

		<b>Executive, 20<sup>th</sup> June 2012</b>	<b>Agenda Item No. 6</b>
<b>Title:</b>	<b>Expansion of Biomass Heating Programme.</b>		
<b>For further information about this report please contact</b>	Jameel Malik, Head of Housing and Property Services		
<b>Service Area</b>	Housing and Property Services		
<b>Wards of the District directly affected</b>	Kenilworth Abbey.		
<b>Is the report private and confidential and not for publication by virtue of a paragraph of schedule 12A of the Local Government Act 1972, following the Local Government (Access to Information) (Variation) Order 2006</b>	No		
<b>Date and meeting when issue was last considered and relevant minute number</b>	Executive of 3 <sup>rd</sup> September 2008		
<b>Background Papers</b>	Installation of Biomass Boiler at Oakley Woods Report to Executive of 23 <sup>rd</sup> October 2006  Biomass Boiler Replacement Report to Executive of 3 <sup>rd</sup> September 2008		

<b>Contrary to the policy framework:</b>	No
<b>Contrary to the budgetary framework:</b>	No
<b>Key Decision?</b>	Yes
<b>Included within the Forward Plan? (If yes include reference number)</b>	Yes, Ref 412
<b>Equality &amp; Sustainability Impact Assessment Undertaken</b>	Yes

<b>Officer/Councillor Approval</b>		
<b>Officer Approval</b>		
<b>Officer Approval</b>	<b>Date</b>	<b>Name</b>
Chief Executive	20/05/12	Chris Elliot
Deputy Chief Executive	05/06/12	Bill Hunt
Head of Service	17/05/12	Jameel Malik
Section 151 Officer	17/05/12	Mike Snow
Monitoring Officer	15/05/12	Andrew Jones
Finance	17/05/12	Sandra Jones
Portfolio Holder(s)	15/05/12	Councillor Norman Vincett
<b>Consultation Undertaken</b>		
Internal Only		
<b>Final Decision?</b>		Yes
<b>Suggested next steps (if not final decision please set out below)</b>		

## **1 SUMMARY**

- 1.1 This report seeks Executive approval to install a biomass heating systems at an additional site – Tannery Court Sheltered Housing Complex, following successful operation of a pilot installation at Oakley Woods Crematorium.

## **2 RECOMMENDATION**

That the Executive:

- 2.1 Grant approval to the Head of Housing & Property Services to seek tenders for the installation of the proposed Biomass Heating system at Tannery Court, in full accordance with the Council's Code of Procurement Practice requirements, and authorises the installation of the winning bidder's scheme assuming the financial benefits meet or exceed those offered by the draft design.
- 2.2 Agree to include up to £176,000 in the Housing Investment Programme for the installation of the system, funded from the HRA Capital Investment Reserve.

## **3 REASONS FOR THE RECOMMENDATION**

- 3.1 It was recognised some time ago that the heating plant serving all five of the Sheltered Housing complexes was nearing the end of its useful working life, becoming increasingly difficult and expensive to maintain, with the added penalty of inherently poor energy-efficiency compared to modern alternatives.
- 3.2 This has led to a rolling programme of boiler replacement that has seen two of the sites (Acorn Court and Chandos Court) re-fitted with modern, gas burning plant.
- 3.3 The recently announced Renewable Heat Incentive (RHI) offers grant funding to support the installation of renewable technology in-place of conventional, and Tannery Court offers an ideal opportunity to realise the considerable financial and environmental benefits inherent in such a change.

## **4 POLICY FRAMEWORK**

- 4.1 The proposed heating system will assist in delivering the Council's vision of sustainable, stronger, and healthier communities, and help the district to become a great place to live.
- 4.2 It will directly contribute to the Sustainable Community Strategy's thematic and cross cutting priorities, embedding sustainability.

