Housing Committee	Agenda Item 47 Brighton & Hove City Council

Subject:		**Elwyn Jones Court – Renewable Heating Proposal**
Date of Meeting:		**15 January 2020**
Report of:		**Executive Director, Housing Neighbourhoods & Communities**
Contact Officer:	**Name:**	**Dan Goodchild, Home Energy Efficiency Project Manager** **Tel: 01273 290486**
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Ward(s) affected:		**Patcham**

FOR GENERAL RELEASE

1. PURPOSE OF REPORT AND POLICY CONTEXT

1.1 Elwyn Jones Court is a 75 bed Seniors' Housing Scheme in Brighton. All parts of the building are currently heated by night storage heaters that are old, inefficient and expensive to run. Due to their age, replacement parts are increasingly difficult to maintain and they are in need of replacing.

1.2 An options appraisal has been conducted to explore upgrades for the space heating and domestic hot water systems.

1.3 This report explains the findings of this feasibility study and recommends the installation of a low carbon heating solution at Elwyn Jones Court – specifically a ground source heat pump.

1.4 The capital expenditure required for the project is estimated at £590,000. The system would be eligible for the Renewable Heat Incentive (RHI) and the project would generate an annual income for the council of £34,966 and an electricity bill reduction of £41,880[1].

1.5 This report seeks approval and authorisation from the Housing Committee regarding the recommendations in Section 2 to procure a contract for the installation of a ground source heat pump.

2. RECOMMENDATIONS:

2.1 That Housing Committee:

2.1.1 Delegates authority to the Executive Director for Housing Neighbourhoods & Communities to take all steps necessary to procure and award a contract for the

[1] Approximately 30% of this reduction would be to tenants' electricity bills due to the replacement of the hot water system

installation of a ground source heat pump (option 1, below) with the option of a maintenance contract for a term of five years.

3. CONTEXT/ BACKGROUND INFORMATION

3.1 The current heating system at Elwyn Jones Court consists of:

- Electric night storage heaters that run off of the communal electricity supply. These provide space heating to individual flats and communal areas
- Point of use (POU) water heaters for domestic hot water (DHW) run off of the tenants' own electricity supplies
- POU water heaters for hot water in communal areas, run off of the communal electricity supply.

3.2 The current space heaters are old, wall-mounted storage heaters. Whilst it is possible to continue running them, they are becoming increasingly difficult to maintain due to their age and the availability of parts. The domestic POU water heaters were installed in 2017, replacing individual water tanks in each flat. Whilst removing stored water lowered the risk of legionella, the new system increased tenants' fuel bills, as the old system was run from the communal electricity supply.

3.3 It is estimated that the total electricity bill for the site for communal electricity and domestic hot water is £62,942. Electricity prices are expected to continue rising at approximately 5% annually for the foreseeable future.

3.4 The Housing work plan agreed on 18 September 2019 committed the council to ensuring housing contributes to making the city carbon neutral by 2030.The HRA Energy Strategy, adopted in 2018, noted the following:

- Technical Energy Efficiency (compliance with legislation) is a key driver for improving the energy performance of HRA assets
- Energy efficiency risks and opportunities will be incorporated into business planning
- Major projects will be developed holistically
- Heat pumps would be deployed where cost effective

3.5 Ricardo, an engineering and consultancy firm, were commissioned to complete a feasibility study (summary included at Appendix 1) to explore the potential for installing a low carbon heating system at Elwyn Jones Court. The results of this study are summarised in Table 1 below. Options 1 and 2 would require a 'wet' central heating system to be installed in each flat and the costs of this installation are included below.

Scenario:	1: Ground Source Heat Pump	2: Air Source Heat Pump	3: Electric heaters[2]
Capital costs:	£590,000	£360,000	£90,939
Electricity savings (incl. inflation - 20 yrs.)	£1,070,602	£978,081	Negligible
RHI income (incl inflation 20 yrs.)	£893,852[3]	£308,690[4]	Nil
Annual Operating & Maintenance costs:	£7,641	£7,641	Minimal
Total net benefit (20yr)	£1,776,955	£1,095,746	Negligible
Project Payback:	7.75 years	7.2 years	No payback
Carbon Saving/yr:	75	70	Nil

Table 1 – summary of options

3.6 Some technologies were discounted for the following reasons:

- Decentralised (individual) Air Source Heat Pumps (ASHPs) - due to the visual impact multiple distributed units would have on the building.
- A centralised 'open-loop' Ground Source Heat Pump (GSHP) - due to the risks associated with groundwater contamination and the costs and resources required to obtain appropriate permissions from the Environment Agency
- Gas boilers – due to the council's commitment to be net zero carbon by 2030.

