

ITEM 9: APPENDIX D

WAVERLEY BOROUGH COUNCIL

EXECUTIVE – 1 APRIL 2014

Title:

LOW CARBON ENERGY OPTION – HERONS LEISURE CENTRE

**[Portfolio Holder: Cllrs Tom Martin and Julia Potts]
[Wards Affected: All]**

Summary and purpose:

A number of low carbon energy options for the Herons were originally approved by members over a year ago, to form part of the refurbishment works. The options were examined in terms of carbon and cost reductions, as well as practicality in terms of installation. The two shortlisted options were:

- a. Gas Combined Heat Power (CHP) plant: will generate electricity and as a result produce free heat.
- b. Solar PV: will generate a proportion of electricity and will provide an income through the Feed in Tariff (FiT).

Following that, it was considered more appropriate to examine those options on their own merits, separate from the main funding proposal for the refurbishment project.

The Carbon Management Board has requested that the low carbon energy options for the Herons refurbishment are reconsidered and presented to the Executive for additional funding approval. This report outlines the options proposed for consideration and demonstrates the return of the capital investment.

How this report relates to the Council's Corporate Priorities:

The low carbon options proposed for the Herons will deliver value for money by offering a return on Waverley's investment from running the building more efficiently making long term cost savings through reduced energy bills.

Protects the environment by reducing energy and carbon emissions and contributes to Waverley's Carbon reduction target.

Financial Implications:

This report aims to seek additional capital funding approval to implement low carbon energy options at the Herons. These options will have a minimum return on investment of 10% depending on which option is selected.

Legal Implications:

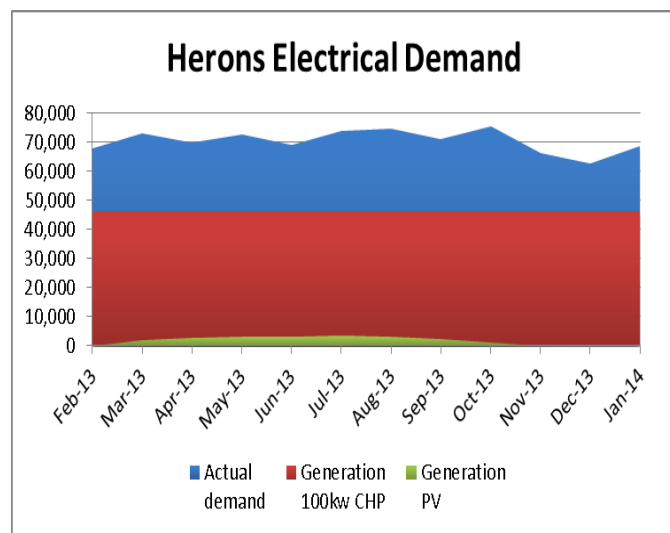
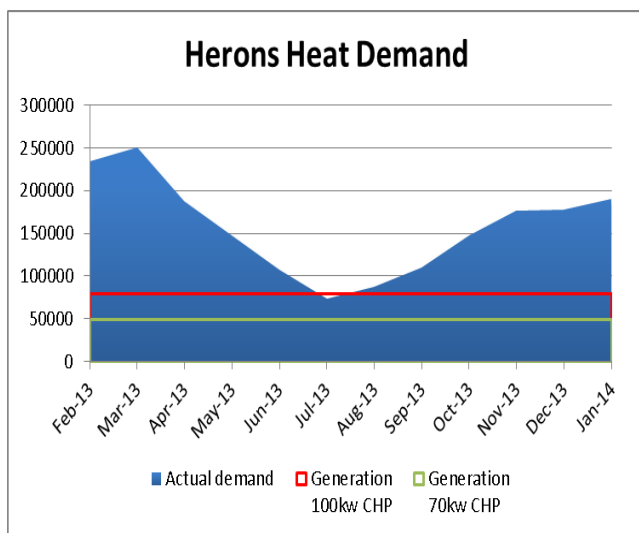
There are no legal implications associated with this report.

Introduction

1. The Herons accounts for approximately 18% of Waverley's total carbon footprint. The refurbishment project presents an opportunity to make energy efficiency improvements to the leisure centre that will not only offer energy and cost reductions but also significantly reduce carbon. These improvements will support Waverley's commitment to reduce carbon emissions and is potentially our last opportunity to significantly contribute to our carbon reduction target.
2. Undoubtedly, the best time to look at implementing efficiency improvements is when major refurbishment works are being carried out, because it will minimise disturbance and potentially lower installation costs.

Low carbon options and benefits

3. The two main low carbon options proposed for the Herons are: a **Gas Combined Heat Power (CHP)** plant (various sizing options explored) and **Solar PV**.
4. The graphs below give an accurate picture of the heat and electrical demand of the Herons over a period of 12 months. The CHP will be designed to cover the base load heat demand and the two sizing options considered, are plotted against that demand. The graph illustrates the need to also have gas boilers that will top up the heat demand.
5. The majority of the Electrical demand will be covered by the CHP with a small percentage contributed by the PV panels.



