Southend-on-Sea Borough Council

Report of Corporate Director for Place

to
Cabinet
on
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Agenda Item No.

22

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Beecroft and Central Museum Energy Project

Place Scrutiny Committee
Executive Councillor: Councillor Longley
Part 1 (Public Agenda Item)

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1. Purpose of Report

1.1. The purpose of this report is to seek approval to utilise £720k of allocated local growth fund money to install a biomass boiler, a small solar array, improved heating and ventilation energy efficiency measures, and new lifts to the Beecroft Centre and the Central Museum. This would be matched by £372k from the capital reserve to deliver the whole project and to benefit from the Feed-in Tariffs and Renewable Heat Incentive. This would result in revenue increasing from £49k in year one to £71k in year 20. This proposal is an Invest to Save proposition to upgrade the building avoiding future capital cost whilst also generating a future revenue stream at a low cost to the Council which can contribute to future budget savings.

2. Recommendations

2.1. This proposal recommends that the Council installs a biomass boiler in the Beecroft Centre serving both the Beecroft and the Central Museum and replaces the lifts in the Beecroft Centre

2.2. That the proposal is funded by £720k from the Local Growth Fund and £372k the Capital Reserve.

2.3. That the Local Growth Fund budget already in the capital programme is re-profiled, a virement approved to move the £720k to a separate capital project and a new budget be approved for the £372k to be funded from the capital reserve.

3. Background

3.1. In late 2014, the Council adopted the Low Carbon and Sustainability Strategy (LCSS) which identifies CO2 reduction through energy projects as a priority.

3.2. The Beecroft Centre has recently been refurbished but no work was done on the boiler systems because parts of it are relatively new. The Beecroft has three new boilers and a bank of eight old boilers. The new boilers will handle most of the heating requirement for mild winters in the Beecroft Building but the bank of old boilers will need to be replaced to provide contingency when one or more of the new boilers fail and for when a cold winter strikes. Therefore additional resilience in the system is required to ensure optimum and sustainable operation. 2014-15 was unaffected because the building was largely unoccupied during the winter. The cost to replace the bank of old boilers is estimated at around £100k.

3.3. The entrance area of the Beecroft has poor heating because the original under floor heating has failed. It would be prohibitively expensive to repair or replace the under floor heating but improvements could be made using air curtains and low level perimeter heaters linked to the main central system. The pumps are serviceable but are now old and will require replacement. Energy savings would be derived from the change which would cost around £120k as a stand-alone project.

3.4. The ventilation in the Beecroft is old but functional. It is noisy and constrains the use of parts of The Hive. The system can be upgraded and improved to extend its life and to reduce the noise.

3.4. The Central Museum has two old gas boilers which are obsolete and one has now failed. The cost to replace the boilers will be large because of the asbestos contained in the flue and other areas in the current installation. The cost is estimated at £100-150k.

3.5. The Beecroft now houses the new incubation centre (The Hive) which will work extended hours compared to the previous use of the building in order to meet the needs of the businesses that are established there. This will raise the combined heat requirements for the buildings to an estimated 1.6m kWh or around £40,000 each year at current gas prices. Some energy efficiency equipment can be installed to improve the management of the heating.

3.6. The roof area at the Beecroft may be used as a terrace in the future but the area on top of the current boiler house is ideal for solar PV.

3.7 The lifts in the Beecroft Centre are still functioning but reaching a point where reliable operation cannot be guaranteed. This would impact both the Beecroft Gallery and the Hive Enterprise Centre. Replacing the lifts now will avoid repairs due to deterioration thereby reducing the costs of maintaining a working system. While the Hive is still increasing its occupancy numbers in its early days of operation it would be advantageous to undertake the work now to minimise the impact on centre users.