3.7 A centralised 'closed-loop' GSHP was explored in the feasibility, however when compared to a decentralised ('shared loop') system, the decentralised system gives a number of resilience and financial benefits. This includes providing the council with a fixed income stream and allowing individual flats to be isolated for maintenance. For these reasons, as well as simplicity, a centralised GSHP system was excluded from this report.

3.8 **Renewable Energy Options**

Two types of 'heat pump' solution were explored. Heat pumps work by using electricity to extract renewable heat from either the ground or air. A diagram providing more information on how they work and additional information about the two heat pump options explored by the feasibility study is included at Appendix 1

[2] note there is no replacement of the POU boilers in this scenario
[3] Fixed based on EPCs of individual flats
[4] Variable, based on heat demand of whole building

Option 1 – Ground Source Heat Pump (Shared Loop)

This option would see heat collected from approximately 40 boreholes drilled on site and delivered to each flat at an ambient temperature. Each flat would contain its own, independent heat pump and hot water cylinder, located in existing cupboards and run from the communal electricity supply. This minimises the risk of overheating in communal areas and allows for heating maintenance on a flat-by-flat basis.

Once completed, the boreholes and heat pumps would seldom need to be accessed for maintenance. External space would be reinstated to its current use, whilst it is estimated that at least half of the existing cupboard space would be able to be retained for storage.

Each flat would have a control system similar to those for central heating systems installed across the housing estate. Training will be provided for those tenants who require it.

DHW costs would revert to the landlord supply and be incorporated into service charges.

There would be a significant reduction in carbon emissions as the amount of electricity consumed by the building is projected to reduce significantly.

Option 2 – ASHP Centralised

This option would locate approximately 5 large ASHP units external to Elwyn Jones Court, likely to the rear of the garages (facing Carden Avenue). Approximately 16m is required to site the units, which would be screened by the existing mature trees and protected from vandalism and leaf drop by cages.

Electricity, hot and cold water supplies would also need to be installed in a duct under the car park, but no other external works would be required.

Warm water would be circulated round the interior of the building in insulated pipework. Each flat would then require a heat exchanger in order to deliver heat and hot water. This system is identical to that operated across many council housing blocks.

DHW costs would revert to the landlord supply and be incorporated into service charges.

Given ASHPs are less efficient that GSHPs, the electricity and carbon emission reductions would be lower.

3.9 There are two primary risks to the project:

1. Given the likely length of the works (see section 8), the key risk is that the project is not commissioned by 31 March 2021- the date by which installations must be commissioned in order to receive RHI. Even in this scenario, however, the project would still deliver an improved heating solution for tenants and deliver ongoing savings to BHCC.

2. The other primary risk is that insufficient heat can be extracted from the ground area to meet the demand of the building. This is considered unlikely, however temperature monitoring will be undertaken this winter to inform the final design. Thermal response testing may be conducted depending on the outcome of this monitoring and supplementary air source heat pumps could be utilised in order to reduce the heat demand from the borehole array.

A full risk register has been compiled and will be maintained throughout the duration of the project.

3.10 Subject to further liaison with the Executive Director, it is proposed to procure a design and build contract with an option for a 5 year maintenance contract.

There are a number of frameworks through which this work could be procured, including:

- Northumberland County Council (2018/S 051-112351)
- ESPO (Framework 2838_19)
- YPO (2015/S 196-355076 – expires Nov 2020)

It would also be possible to procure the contract by issuing a standard Invitation to Tender or by using the existing heating contract with K&T Heating.

It is proposed to use one of the above frameworks and to explore further frameworks if necessary, subject to further evaluation and due diligence by officers.

4. ANALYSIS & CONSIDERATION OF ANY ALTERNATIVE OPTIONS

4.1 In order to present a 'Business as Usual' scenario, a quotation was sought to cost the full upgrade of all existing storage heaters to modern storage heaters. This would replace each existing storage heater with a *Heatstore Intelirad* Oil Filled Radiator of equivalent heat output to the existing units. These would be very unlikely to deliver any discernible benefit in terms of space heating cost.

4.2 Whilst this solution would modernise the system and be maintainable, there is no proposed change in the domestic hot water production method and residents would continue to pay for this through their own electricity bills. There would also only be a negligible reduction in electricity consumption (through improved user controls) and therefore a correspondingly small reduction in carbon emissions.

5. COMMUNITY ENGAGEMENT & CONSULTATION

5.2 An engagement event with residents was held on 14 November 2019. Feedback from this meeting was that residents would welcome an upgrade to their existing system, which was reported as being difficult to control and necessary to anticipate the weather in advance, in order to set the heaters correctly. The proposed replacement of the Point of Use boilers was also welcomed.

5.3 Suggestions were made around where the existing system could be improved (for example, by providing heating in bathrooms) and this will be explored during the design phase.

5.4 Further engagement with residents will occur during the design phase. It is expected that a full-time site manager will be appointed by the successful contractor, with regular site visits from BHCC officers to monitor works and address residents' concerns that may arise.