The cost benefits of investing in low carbon technologies are outlined in Tables 1 and 2. The CHP is examined in its own merits as well as in comparison to a gas boiler. The PV is based on 30kw unit which is the maximum potential of the roof.

6. Certain assumptions were made when calculating cost benefits of the CHP:
- Energy prices used are at current values paid by DC Leisure (DCL).
 - DCL will be reimbursing Waverley from direct energy savings achieved
 - The CHP will be running for 17hours a day for 52 weeks of the year, with 90% availability allowing time off for maintenance. A 15 year life span has been assumed.
 - Gas boiler lifecycle savings have not been evaluated.

Table 1. Cost benefits of CHP when comparing to a gas boiler

Options	Capital Cost (1)	Estimated Annual Cost Saving (2)	Estimated Annual Maintenance costs (3)	Indicative Payback Period =1/(2-3)	Return on investment	CO2 Saving (t/y)	Contribution to carbon reduction target
70KW Gas CHP	£111,000	-£21,200	£9,500	9.5y	10.5%	236	4.5%
100KW Gas CHP	£140,000	-£31,700	£11,200	6.8y	14.6%	262	5%
30KW PV Array	£38,000	-£6,000	£175	6.5y	15%	13	0.2%

Table 2. Cost benefits of CHP stand alone

Options	Capital Cost (1)	Estimated Annual Cost Saving (2)	Estimated Annual Maintenance costs (3)	Indicative Payback Period =1/(2-3)	Return on investment	CO2 Saving (t/y)	Contribution to carbon reduction target
70KW Gas CHP	£111,000	-£19,400	£9,500	11y	9%	236	4.5%
100KW Gas CHP	£140,000	-£28,800	£11,200	7.9y	12.5%	262	5%
30KW PV Array	£38,000	-£6,000	£175	6.5y	15%	13	0.2%

7. The tables above demonstrate two different ways of calculating potential savings. The difference in saving between the two can simply be explained by considering the efficiency of the CHP against a gas boiler. The CHP operates like a small power plant. It burns gas and it generates electricity and as result of this process it also generates useful heat. It is important to note that the cost savings that derive from a CHP relate mainly to the electricity generation, that if it was to be imported from the grid it would cost over three times more than the cost of gas.

8. Table 1 outlines the cost of running a CHP in comparison to a conventional gas boiler based on the same heat **output**. Table 2 just examines the cost benefits based on gas **input** in a CHP. A CHP, if considered for heat generation only, is less efficient than a gas boiler therefore will require more gas input to generate the same amount of heat output as a gas boiler. When looking at a CHP as a stand alone unit, we are neglecting that shortfall of heat generations (because of its inefficiency) that would still need to be generated through the gas boilers and will have an unavoidable associated cost. Therefore Table 1 gives a more realistic assessment of the CHP advantages.
9. Following further considerations in terms of CHP sizing, the 70kw CHP initially costed is not considered to be the optimum size for the site's energy demand and this is reflected in the payback time. A more detailed evaluation was conducted with a supplier that confirmed that the minimum size CHP for the energy requirements of the Herons is 100kw.
10. Gas boilers will also be installed to cover the peak heat demand and also to ensure full and smooth operations of the site when the CHP is being maintained. The sizing of those boilers could be reduced in size reducing their initial capital cost. The life expectancy of the gas boilers will increase significantly as they will be operating on half load basis. These costs savings are yet to be quantified.

Conclusion

11. The £3.3 million investment for the Herons refurbishment project (excluding brought forward life cycle costs) will give the Council 4.2% return on its investment. The low carbon options proposed within this report will offer, in a worse case scenario a 10% return.
12. The calculations above present a snapshot of what the current prices and benefits will be. Energy prices are predicted to increase annually at a rate of 7% during the life of a CHP and PV making the returns even better.
13. The 100kw gas CHP is considered to be the optimum size plant for the Herons.
14. DC Leisure has agreed that they will reimburse savings if Waverley fully funds any of the options. Energy generation from the CHP and PV will be metered and monitored to ensure a fair and accurate return. Energy tariffs paid by DCL in the future will be reflected in the returns.

Recommendation

That the Executive recommends the Council to approve the following two invest-to-save schemes for the Herons Leisure Centre:

1. the provision of a 100kw CHP to be fully funded by Waverley, with the capital budget of up to £140,000 being met from the Revenue Reserve Fund;

2. to delegate authority to the Portfolio Holders for Finance and Sustainability and the Director of Finance and Resources to approve the final CHP scheme following additional information submission on the specified new gas boilers; and
3. the installation of a 30kw PV array with the capital budget of up to £38,000 to be met from the Revenue Reserve Fund.

Background Papers

There are no background papers (as defined by Section 100D(5) of the Local Government Act 1972) relating to this report.

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