3.8 Micro-generation from renewables can generate free electricity whilst also generating revenue from Feed-in-Tariffs (FiTs) whilst renewable heat can attract revenue from the Renewable Heat Incentive (RHI). These will be linked to direct energy reduction measures to generate savings

4. Proposal

4.1. A 995kW biomass boiler is proposed to be installed in a new containerised boiler room with fuel store to be located at the edge of the Beecroft car park at the back of the building. This boiler will provide all the heating for the museum and the majority for the Beecroft, with the existing three boilers providing additional capacity and resilience at times of peak demand.

4.2. The biomass boiler will be interfaced into the Museum heating and the Beecroft using heat mains running underground as much as possible. New controls will manage the firing of the biomass and the remaining gas boilers with the biomass used mainly to provide baseload and to maximise RHI revenue. The proposed biomass boiler is not replacing existing serviceable plant i.e. boilers. It is however replacing old inefficient boilers that are still just about running and may fail without warning during the heating season. This could result in the buildings having to close.

4.3. The Beecroft will have improved heating to the entrance whilst the Museum and the Hive will have improved in room control from programmable thermostatic radiator valves to allow better control of heat in individual rooms. New pumps within the current boiler rooms will allow better control and provide direct energy savings from more efficient operation.

4.4. A 30kWp solar system will be installed on the boiler room rooftop to take advantage of the south facing aspect.

4.5. The ventilation will be improved to extend life and to reduce noise.

4.6. The lifts which are at the end of their life will be replaced.

5. Timescale

5.1. The heating project will be completed during Autumn 2015 to ensure that the Central Museum will have enough heat for the coming winter whilst the lifts will be completed as fast as tendering and parts supply will allow. While the lifts will be done before the end of the financial year subject to availability of parts.

5.2. A detailed implementation plan will be agreed once approval is granted but implementation is proposed to be as fast as possible to minimise the risks of falling revenue from FiT and RHI reviews.

6. Direct Savings

6.1. The project is presented financially in two parts to be integrated on delivery; first to upgrade the building to improve heating and ventilation together with some energy efficiency measures funded by the Local Growth Fund and second to install the biomass boiler and Solar PV array funded by the Council.

Expected capital costs (which will otherwise be incurred without this project)		Proposed spend and savings	
£150k	Central museum boilers	£13k	Museum pipework
£100k	Beecroft boilers (replace bank of 8 old)	£80k	Building Management System (incl ventilation controls)
£270k	Heat ground floor of Beecroft (replace where underfloor heating has failed, replace aging pumps in the heating system and to provide extra life to the ventilation system)	£40k	Programmable Thermostatic Radiator Valves, insulation and associated controls (Museum and former central library) to provide virtual zoning
£175k	Replace lifts when they fail	£120k	Heating for former central library reception and new pumps
		£155k	Improvements to ventilation incl noise reduction
		£175k	Lift replacement
		£137k	Fees
		£332k	Biomass
		£40k	Solar PV
No income generation and limited cost savings through more modern and therefore equipment		£695k avoided capital costs plus £1.3m revenue net of bio fuel costs over 20 years	

6.2. **£695k capital spend is expected to be required to sustain the Museum and Beecroft building in the short term. By investing £720k growth deal funding plus £372k capital that spend is off-set and an opportunity to generate an income of £1.3m over 20 years is created, thereby not just covering the cost of the capital spend but also generating £1.3m additional income over 20 years.**

6.3. Replacing the lifts and improving the heating and ventilation now will reduce the maintenance costs associated with near end of life equipment.

6.4. An estimated £49k revenue will be generated in year 1, rising to £70k by year 20, from energy savings, RHI income and FiT income net of the additional cost of the biomass fuel and maintenance. The income will rise year on year linked to RPI and rises in energy costs.

Estimated Year 1 revenue net of biofuel costs	£49.1k
Estimated Year 20 revenue net of biofuel costs	£71.2k
Total 20 year estimated revenue (net of biofuel costs)	£1,315k
Capital Cost	£1,092k
Funded by	
Local Growth Fund	£720k
Direct Council capital	£372k
Future Capital requirements avoided	£695k

7. Other Benefits

7.1. The proposal will save 251tCO2. The CO2 reduction represents 1.42% of the CO2 for which the Council is responsible and 0.03% of total CO2 emissions for the entire borough.

