

Schools Low Carbon Heating Investments

To: Environment & Sustainability

Meeting Date: 11th March 2021

From: Steve Cox, Executive Director Place & Economy

Electoral division(s): Abbey and Hardwick

Key decision: Yes

Forward Plan ref: 2021/006

Outcome: 11,751 tonnes of carbon emission savings over 30 years from replacing fossil fuel heating and hot water systems at Comberton Village College and The Galfrid Primary School with low carbon heating alternatives. Plus, testing a new green business model, a 'living lab' for learning on scaling up decarbonisation across further schools.

Recommendation: The Committee is asked to:

- a) Agree the investment case for the Comberton Village College Low Carbon Heat Network and The Galfrid Primary School Ground Source Heat Pump Project as set out in section 2.4.
- b) Note the key project risks set out in section 4.3 and the full risk register at Appendix A.
- c) Delegate authority to the Executive Director of Place and Economy and Chief Financial Officer, in consultation with the Chair of the Environment & Sustainability Committee and the Green Investment Advisory Group to sign contracts:
 - i) with Bouygues for project construction and operation; and
 - ii) with the Cam Academy Trust and 'United Learning' for Heat Supply to the schools.

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1. Background

- 1.1 In May 2020 Commercial & Investment Committee agreed a development budget for low carbon heating projects at Comberton Village College, Impington Village College and The Galfrid Primary School. It was envisaged that these projects would involve the Council installing and operating Ground Source Heat Pumps (GSHPs) at the schools and selling heat to the schools via 20-year Heat Supply Agreements. Projects were noted as being dependent on securing Renewable Heat Incentive (RHI) funding via Tariff Guarantees, requiring planning consent, not offering a commercial rate of return, but being of interest due to the substantial carbon savings on offer.
- 1.2 Activity on the Impington Village College project was suspended in December 2020 due to the Trust considering redeveloping the site and, in particular, the proposed location of the borehole array. Development activity on the other two projects has now reached a point where a decision on whether to invest is required. Renewable Heat Incentive (RHI) criteria require this decision to be made ahead of the end of March 2021. If a decision is made to proceed to construction works, RHI requires the plant to be commissioned no later than 31st March 2022.

- 1.3 The projects would deliver the following outcomes over a 30-year Heat Supply Agreement.

	Comberton Village College	The Galfrid Primary School
Carbon Saving tCO2e over 30 years	8,760	2,991
Heating Levelised Cost Saving to School	1.1 p/kWh (10%)	0.56 p/kWh (10%)
Undiscounted cash saving to school over 30 years	£657k	£217k
Saving to school over 30 years (NPV)	£424k	£137k
Other Benefit to School	Avoided capex (c.£774k) to replace oil boilers in 14 plant rooms	Contributes to United Learning's target of being carbon neutral by 2030

- 1.4 Appendix B provides images of the proposed borehole arrays and GSHPs for context.

2. Main Issues

2.1 Status of Project Development Work

- 2.1.1 The following development work on these projects has now been concluded:

- Planning applications have been submitted for both projects and supplementary evidence provided in response to holding objections (all of which have now been lifted). The planning determination date for The Galfrid Primary School is 10th March and for Comberton Village college is 18th March. An oral update on the status of the planning applications will be provided to Committee;

- Energy analysis and design work has been delivered and construction work package tendering completed to arrive at a firm cost for each project;
- A final business case for each project has been produced, including guaranteed heat generation figures;
- Heat Supply Agreements (HSA) have been drafted and discussed with the Trusts and with the Department for Education.

2.1.2 The following activity is ongoing and will be completed subject to the Committee's decision:

- Construction contracts are being drafted;
- Finalisation of the draft lease (at a peppercorn rent) for the borehole array and plant room locations at Comberton and signature;
- Finalisation of the Heat Supply Agreements and their agreement by the Department for Education. We will provide an oral update on this to Committee. Signature of Heat Supply Agreements will follow after the Committee's decision and Department for Education Agreement;
- An application for the RHI needs to be submitted no later than 31st March 2021. The Committee's decision on whether to invest in these projects and planning permissions are required.

