughout the 12-month pilot volunteers received quarterly statements that showed their heat consumption (from the meter readings), the cost of the heat they had used, and notification of whether they were on course to make a saving against the block charge at the end of the year.

4.12.11 At the end of the pilot those volunteers who had saved money were issued with either a cheque refund for the difference or a credit to their rent account.

4.12.12 Cost and time of introduction

The cost to install meters to all house/flats that do not currently have them is estimated to be £3m and initial indications suggest that the work could be completed in 40 weeks after the contractor has been appointed.

4.12.13 How significant a difference it could make?

4.12.14 The Energy Services team monitored consumption in the 56 homes that had heat meters installed and compared the actual annual consumption and assumed expenditure from June 2012 to May 2013 to assumed consumption and actual expenditure for the previous year.

4.12.15 Whether a resident was able to make savings under the pilot scheme was dependent on a number of factors:

- Occupant dynamics and the normal levels of heat consumption. For example, annual heat consumption might be below the estimated average for the property size because the occupants are out all day, or they already actively manage the amount of heat that they use, or there are fewer adults living in the property.
- Whether, following installation of a meter, the residents have changed the way in which they manage their heating and, now they are able to make financial savings, they have made an effort to reduce their heating bills by turning the heating down or turning it off in warmer weather.
- The weather and seasonal factors, including the fact that the winter of 2012 (during the pilot period) was 23.66% colder than the previous winter
- The property itself. For example, the position of the property within a block – whether it is north or south facing - or if the property is in a position that benefits from the transfer of heat from other properties (borrowed heat), whether the property is energy efficient, and whether the property has heating temperature controls area all factors that can influence the level of heat consumed.

4.12.16 A number of assumptions were made in assessing the findings:

- Although the residential heat metering pilot covered only 56 residences (a sample of around 2%) it is reasonably assumed that similar behaviour will be replicated across the property types and across all of the estates
- The pilot also assumes that the installation of a heat meter - and being given an opportunity pay only for the heat used - had influenced residents to change their behaviour and reduce heat consumption
- The calculations made no allowance for the likely increase in consumption as a result of the cold winter in 2012
- Conclusions did not take into account the impact of borrowed heat. (from a neighbouring property above/below or to the side)

4.12.17 Key Results / Outcome of the Pilot

- The total annual block charge attributed to the 56 pilot residences was £44,626.50. The volunteers made savings totaling £15,716.62, despite the cold winter.
- Of the 56 volunteers, 49 households (87.5%) made a saving against their assumed consumption and therefore also made a saving on their annual heating charge.
- Of the 49 pilot households that made an annual saving, 28 saved more than £300 against their initial block charge, 11 saved more than £150, and 5 saved more than £100.
- With 87.5% of the volunteers achieving an annual saving of £15,716.62 and a small number of volunteers increasing their consumption against anticipated levels, the cost of the gas and heat consumed over the year decreased from £44,626.50 to £29,743.28 – representing a net decrease of £14,883.22.
- This means that the 7 volunteers (the other 12.5%) that did not save money actually increased their bills by a total of £833.40 – an increase of 1.87% of the total annual block charge of £44,626.50.
- Carbon emissions decreased by more than 100,000 kg (100 tonnes) over the period of the pilot.
- Having volunteer status and the ability to save money on their heating bills meant that the overall heat consumed and total annual heating bill across the 56 pilot residences decreased by a net value of 33.35%.

4.12.18 Whilst heat meters can provide residents with the opportunity to save money on their heating bills as they will only pay for the heat that they consume rather than paying a fixed annual charge set in advance, residents will only benefit from savings on their annual heating bills if they actively manage their consumption by turning heating down or turning it off in warmer months.

4.12.19 The housing network is split into distinct areas, these being the estates that they serve, each estate is unique, and this influence the feasibility:

St Peters – high rise.

The four-tower blocks are already enabled with Heat Interface Units (HIU's) and meters, these just need to be enabled, which is a relatively straight forward job and could be achieved relatively easily (we would need a billing solution)

St Peters, St Matthews, St Andrews, St. Marks and Beaty Ave – low rise.