7.2. The heating within the Beecroft around the entrance will be improved.

7.3. If required, the biomass can be installed with a viewing hatch and material allowing the museum to use the facility for sustainability exhibits and teaching.

7.4. As the remaining gas boilers will work less hard, there will be un-quantified savings in maintenance together with extended life delaying future capital costs for replacement.

7.5. The improvements in ventilation and new lifts will extend the useful life of the building.

8. Risks

8.1. Planning. The proposed biomass boiler room would be subject to planning. The solar scheme may fall within permitted development which would be confirmed through drawings before proceeding on that basis.

8.2. Distribution Network Operator (DNO). Approval for the grid connection of the solar will be required from the DNO – UK Power Networks. As all of the electricity generation will be used on site this is not expected to be a problem.

8.3. Timescale. The FiTs for Solar are revised quarterly on a downward trend based partly on the costs of solar installation but also on take up. The rates have recently been revised down and the figures till 30 September 2015 are assumed with 3.5% reduction to simulate the likely revenue. RHI rates have been revised recently but a further 5% drop is assumed within the calculations.

8.4. FiT Regime Changes. DECC have recently issued a consultation on changes to the FiT regime in the UK. There are two risks to this project as a result. First, the rate of FiT will fall from 11.3p per kWh to 3.69p from 1 January 2016 which would remove up to £2.2k per annum revenue. This risk will be managed by starting the procurement process early subject to funding approval to ensure that this element of the project can be installed before the end of 2015. The second potential impact to this project stems only from a proposal within the consultation for a retrospective change to the export FiT relating to unmetered systems. The financial risk is that, from 2017 or after, up to £700 per year (inflating) could be lost from the revenue out of £49.1k estimated in year 1.

8.5. Performance. The financial projections depend on the calculated savings and revenue generation from the measures being achieved. These have been calculated cautiously to ensure that the risks are on the upside. Nevertheless, the risk remains because all of the proposed measures involve interfacing into existing plant.

8.6. Weather. Performance of solar can be weather related and a cool summer with lower than average sunlight may result in a lower yield than predicted. Conversely, a summer with higher than average sunlight will generate a higher yield.

8.7. Resources. Whilst some of the projects can be managed through contractors, some internal engineering and project resources will be required. Fees to allow the use of external consultants and to provide for internal engineer resources have been included within the financial projections. 1.5% fees have been included to provide for repayment of costs for the energy team to the Transitional Fund.

8.8. Capital Cost. The costs for the measures have been estimated based on quotes from manufacturers and experienced sources. The final costs will be subject to the results from tenders of each measure.

8.9. Inflation. The financials are calculated using a standard assumption of 2.5% inflation (RPI) and 5% energy inflation. Lower inflation will result in lower revenues and lower savings but will be in an environment where the overall energy costs for the Council will be lower. If inflation is higher, the revenue and savings will be higher but this will be in an environment where the overall energy costs will be higher.

8.10. Fuel Deliveries. The access to the site for large deliveries is tight which may dictate the location of the boiler. There is a further risk with Biomass that poor road conditions can make access difficult. This will be managed by installing a large fuel store capable of handling several months' supply. Also a Biomass system designed to facilitate easy vehicular access for fuel deliveries.

8.11. The Biomas proposal will deliver heat to both Beecroft and the Central Museum in support of the three existing new boilers; smart control design will allow proportional heat distribution as required.

8.12. The Solar PV Photovoltaic panels on the Beecroft Roof will deliver free clean electricity into the Beecroft Gallery reducing energy costs, and generate significant financial income.

8.13. Biomass availability. This site is planned based around wood chip. Availability and delivery using smaller vehicles could become. Long term supply contracts should be considered as a means to manage this risk.