- 4.3 It is designed to capitalise on government incentives to encourage use of green energy.
- 4.4 It will assist in:
- Reducing heating bills
  - Generating additional revenue from RHI grant payments
  - Improving health outcomes
  - Reducing the district's carbon footprint
  - Positioning the council as a leader in the utilisation of green technologies.
- 4.5 The installation proposed would save some 100 tonnes of CO<sub>2</sub> per year; 2,000 tonnes over the twenty year lifetime of the plant.

## 5 BUDGETARY FRAMEWORK

- 5.1 The capital expenditure to deliver the system proposed at Tannery Court from the HRA Capital Investment Reserve is estimated at £176,000. The scheme is forecast to generate a return of £215,000 over 20 years, repaying the investment in year 12. This equates to a Net Present Value (NPV) surplus of £69,000 at today's prices. This surplus is from RHI grant income alone and is likely to be augmented by savings on fuel costs.
- 5.2 The projected up-front expenditure and net surplus over 20 years of operation is as follows:

	<b>Capital Expend. £ '000</b>	<b>20 year Net Cash Surplus £ '000</b>	<b>Net Present Value 'NPV' of Surplus £ '000</b>	<b>Payback Period</b>
Tannery Court	176	215	69	12 years

- 5.3 This Biomass installation project is additional to the Housing Business Plan presented to the Executive in March 2012. The £176,000 installation will be funded from the HRA Capital Investment Reserve, initially reducing the funds available to build new homes, but the Business Plan assumes no use of those funds within the first 5 years.
- 5.4 Under the RHI scheme an annual grant will provide income for the first 20 years of operation; this should repay the initial investment in approximately 12 years, so the overall funding available for the Business Plan new build aspirations should not be reduced.
- 5.5 In an unlikely 'worst case' scenario where no income or fuel saving were achieved, the cost of the installation would be fully borne by the HRA

Capital Investment Reserve. This would not significantly affect the current Business Plan aspiration of approximately 1,400 new homes over 50 years, as it would only reduce it by 2 to 3 homes at worst.

5.6 The assumptions made in calculating the Cash Flow / NPV are:

<b>Factor</b>	<b>Basis of Assumption</b>	<b>Tannery Court VSH</b>
Current annual fuel (gas) consumption	Actual gas consumption for previous 3 years	500,000 kWh
% Efficiency of existing gas boilers	Pessimistic assumption from consultant	75%
% of annual heat need that can be provided by Biomass	Pessimistic assumption from consultant	70%
Annual Biomass energy eligible for RHI income	Calculated from the above assumptions	275,000 kWh
Tier 1 annual RHI tariff rate	Current RHI scheme tariff for boiler rating	4.9 p/kWh
Tier 2 annual RHI tariff rate	Current RHI scheme tariff for boiler rating	2.0 p/kWh
Period RHI grant income is received for	Projected useful life of Biomass system is at least 20 years, so expect grant for maximum 20 year period allowed by RHI scheme	20 years
Biomass boiler rating	Maximum practical for site	150 kW
Capital cost	Contractor's quote, + 10% contingency	£176,000
Effective interest cost	Pessimistic assumption	6%

5.7 All of the variables entered are purposely pessimistic to present a prudent financial projection.

5.8 If there are significant variances from the assumptions above prior to installation, e.g. changes to the RHI grant scheme or increases to the costs, it will be necessary to review the financial position to assess whether the project is still viable.

5.9 Additionally, no potential benefit from reduced fuel costs or increased efficiency is included, again to strongly err on the side of caution, although savings are to be expected.

5.10 This since the future cost of fossil-fuel is notoriously difficult to predict, although the days of inexpensive natural gas are almost certainly past, with regular rises common and supply levels volatile.

- 5.11 However, Woodfuel is a UK-sourced and rapidly developing market that is considered stable for the foreseeable future as increasing competition holds prices in-check.
- 5.12 Modern biomass boilers are 93%+ efficient compared to the 75% efficiency accredited to the gas-powered plant presently in-place. (New gas boilers are typically 85% efficient.)