2.2 Heat Supply Agreements

2.2.1 Both projects will involve the Council owning and operating the equipment and entering into Heat Supply Agreements with the academy trusts. It was originally anticipated that these agreements would be for 20 years, matching the lifetime of the GSHPs (although the boreholes and pipework have 40-60 years lifetime). However, since the start of the project development work, RHI revenues have decreased by 49%, due to degeneration of the tariffs on offer, whilst capital costs have increased slightly for Comberton, and significantly for The Galfrid owing in particular to the geology increasing costs of drilling boreholes. As a result, the projects do not payback within 20 years and a longer HSA term, with replacement of the GSHPs at year 20 is necessary. A 40-year agreement would be preferable, in order to cover the full lifetime of the replacement GSHPs, however both academy trusts have indicated that they are extremely unlikely to sign up to such a long agreement.

2.2.2 Academy trusts are required to seek Department for Education approval for any new types of financial agreement they enter into. We have engaged with the Department to discuss the Heat Supply Agreement duration and terms. They have indicated that 30 years is the maximum period they would normally consider for financial agreements and, only in exceptional circumstances would they approve longer agreements. For this reason, costs and benefits in this report are presented over a 30-year term. We are awaiting a formal response from the trusts on the acceptability of this. If an option to agree a longer term arises, we will pursue this, as it will improve the project financial performance.

2.2.3 The Department for Education provided a number of comments and conditions on reviewing the draft Heat Supply Agreement and we have modified the draft to address these. One of their key conditions was that any financial benefit arising from the projects' operation should be shared with the schools via reduced heat tariffs. The HSAs therefore

include provisions that, if the Internal Rate of Return on these projects (after inflation and interest costs, but excluding the monetised social benefit of the carbon savings) is more than 1%, the additional benefit will be shared with the school via a reduction in heat tariffs. The precise terms of this benefit sharing are still subject to discussion with the Department for Education. We will provide an oral update on this to the Committee. This provision does limit the maximum potential benefit to the Council to a modest return.

2.2.4 At the Department for Education’s request the Heat Supply Agreement also includes transfer of ownership of the equipment to the Trust at the end of the Heat Supply Agreement term. There will be a residual payment required in the event that the Council’s cost is not fully recovered in cash terms over the duration of the Heat Supply Agreement through the heat tariff and standing charge. The agreements also contain an option for the Trust to roll over the unamortised cost into a new Heat Supply Agreement with the Council.

2.3 Cost comparisons for the schools

2.3.1 Heat tariffs and standing charges have been set to offer the schools a 10% saving over the counterfactual cost of operating their own fossil fuel fired heating. Annual (year 1) and 30-year costs to the schools of entering into a Heat Supply Agreement (HSA) relative to the counterfactual (of operating their own fossil fuel heating) are summarised below. For comparability the counterfactual costs are total costs i.e. inclusive of operation & maintenance and annualised lifecycle replacement costs. The cost savings to the schools over a 30 year Heat Supply Agreement lifetime are £424,000 for Comberton and £137,300 for The Galfrid in Net Present Value terms.

	Comberton Counterfactual	Comberton HSA	Galfrid Counterfactual	Galfrid HSA
Year 1	£114,456	£103,011	£29,520	£26,568
30 year cost NPV	£4.18 million	£3.75 million	£1.37 million	£1.23 million

2.3.2 In addition to the above cost savings, the Heat Supply Agreement benefits the schools by removing their maintenance cost risk, as the Council would be responsible for maintenance of the GSHPs, ground loops etc. Tariffs under the HSA will be indexed with fossil fuel prices, so the schools’ retain some exposure to price risk, although they do not take on risk of the cost of electricity used to operate the GSHPs increasing faster than projected, this risk sits with the Council. Indexing the heat tariff in line with fossil fuel prices also means that the schools receive a consistent annual saving of 10% of the counterfactual cost of their existing fossil fuel heating systems. At the Department for Education’s request the Heat Supply Agreement also shares any significant financial over-performance with the school via a reduction in heat tariffs. This provides the schools some protection against higher than projected fossil fuel price rises. The Heat Supply Agreement also includes performance penalties that protect the school from costs in the event that of a failure to of the GSHPs.

2.3.3 As discussed below, the borehole and groundloop array have significant remaining useful lives at the end of the Heat Supply Agreement term, if repowered with new GSHPs. The options presented to the schools are a residual payment to purchase the boreholes and groundloops or rolling any unamortised cost over into a new contract with the Council.