9. Funding

9.1. Local Growth Fund. An allocation in the July 2014 Growth Deal announcement made provision for investment in Southend's Central Area. A detailed business case to secure the £720k required is necessary to complete the process.

9.2. Capital Reserves. £372k has been identified for this project from capital reserves.

10. Financial Summary

10.1. The project will provide an income stream from energy savings and FiT/RHI income of £49k per annum rising with inflation.

10.2. The project provides a solution which removes the need for immediate and future capital of £695k. This future capital would have been required to replace boilers as they fail, to provide heating to the Beecroft ground floor and to replace the lifts.

11. Assumptions

11.1. The following key assumptions are included in the financial summary:

- The gas and electricity price increase will fall by 5% for the renewal in April and October 2015 but woodchip prices will not.
- Future years energy price inflation will be 5% per annum for all fuels
- Heat requirements in the Beecroft will rise by 20% from current levels due to the extended hours operated by the Hive.
- FiT and RHI income will be uprated by RPI each year assumed to be 2.5% for the life of the project.
- Solar generation will be around 7.5% below Climate SAF database calculations. Evidence nationally and locally from other installations in Southend suggests that the databases are consistently predicting output low against Climate Classic and that Climate SAF is more accurate.
- Solar generation will continue on site beyond the 20 year FiT period. It is expected that the Council will have multiple generation facilities within the borough operating at that time and will negotiate a bulk sales rate for all export from such facilities

12. Other Options

12.1 Other options considered include:

- Do nothing. Doing nothing will leave the Beecroft exposed to failure of the obsolete bank of boilers and with poor heating to the entrance area. The Museum would be exposed to poor heating from the failure of its heating system.
- Replace with gas boilers. This option will require £350k capital which is not budgeted without any revenue stream to support the expenditure. This would also not address the heating, ventilation and lift improvements.
- Other renewable technologies including wind, micro anaerobic digestion, ground source heat pumps, biomass CHP and liquid biofuel have all been considered and found not to be feasible.
- Fund through another source. It may be possible to fund the project through private sector finance sources but this would be more expensive and may not be available for a multi-technology project
- Smaller biomass and PV. Smaller systems have been considered but they generate less revenue.
- Framework. This project could be delivered through a Framework such as BSP. Use of an appropriate framework will be considered as part of the procurement of the works

13. Corporate Implications

13.1. Contribution to Council's Vision & Corporate Priorities

13.1.1 This project will support the delivery of the Council's second Low Carbon Energy and Sustainability Strategy which was adopted in late 2014. It also supports the Council's Economic Development and Tourism agenda.

13.2. Financial Implications

13.2.1 This is an invest-to-save project to be financed by external resources and internal resources already set aside.

13.2.2 There are risks associated with the revenue returns and if circumstances transpired where they did not occur, then the Department of Place would need to supply the shortfall from their budgets. Finance consultation has been restricted to funding and accounting relating to the project proposals and not to the underlying capital costs or energy generation modeling.

13.3. Legal Implications

13.3.1 There are no legal implications as a result of this report.

13.4 People Implications

13.4.1 There are no people implications as a result of this report.

13.5 Property Implications

13.5.1 This proposal applies only to the Beecroft Centre and the Central Museum

13.6 Consultation

13.6.1 Economy and Tourism, Property Services, Finance, Culture and Asset Management have been consulted in this project.

13.7 Equalities and Diversity Implications

13.7.1 There are no equalities and diversity implications as a result of this report.

13.8 Risk Assessment

13.8.1 The risks are reviewed in full at Section 8. The major risks relate to DNO approval and to timing in that revenues may fall each time that FiT and RHI rates are reviewed.

13.9 Value for Money

13.9.1 This project will use revenue from renewable energy and savings achieved through energy reduction measured to achieve its objectives, repay all capital and interest and leave a small surplus.

13.10 Environmental Impact

13.10.1The proposal will save 251t CO2 per annum.

14. Background Papers

14.1 There are no background papers for this report.

15. Appendices

15.1 There are no appendices for this report.