Retrofitting a metering solution will be challenging but it has been established that for the estates listed it is feasible, some will be easier than the others, St Matthews will be the most challenging and we still need to do more work to fully understand the challenges in some of the blocks on the estate.

Aikman Ave.

The heat metering feasibility study has concluded that it is not feasible to fit meters to the Burns flats du to the existing pipework layout which runs straight through all flats.

4.13 Contract and energy cost flexibility.

4.13.1 The price that the council pays for gas is fixed until 31 March 2023, and whilst this feeds into the district heating charges, the council buys heat - rather than gas - from LDEC (on behalf of residents and non-residential buildings) and this will continue for the term of the contract (25 years ending 2037). The heat is provided by LDEC utilising the gas (and biomass) boilers and/or CHP engines at both the Housing-owned boiler houses on the residential estates and the University of Leicester-owned boiler houses on the university site on University Road.

4.13.2 The LDEC charge to the Council covers: a) the cost of gas; and b) the capital and revenue costs of running and maintaining the plant.

4.13.3 LDEC charges are complex, and it is often mistakenly assumed that the LDEC *variable* charges are equivalent to gas charges. This is not the case - despite variable charges being indexed to gas prices and calculated based on consumption levels, they are not simply fuel costs and include an element of operating costs. As a result, the per kWh charge for a unit of heat is higher than the per kWh unit charge for gas as it includes both the fuel element and an element of operating cost.

4.13.4 It should be noted that, although the charge for a unit of heat is higher than for a unit of gas, heat consumption is generally lower than gas consumption as there are some losses within the system (i.e. it takes more than one unit of gas to produce one unit of heat). System efficiency is calculated to be around 75% which is considered comparable to other District heating networks and also against the use of gas for individual boilers.

4.13.5 In addition to the council's internal governance arrangements, there is an Energy Purchasing Board in place utilising internal and external expertise to agree on the best procurement route to deliver of best value gas/fuel prices for the scheme and therefore minimise the unit cost (pence per kWh) of heat. Members of the Energy

Purchasing Board include officer from the council, University of Leicester estates representatives and the LDEC representative. The Board aims to meet quarterly to review the existing agreements relating to gas prices and gas contracts, although meetings are currently taking place on a monthly basis.

4.13.6 To ensure ongoing best value, the contract allows for a review of the costs of the contract every five years or at any point when the Council believes that there has been sufficient material change in the costs to warrant such a review which has now been triggered. The first five-year review took place in October / November 2017 with the second review now commencing. This review will be undertaken by Leicester City Council and LDEC and will review the existing and future level of charges.

4.13.7 The volatility of fuel prices means that there is a level of uncertainty about costs of providing district heating in the future. This would be the case whether the service is provided by LDEC or by the council and is the same for consumers using heat from traditional gas boilers.

4.13.8 Heat charges can be reduced by introducing measures to reduce heat consumption and / or through incremental improvements to the efficiency of the current heating systems to reduce waste. Reduced consumption would also reduce carbon emissions.

4.14 Cost and time impact of changing power source and/or heating type.

4.14.1 To take out the existing heating system and replace it with either a new gas or electric system would be a massive undertaking.

4.14.1.1 We need to provide 12 months-notice to terminate the LDEC contract. If we were to voluntarily terminate the contract the costs to the council could be significant

4.14.2 We would need to conduct and confirm what power source would be appropriate for each unit, some may not be suitable for gas due to the location of flues etc. so it may have to be a mixed approach, a robust EIA would need to be completed as this could lead to significant cost difference for the cost of heat and hot water on a single estate and this will need to be managed along with the leaseholder relationship

4.14.3 Our existing boiler installation contract does not have the financial capacity to deliver so we would have to carry out a new procurement exercise to secure a contractor/s to do this. This is likely to take 6/9 months. We fit circa 900 gas boiler per year, based on this delivery rate it could take up to 3 years, obviously we could agree KPI's as part of any contract to reduce this, but we need to be mindful that we need to resource this project to ensure good governance and contract management alongside our existing commitments. We are also experiencing cost price inflation and limited contractor capacity across work areas, and this may have an impact on delivery.