Residual value payments at the end of the Heat Supply Agreement term are not included in the above comparison as they will be cost-benefit neutral to the school.

2.4 Investment Case for the Projects

2.4.1 Overall finances for the projects are summarised below.

	Comberton Village College	The Galfrid Primary School
Capital Cost (funded by borrowing)	£2,606,820	£751,299 (after £300k capital funding ¹)
Project Payback (years) excluding monetised carbon savings	32 years	40 years
Project Payback (years) including monetised carbon savings	24 years	30 years
IRR over 30 years excluding monetised carbon savings	-0.87%	-6.97%
NPV excluding monetised carbon savings	-£1.15 million	-£0.731 million
30-year Carbon savings £ NPV	£1.1 million	£0.381 million
Residual payment at end of 30 years	£388,229 (present value £185,085)	£700,000 (present value £333,720)

¹ Pre-existing Education Capital commitment for plant room refurbishment

2.4.2 As noted at the initiation of project development, the projects do not offer a commercial return, but are being pursued for their carbon benefits and learning on commercialisation of the green business model as it is scaled up across other schools and buildings. The project business cases have been weakened by a 49% reduction in RHI support levels since the start of project development in May 2020, and by an increase in capital costs. This results in paybacks exceeding 30 years and negative returns over this period. However, if monetised carbon savings are included in the payback evaluation, the payback is within the 30-year Heat Supply Agreement term and, in the case of Comberton is close to neutral NPV. The business case for The Galfrid is significantly weaker than for Comberton. Over a 30-year Heat Supply Agreement, the business case does not quite reach NPV neutrality even if both the residual payment and the monetised carbon savings are included. A 40-year agreement is likely to be necessary to make this project viable.

2.4.3 The groundloops and boreholes have a longer lifetime (40-60 years) than 30 years. Replacement GSHPs installed in year 21 would also have a remaining 10 years of life at the end of a 30-year Heat Supply Agreement. It is therefore reasonable for the Heat Supply Agreements to include a residual value payment to purchase the equipment at the end of the term of the agreement. The draft Heat Supply Agreement offers the option of rolling any residual value over into a new contract.

2.4.4 Residual payments: The value of a residual payment could be calculated in a number of ways. The residual payments included in the above table are calculated on the basis of bringing the (undiscounted cashflow) payback within the term of the Heat Supply

Agreement. Much higher values would be needed if the Council required these to bring the projects to zero NPV.

2.4.5 Both the residual payment values and a 30-year Heat Supply Agreement term remain to be agreed with the Trusts and Department for Education. We will provide an oral update to the Committee on discussions on these points.

2.4.6 Appendix C provides the results of sensitivity analysis on: heat tariffs; variations in future fossil fuel and electricity prices; and operation & maintenance costs. A longer Heat Supply Agreement duration has the greatest positive effect on the business cases and slower than projected growth in fossil fuel prices has the greatest negative effect. The Galfrid project shows a greater sensitivity to market price fluctuations than Comberton.

2.5 Renewable Heat Incentive

2.5.1 The above payback and IRR figures include RHI revenue. Without this revenue the projects would not be viable. RHI provides a 19-year revenue stream for each project. In order to secure this funding, the projects will need to submit RHI applications no later than 31st March 2021 including evidence of: planning consent; (at Comberton) a signed lease for the borehole array and an independent audit report confirming that the Council has made a financial investment decision for these projects.

2.5.2 Once a fully evidenced RHI application has been submitted, securing this funding will be conditional on the total available RHI budget (£28m) not having been over-subscribed. At the time of writing Ofgem have provisionally allocated £9.4m of this £28m. Construction would also need to complete and the projects commission no later than 31st March 2022 in order to secure RHI funding (see paragraph 4.3 for a discussion of the associated risk).