## **6 ALTERNATIVE OPTIONS CONSIDERED**

- 6.1 It would clearly be possible to re-fit the building with modern gas-burning plant, or indeed to continue with the existing.
- 6.2 This is not favoured as the site presents a clear opportunity to very effectively address concerns over the performance of the existing equipment *and* realise the benefit of long-term grant funding that offers defined benefit beyond repayment of investment.

## **7 BACKGROUND**

- 7.1 On 28<sup>th</sup> November 2011 the Government launched the Renewable Heat Incentive (RHI) specifically designed to meet the difference in upfront capital and ongoing costs between renewable and conventional heating and offering grant support to encourage new investment in low carbon heating technologies.
- 7.2 The essence of the RHI is the payment (quarterly) of an agreed tariff for every kWh of energy delivered by a qualifying renewable technology, for a period that reflects the expected useful lifespan of the installation (in the case of biomass boilers – 20 yrs). This is completely independent of the recovery of initial investment costs, and it is forecast that the scheme proposed will continue to receive grant support for considerable time beyond “payback”; as detailed within the financial analysis.
- 7.3 A tariff boundary applies within the medium-scale biomass tariffs applicable to this proposal. This means that such installations will, each year, receive a higher Tier 1 tariff for the initial proportion of their heat generation, followed by a lower Tier 2 tariff for heat generated in excess of this.
- 7.4 The “Tier Break” – i.e. the point at which the tariff switches from tier 1 to tier 2 – is set at the amount of heat corresponding with a 15 per cent load factor of the installation. This means that if an installation generates over the year a quantity of heat equal to running the installation at full capacity for 15 per cent of the year, it receives the tier 1 tariff for this quantity of heat – any additional heat will be compensated by the tier 2 tariff. A 15 per cent load factor corresponds with 1,314 peak load hours

(i.e. running the installation at full, or peak capacity for 1,314 hours over the year), and represents a reasonable minimum level of usage to be expected from a renewable heat installation used for space heating. The scheme proposed would make the full Tier 1 allowance plus substantial Tier 2 support.

- 7.5 Heat generated would be measured by metering, which is convenient as it is the basis on which we would expect to pay our woodchip supplier for fuel.
- 7.6 To counter inflation, tariff levels will be adjusted automatically each year in line with the Retail Price Index (RPI).
- 7.7 In order to provide certainty to those investing in biomass heat installations about the value of benefit they will receive under the RHI, the support levels for installations are fixed at time of award – a concept referred to as “Grandfathering”. This means that changes to support levels resulting from future reviews would only affect new projects accredited on or after the date that new tariff levels are implemented; existing installations will continue to receive the same tariff level regardless of any change made.
- 7.8 In addition to the clear potential the proposal offers to deliver considerable financial benefit via the RHI, it also offers a reduction in Carbon emissions in excess of 100 tons p.a. - which may reasonably be expected to limit any *future* financial-liability under “Carbon Tax” schemes such as the current CRC Energy Efficiency Scheme (formerly known as the Carbon Reduction Commitment).

## **8 PROPOSED SCHEME DETAIL**

### **8.1 GENERAL**

- 8.1.1 There follows a practical proposal for the installation of a biomass boiler system at the site considered most suitable after assessment of the technical merits of all of the Council’s potential sites. It is technically workable and is supported by a detailed draft design and costing that has been developed in consultation with the specialists who designed and installed the system at Oakley Woods. (Similar proposals were prepared for two additional sites – Newbold Comyn & St Nicholas Park Leisure Centres – but have been withheld, pending the recommendations resulting from the current Facilities Audit regarding these sites’ future). It accurately identifies the budgetary provision necessary and allows informed assessment of the merit in proceeding, but as part of a proper, open, procurement process would be tested competitively against the tenders of other bidders, in respect of both performance and economics.
- 8.1.2 The biomass boiler has been sized based upon existing installed capacity and approximate current gas consumption. It is sized as a “base load boiler” (at less than the anticipated peak heating load) although it is forecast that it would provide for a very significant proportion of the total heating demand of the site. The load characteristics of the site dictate

that a larger boiler would not be practical, whilst a smaller boiler would be less economically desirable.