4.14.4 If we decide to install electric heat and hot water systems initially, the work to install an electric system is greater than a gas system due to the requirement to

upgrade the electrics and we would still encounter the same issues such as contractor capacity and cost price inflation, realistically it could take a considerable time to complete a programme of installations to 2800 properties. As we have already demonstrated running costs of such a system are four times greater which is unlikely to change.

4.14.5 To ensure compliance with procurement rules, any approach which involves a material change to the current arrangements would not be permissible. The contract provides for voluntary termination by the Council but would be subject to an exit fee, which is likely to be significant.

4.15 Answers to key Councillor questions (from District Heating sessions)

Is the District Heating system good value?

The DH system has enabled those on the system to benefit from costs 30% or greater below market costs for many years.

Is the DH system good for the environment?

In the way that the heat is produced as a byproduct on the production of electricity the DH system has achieved over 80,000 tonnes of CO2 saving in the last 10 years.

However levels of use of the system including tenants not turning radiators off and also a lack of metering has led to a position where the average kwh use is much greater than that of the average domestic use of gas. This then affects the overall level of gas used.

Can the owner occupiers and other non Council tenants on the district heating scheme be charged a different weekly/monthly amount to the tenants?

Yes it is possible to set charges for Leaseholders separately and at different levels to tenants

Is the Council considering metering?

The Council along with LDEC has undertaken a pilot trial with 56 tenants to consider the potential impact of the installation of metering to the District Heating system. This trial lasted for 12 months. (see section 7 for more detail on the outcome of this)

As a result of this trial further work has been undertaken to consider the viability of the installation of metering at each of the 4 sites. The outcome of this viability work confirms that many of those on the network could have meters installed.

The Aikman Avenue network was deemed to not be viable for meter installation due to the current district heating pipe network are deemed not to be possible/viable. In the short term alternative options will need to be considered for in relation to charging while medium to longer term options are considered.

For those units metering would be viable the Council are now reviewing the length of time installation may take. Work is now being undertaken to draft out a planned programme of work to install meters for tenants and leaseholders. It is hoped that this proposed programme will be available during January 2023 to share with the aim to install meters on a programme during 2023 and before the winter.

How much might this meter installation programme cost?

It is estimated that meter installation could cost approximately £3m. (excluding Aikman Avenue)

Do tenants and leaseholders have controls to turn off their District Heating?

Yes they do have controls some are manual and some automatic. If a programme of meter installation was approved then the upgrade of these controlled devices would also be included and completed during 2023.

What other heating options are available to consider by the Council and how much might these cost tenants and leaseholders?

A number of current options exist,

Installation of individual gas boilers for each property.

Capital install costs are not fully known but estimates are in the region of £4,000 for installation per property with running costs assumed to be that of the gas cap costs.

Electrification of the flats

Heating and hot water electrification of flats on district heating is theoretically feasible. Estimated running costs based on current kwh costs of 40pkwh for electric would be £6,000 - £7,000pa based on average usage. Currently this would appear to preclude this as an option.

Installation costs are not known but based on know national schedule of rate costs are estimated to be in the region of £8,000 to £10,000 per property. – Along with the decommissioning and removal of the DH pipework.

This option would also likely require an increase in the local electrical load arrangements to facilitate an increase in electricity usage. The cost of each new sub station can be £500k.

Other options may be possible in the future include fuelling the district heating system by other fuels such as Hydrogen but are not a current viable option.

Does the LDEC Contract allow for review?

The contract allows for a review of the costs of the scheme every five years from operational start date (or at any point when the Council believes that there has been sufficient material change in the costs to warrant such a review). Any changes would have to be agreed by both the Council and Engie.

4.0 Legal Implications

No comments - this report is a briefing paper without recommendations

5.0 Finance & Other implications

No comments - this report is a briefing paper without recommendations

6.0 Equalities Implications

No comments - this report is a briefing paper without recommendations

7.0 Climate Change & Carbon Reduction Implications

No comments - this report is a briefing paper without recommendations