2.6 Other Dependencies

2.6.1 In addition to planning consent and confirmation, via a Tariff Guarantee Notice, that RHI support has been granted, the following steps must be completed before construction costs would be committed:

- Discharge of planning conditions on noise & vibration. These simply require impact assessments to be provided. Neither project has significant impacts in these areas and discharge of planning conditions is not expected to present problems.
- Department for Education approval of the Heat Supply Agreements. We have discussed the agreements and the technical details of the projects with the Department who recognise the value of the projects as exemplars of retrofit decarbonisation solutions. Their primary concern is that the agreements offer good value for money to the Trusts. Final business cases are being provided to the Department who are seeking formal approval from the Secretary of State and HM Treasury.
- Signature of Heat Supply Agreements by the Trusts. Terms and conditions have been discussed with the Trusts, final costs, duration of agreements and residual payments remain to be agreed.
- Signature of draft construction contracts.

2.7 Construction & Operation

- 2.7.1 Construction contracts with our engineering contractor Bouygues Energies & Services are being drafted. These will be signed if the Committee decide to proceed with the projects. No cost commitments will be entered into until confirmation of RHI funding for these projects has been received.
- 2.7.2 We also propose to call-off a contract for operation and maintenance of the projects from our Framework Agreement with Bouygues to ensure that responsibility for performance of the projects rests clearly with Bouygues. We propose an initial 5-year operation & maintenance contract with an option to renew or contract elsewhere at the end of this term.

3. Alignment with corporate priorities

3.1 A good quality of life for everyone

There are no significant implications for this priority.

3.2 Thriving places for people to live

There are no significant implications for this priority.

3.3 The best start for Cambridgeshire's children

The following bullet points set out details of implications identified by officers:

- The projects will help schools manage their heating costs by providing certainty over heating costs and reducing heating and maintenance costs slightly. This will in turn reduce pressure on school budgets helping improve educational delivery.
- The projects have the potential to help children at the schools learn about tackling climate change.

3.4 Net zero carbon emissions for Cambridgeshire by 2050

The following bullet points set out details of implications identified by officers:

- Achieving net zero carbon emissions requires fully decarbonising heating in buildings by 2050. These projects reduce the direct carbon emissions from the heating of the schools by 93% in the case of Comberton and 85% in the case of The Galfrid. Accounting for indirect emissions for the electricity required to operate the heat pumps, the savings in the sites' heating emissions will be:
 - For Comberton: 65% in 2022 increasing to 90% in 2052 for Comberton;
 - For Galfrid: 51% in 2022 increasing to 82% in 2042.
- As such these projects make a significant contribution to decarbonising the sites and act as an exemplar of how this can be achieved on other schools.

4. Significant Implications

4.1 Resource Implications

The report above sets out details of significant implications in section 2.4. In the event that the Committee decides not to invest in the projects the £208k development costs would be sunk costs. The agreed development budget was from prudential borrowing over 20 years and would need to be repaid from net income from other projects in the Council's schools energy efficiency programme and using Transformation Funding secured by the Energy Investment Unit in January 2020.

4.2 Procurement/Contractual/Council Contract Procedure Rules Implications

The following bullet points set out details of significant implications identified by officers:

- Project construction will be delivered under the Refit 3 Framework, Call off Contract with Bouygues Energies & Services procured in 2017.

4.3 Statutory, Legal and Risk Implications

The following bullet points set out details of significant implications identified by officers:

- Planning determination for The Galfrid is due on 10th March and for Comberton on 18th March. If planning consent is not secured in March, this will prevent the project from securing RHI funding, and it will not be economically viable. No construction costs will be committed until RHI funding has been confirmed.
- Completing construction and commissioning by 31st March 2022 is challenging (in particular for the larger Comberton project), but deliverable. Construction plans have been prepared with input from experienced GSHP specialists at Bouygues. These plans have completion of works at the end of January with one month for formal handover and a further month's leeway for slippage. Construction contracts include penalties for late delivery to incentivise timely construction, although ultimate risk of missing the RHI commissioning deadline does rest with the Council.
- Covid-19 disruption may lengthen equipment lead times. However, owing to the duration of the borehole drilling programme up to 4 months can be accommodated for equipment leadtime, without delaying completion. Project works do not require access to areas of the school where staff or students are present, only car parks and plant rooms, minimising impacts of pandemic restrictions. The cancellation of exams in summer 2021 due to Covid disruption is potentially helpful for the projects as the start of borehole drilling no longer needs to be held back until after exams.
- In entering into Heat Supply Agreements, the Council will be taking on a contractual responsibility for heat supply, with defined response times and penalties for non-compliance. These are based on industry standard terms. The risks associated with this will be transferred to Bouygues via the Operation & Maintenance contract.
- The business case models revenues from heat sales based on providing the schools with a small percentage saving over the projected counterfactual cost of operating gas or oil heating. The models use oil and gas (and electricity in respect of GSHP running costs) price inflation rates from Government projections. The Heat Supply Agreement adjusts tariffs annually to account for actual oil or gas price inflation. Depending on how actual energy inflation rates compare with projections the

Council's revenues could exceed or be lower than those projected. Faster than projected fossil fuel price growth, such as might occur if Government increased carbon levies on heating fuels would increase project revenues.