- 8.1.3 The existing gas-powered plant would initially be retained to both meet (short-term) peak-load demand “spikes” and to provide security of service until the new biomass installation was considered proven. Over time, once actual site operational data had been gathered, the existing plant would be reduced and re-ordered to meet peak load shortfall only.

## 8.2 TECHNICAL DETAIL

### 8.2.1 Heating Requirements

- A system is required to heat a block of 40 sheltered flats.
- Heat demand is approximately 500,000 kWh / year into the boilers. The heat delivered by the gas boilers is some 375,000 kWh / year; the loss largely due to the relatively poor efficiency of the (ageing) existing units.

### 8.2.2 Proposed Installation

- A 150 kW wood chip boiler, installed with 3,200 litre buffer tank, is ideal to meet the site’s base load demand.
- This combination would be expected to deliver > 70% of the annual heating demand of the site, dependent on the actual heat load profile.
- A high-efficiency, fully automated, boiler is proposed with features including; automatic ignition, fully modulating combustion control, full moving grate for high fuel-quality tolerance, automatic ash extraction to external bin, automatic mechanical cleaning of the vertical boiler tubes, and automatic fly ash extraction.
- The wood boiler along with buffer tank, ancillary plant, and the fuel store would be housed within a new, purpose-built, plant room.
- Fuel would be held in a store of some 33m<sup>3</sup> useful volume, be automatically extracted by a rotary arm fuel feeder of 4m diameter, and transferred to the boiler by suitable fuel-transfer auger.
- This proposed layout has already been granted Planning Approval.
- It is depicted in a draft layout drawing attached as Appendix 1.

### 8.2.3 Connection and Controls

- The existing fossil fuel boilers currently installed remotely within the main boiler room would be retained to provide standby and peak load capacity.
- An insulated, underground, heat main would be installed to connect the remote plant room to the existing header within the boiler room and allow the effective supply of heat from the new biomass boiler.
- An interface panel would be installed and integrated into the building's existing BMS installation to control the supply of heat from the biomass boiler to the system, holding-off the gas boiler plant while the biomass boiler is in operation and meeting the heat demand.

### 8.2.4 Operating Outline

- Fuel deliveries of up to 33m<sup>3</sup> would be made by chip tanker (the woodchips being "blown" into the store by compressed air).
- Fuel has been successfully delivered to our Crematorium's biomass boiler by similar means, without disruption or nuisance to the day-to-day operation.
- Each delivery would be sufficient to run the boiler for some 112 hours at full load; practically, this represents just over 10 days at 10 full load hours per day / 20 days at 10 half load hours per day.
- Therefore, the general regime would be for fortnightly deliveries; peaking at weekly deliveries in very cold weather.
- Annually, it is expected the boiler would use approximately 160 tonnes of woodfuel.
- The high level of automation - described previously - means that routine maintenance is limited to a requirement for fortnightly emptying of the ash receptacle. It is proposed that this be undertaken by WPM engineers, (who already travel daily to Kenilworth as part of their Leisure Centre maintenance regime).

8.2.5 In fact, Executive approval was given in late 2008 to install the system proposed for Tannery Court.

8.2.6 This was based on the economics of the time, when gas prices were rising dramatically and the business case appeared favourable without grant-support.

8.2.7 During the time the engineering & planning detail was being finalised the gas price stabilised, so Housing and Property Services took the initiative to explore the use of grant funding to support the business case; via the Bio-Energy Capital Grant Scheme.



- 8.2.8 Scheme time-limits and the need to meet project-critical milestones, such as Planning Approval, meant that it did not prove possible to complete an installation within the timescale required to secure the funding.
- 8.2.9 However, the newly announced RHI funding provides much stronger financial support; far in excess of the one-off £ 35k payment offered by the BECG scheme, and it is hoped that Executive will re-authorise the install on this new and more attractive financial basis.