6. CONCLUSION

6.1 The above information demonstrates that both heat pump options deliver significant carbon savings, addresses the dissatisfaction with the existing DHW supply and delivers financial benefits for the council and tenants over the electric radiator solution.

6.2 Of these, the GSHP is the preferred option for the following reasons:

- Greater efficiency (lower running costs)
- Greater confidence of higher performance
- Increased system resilience for maintenance
- Fixed income stream guaranteed for 20 years
- Greater carbon savings
- Lower risk of overheating

6.3 Based on the results highlighted above study, it is recommended to proceed to procure an ambient temperature GSHP. Upon approval of the recommendations in this report, the following timetable is proposed:

Jan-Feb 2020	Procurement documents prepared
Mar 2020	Procurement advertised
Apr 2020	Tenders back
May 2020	Contract awarded
June 2020	Design, further resident consultation and mobilisation
Jul-Sep 2020	External work (borehole drilling etc)
Aug-Dec 2020	Internal works
Jan 2021	System commissioning

7. FINANCIAL & OTHER IMPLICATIONS:

Financial Implications:

7.1 The financial implications are set out in the main body of the report, showing that proposed capital investment of £0.590m is required for the preferred option of the centralised ground source heat pump system. This option provides the shortest payback period and has the benefit of greater carbon savings.

7.2 A proposed budget of £0.590m has been included in the 2020-21 Capital Programme. The annual income generated from the Renewable Heat Incentive scheme would be added to the earmarked reserves for Energy Efficiency. Annual maintenance costs would be met from within the existing revenue budget.
Finance Officer Consulted: Mike Bentley Date: 27/11/19

Legal Implications:

7.3 In accordance with Part 4 of the Council's constitution, the Housing Committee is the appropriate decision making body in respect of the recommendations set out in paragraph 2 above. To comply with CSO 3.1, contracts in excess of £500,000 must be approved by the relevant committee.

7.4 The Council has a duty to secure 'economy, efficiency and effectiveness' in all its activities. Supply of this service in a manner which attracts the most economically advantageous bid supports this principle and is in line with the procurement rules.

7.5 The procurement of a contract through a framework agreement must comply with all relevant European and UK public procurement legislation as well as the council's CSOs.

Lawyer Consulted: Wendy McRae-Smith *Date: 04/12/2019*

Equalities Implications:

7.6 An Equalities Impact Assessment has been carried out and is included as Appendix 2.

7.7 The installation of a new heating and hot water system that is cheaper to run and easier to control will ensure older residents and those with disabilities find it easier to ensure their homes are heated to an appropriate temperature and derive health benefits as a result.

Sustainability Implications:

7.8 The current emissions for the building are as follows:

	Annual emissions (tCO2e)
BHCC (heating and communal ways)	94.27
Tenants (domestic hot water, estimate)	20.45
Tenants (other supplies)	Unknown[5]
TOTAL	**114.72**

Less carbon reduction projects:	Emissions reduction (tCO2e)	Emissions reduction (% of baseline)
GSHP installation	75	65.3
Solar PV installation[6]	15	13.1
Residual Emissions	**24.72[7]**	**78.4%**

7.9 The planned carbon reduction projects make a significant and immediate contribution to reducing the emissions of the building.

[5] Tenants are responsible for their own domestic electricity supplies (for lighting, appliances etc). BHCC has no control over the suppliers for this electricity

[6] The Solar PV installation forms part of the SOLARISE project and is scheduled for completion in Spring 2020

[7] Based on an electricity emissions factor of 0.2556kgCO2e/kWh

7.10 The remaining energy requirement is all grid-purchased electricity. This means that the building will further decarbonise in line with the decarbonisation of the national grid.

7.11 At present the council's Energy and Water team purchase 'brown' electricity for the site. Policy, Resources and Growth Committee decided on 11 July 2019 to allow the Executive Director Economy, Environment & Culture to evaluate comparison prices and make a decision on whether to secure a 'Green tariff' for BHCC properties from 1 October 2020. Should this decision be taken, then there would, in effect, be zero emissions from the BHCC-controlled elements of the building.

7.12 By undertaking this project, BHCC will increase their understanding of renewable heat technologies and look to complete further installations across the city utilising the knowledge gained as part of this project. It is likely many of these projects will be where gas is currently the primary fuel source – therefore significantly contributing to the city's decarbonisation ambitions.

Any Other Significant Implications:

7.13 Public Health

Strategically addressing cold homes and fuel poverty in vulnerable groups will contribute to the prevention of ill health and excess winter deaths, reduce health and social inequalities, and improve wellbeing and quality of life. Supporting and enabling residents to pay less for their energy can contribute to tackling cold homes.

10. Appendices

Appendix 1 – How heat pumps work
Appendix 2 – Equalities Impact Assessment