

Item

CORN EXCHANGE HEATING SYSTEM

To:

Councillor Anna Smith, Executive Councillor for Communities
Environment & Community Scrutiny Committee 25/03/2021

Report by:

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Wards affected:

All

Not a Key Decision

1. Executive Summary

This is a report on the heating system replacement for Cambridge Corn Exchange. It summarises why an interim gas-based solution is necessary.

2. Recommendations

The Executive Councillor is recommended to:
Note the report

3. Background

- (a) Cambridge Corn Exchange, which was opened in 1874, is a 147-year-old Grade II listed building in the historic centre of Cambridge. It is owned and operated by Cambridge City Council and is one of the region's largest indoor performance venues.
- (b) The Council's most recent carbon emissions data shows that in 2019/20 the Corn Exchange accounted for 4% of the Council's carbon emissions. Total emissions in 19/20 attributed to the Corn Exchange were 231.8 tonnes CO₂.
- (c) As part of its 2 previous Carbon Management Plans, covering the period from 2012-2016 and 2016-2021, the Council has delivered 66 projects to date to reduce carbon emissions from its corporate buildings and vehicle

fleet. Through both previous Carbon Management Plans, the Council has prioritised investment in carbon reduction projects at the biggest sources of emissions in its estate, with a view to reducing the Council's total carbon emissions as rapidly as possible. In 2019/20 the biggest sources of emissions were: swimming pools and leisure centres (26%), vehicle fleet (23%), sheltered housing communal areas (13%), offices and administrative buildings (9%) and car parks (8%). A range of different measures have been implemented across these sites.

- (d) Along with LED (light emitting diode) lighting installation at 9 other corporate buildings, the main theatre lighting at the Corn Exchange was replaced with more efficient LED lighting, with the aim of reducing carbon emissions associated with electricity consumption at the building. The Corn Exchange was also considered for a solar PV (photovoltaic) installation as part of a wider programme of PV installations at 8 corporate buildings in 2019, but Bouygues (the Council's Energy Performance Contractors) advised that the Corn Exchange was not suitable for PV, due to the construction of the roof, the listed building status of the building, and significant challenges associated with accessibility and fall-prevention, so this was not taken forward.
- (e) As outlined in the report from Bouygues, along with the Guildhall and the Crematorium, for the following reasons the Corn Exchange building is one of the Council's most challenging assets from a decarbonisation perspective, particularly in relation to its gas usage for heating:
 - i. The building is extremely thermally inefficient, with single-skin brick walls with no insulation, single glazing and issues relating to the roof insulation.
 - ii. The heat distribution system is ineffective.
 - iii. The building energy management system is dated and basic and does not allow heat use to be managed effectively across the building
 - iv. The existing gas boilers are beyond their expected lifespan and are obsolescent technology. They are no longer manufactured, and replacement parts are increasingly difficult to source
- (f) Advice from Bouygues (see Appendix A) concludes that Ground Source Heat Pumps (GSHP) would not be viable for heating the Corn Exchange, because there is insufficient open space near to the building for this solution. Air Source Heat Pump (ASHP) technology is not currently viable for the building because the current thermal inefficiency means that heat pump technology, which operates most efficiently at lower temperatures, would not be able to effectively heat the building
- (g) Although it would be possible to site some ASHPs either on part of the roof of the Corn Exchange, or on the upper level of the Grand Arcade car park and pipe the heat across, this is not recommended by Bouygues on the grounds that an ASHP would not be able to satisfy a meaningful proportion of the building's heating demand, because of the thermal inefficiency. In

other words, gas boilers would still be required to meet the remaining heat demands.

- (h) Bouygues have indicated that a longer-term scheme aligning the heating system with work on the roof and windows, so that the thermal inefficiency can be improved, the heating demand from the building can be reduced and the poor layout of the ventilation system can be addressed, would enable a reconsideration of on-site renewable heat generation.
- (i) The timescale to fully develop a scheme will be significant and will need to be aligned with other Council policies and priorities. The most recent building condition survey indicated that work on the roof and windows would need to be carried out by 2030, but we would aim to complete this work and any subsequent low carbon heating installation before this date, so as to be consistent with the net zero carbon target for the Council's direct carbon emissions set out in the Council's revised Climate Change Strategy and Carbon Management Plan 2021-2026. However, it is important to recognise that, due to the challenging nature of the building, Bouygues have indicated that it may not be possible to reduce carbon emissions at the Corn Exchange to zero carbon, so an element of offsetting may ultimately be required for this building, once all decarbonisation options have been exhausted.
- (j) In the interim, Bouygues have indicated that an annual carbon saving estimated at c.40 tonnes per annum (c 17% of total carbon emissions from the building) will be achieved by upgrading the building energy management system and installing modern gas boilers. The upgraded BEMS would be retained in the longer-term improvement and decarbonisation scheme, with the gas boilers either retained for back up or re-used elsewhere.
- (k) Ensuring that the building has a functional heating system in the near term will provide the time necessary to fully develop the longer-term scheme, reduce the current carbon emissions, and also remove the immediate risks linked to a heating system failure, which are:
 - i. Closure of the venue and loss of the programme, with associated reputational and financial damage
 - ii. Damage to the fabric of the building
 - iii. Need for emergency heating replacement

4. Implications

a) Financial Implications

The indicative budget for the works outlined above is £130,000 funded from Capital Reserves.

b) Staffing Implications

None – The installation project will be overseen by Community Services Managers.

c) Equality and Poverty Implications

An EQIA has not been carried out as there is no planned change to the service provided.

d) Environmental Implications

The project has been rated medium positive, because of the immediate reduction of carbon emissions attributable to the Corn Exchange.

e) Procurement Implications

This work will be carried out as part of the Re-Fit 3 contract

f) Community Safety Implications

There are no community safety implications

5. Consultation and communication considerations

There are no plans to consult further on this matter.

6. Background papers

No background papers were used in the preparation of this report.

7. Appendices

Corn Exchange Decarbonisation – prepared by Bouygues

8. Inspection of papers

To inspect the background papers or if you have a query on the report please contact Jane Wilson, Culture and Community Manager, tel: 01223 - 457860, email: jane.wilson@cambridge.gov.uk.