- The project risk register is attached as Appendix A.

4.4 Equality and Diversity Implications

There are no significant implications within this category.

4.5 Engagement and Communications Implications

There are no significant implications within this category.

4.6 Localism and Local Member Involvement

Officers have ensured that local members have been kept informed of these projects during the development stages, with the latest updates identified below:

- Councillor Nieto is aware of the Comberton Project and was involved in facilitating an initial meeting with the Chief Executive of the Cam Academy Trust to kick-start the Comberton project. She has been updated on project progress.
- Councillor Whitehead has been updated on project progress.

4.7 Public Health Implications

The following bullet point sets out details of implications identified by officers:

- There will be a small positive impact in reducing air pollutant emissions as a result of moving away from combustion-based heating to heat pumps.

4.8 Environment and Climate Change Implications on Priority Areas:

4.8.1 Implication 1: Energy efficient, low carbon buildings.

Status: Positive

Explanation: The GSHPs will reduce school energy consumption and carbon emissions.

4.8.2 Implication 2: Low carbon transport.

Status: Neutral

Explanation: No impact on transport.

4.8.3 Implication 3: Green spaces, peatland, afforestation, habitats and land management.

Status: Neutral

Explanation: No impact on land use

4.8.4 Implication 4: Waste Management and Tackling Plastic Pollution.

Status: Neutral

Explanation: Borehole drilling will result in a small amount, non-harmful, arisings. Packaging waste associated with delivery of materials will be managed by supply chain procurement conditions which Bouygues are required to apply via our contract with them.

4.8.5 Implication 5: Water use, availability and management:

Status: Neutral

Explanation: The projects do not increase hard standing or otherwise affect drainage, neither do the ground loops (which are closed loop) abstract or discharge to groundwater.

4.8.6 Implication 6: Air Pollution.

Status: Positive

Explanation: In principle the reduction in gas and oil consumption reduces production of air pollutants in particular NOx, although the impact on air pollutant concentrations in areas of air quality exceedance will be immeasurably small.

4.8.7 Implication 7: Resilience of our services and infrastructure and supporting vulnerable people to cope with climate change.

Status: Positive

Explanation: The projects will no longer rely on global supply chains for oil and gas providing both cost certainty and supply resilience.

Have the resource implications been cleared by Finance? Yes
Name of Financial Officer: Jonathan Trayer

Have the procurement/contractual/ Council Contract Procedure Rules implications been cleared by the LGSS Head of Procurement? Yes
Name of Officer: Gus de Silva

Has the impact on statutory, legal and risk implications been cleared by the Council's Monitoring Officer or LGSS Law? Yes
Name of Legal Officer: Fiona McMillan

Have the equality and diversity implications been cleared by your Service Contact?
Yes. An Equality Impact Screening undertaken for the proposals has shown no potential negative impact.
Name of Officer: Elsa Evans

Have any engagement and communication implications been cleared by Communications?
Yes
Name of Officer: Simon Cobby

Have any localism and Local Member involvement issues been cleared by your Service Contact? Yes
Name of Officer: Emma Fitch

Have any Public Health implications been cleared by Public Health?
No. Public Health staff are redeployed onto C19 outbreak management and contact tracing and are not able to provide clearance for all Committee papers.
Name of Officer: Kate Parker

If a Key decision, have any Environment and Climate Change implications been cleared by the Climate Change Officer?
Yes
Name of Officer: Emily Bolton

5. Source documents guidance

[Commercial & Investment Committee report: Comberton Village College Low Carbon Heat Network and Other School Heat Pump Projects; 22nd May 2020.](#)

[Commercial & Investment Committee Decision Summary: 22nd May 2020.](#)