CAB2418 (HSG)
FOR DECISION
WARD(S): ALL

CABINET (HOUSING) COMMITTEE

10 DECEMBER 2012

WINNALL FLATS - NEW HEATING AND HOT WATER SERVICES

(CONSULTATION AND FINANCIAL APPRAISAL)

REPORT OF THE HEAD OF HOUSING SERVICES

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RECENT REFERENCES:

CAB2358 (HSG) – WINNALL FLATS - NEW HEATING AND HOT WATER SERVICES – 20 JUNE 2012

EXECUTIVE SUMMARY:

This report sets out proposals, and seeks approval for, the commissioning and renewal of heating and hot water services to the four medium rise blocks of flats in Winnall Manor Road, Winnall (Dennett, Earle, Craddock and Braxton Houses).

The report concentrates on the results of the tenant consultation, the comparative pros and cons of communal versus individual provision arrangements, and a detailed financial appraisal.

The report sets out and reviews a number of different possible options, but concludes that tenants should retain their self-determination and that individual heating provision (i.e. not a move to a communal heating system) should be retained.

The report recommends that a gas supply should be brought into the Winnall flats and that the preferred system of individual gas boilers with wet radiators be offered to all tenants, whilst those preferring to remain on their current system be allowed to do so.

The report also recommends that Cabinet be asked to approve the estimated capital expenditure of £1,106,000 required to implement the recommended option.

RECOMMENDATIONS:

1 That a new gas main be brought into each of the medium rise blocks at Winnall.

2 That individual gas systems be the preferred choice of the Council (because, at this point in time, it offers the most certainty in terms of lower fuel bills for tenants).

3 That tenants be offered the choice of a new gas system, whilst those preferring to remain on their current system be allowed to do so.

4 That as properties become empty, the existing arrangement be changed to a gas system (so that future tenants are given the best chance of lower fuel bills).

5 That the Head of Landlord Services be authorised to call off the installation of individual systems under the existing contracts with Liberty and Ray Williams.

6 That leaseholders remain totally responsible for the provision, maintenance and safe operation of the heating and hot water system within their flat.

7 That subject to individual leaseholders meeting the costs involved, the Council offer to install individual gas heating systems in leasehold flats in the Winnall blocks.

8 That in accordance with Financial Procedure Rule 6.4, the Committee recommends that Cabinet approve capital expenditure of £1,106,000, with this being funded from the capital planned improvements budget for 2013/14.

9 That the additional revenue spending, estimated at £12,000 in a full year, be approved for inclusion in the detailed revenue budget for 2013/14 and the longer term HRA business plan.

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REPORT OF THE HEAD OF HOUSING SERVICES

DETAIL:

1 Background

1.1 At Cabinet (Housing) Committee on 20 June 2012 (CAB2358 (HSG) refers) approval was sought for officer recommendations in respect of a communal biomass solution for Winnall medium rise flats (Craddock, Braxton, Earle and Dennett). In addition, and subject to this previous recommendation being approved, approval was also sought to bring a further, more detailed, report on the technical and financial implications of the proposal and the final procurement method to this Committee in September 2012.

1.2 During discussion, concern was expressed about a number of issues surrounding the proposal, particularly with respect to the implications of a shift to communal charging and the security of supply and access arrangements for the wood pellets/chips. In short, Members felt there were still to many unknowns, and therefore felt they were unable to make an informed decision on the most beneficial and cost effective heating/hot water solution until they had been furnished with more information on the different technologies.

1.3 In conclusion, at the Cabinet (Housing) Committee on 20th June, 2012, it was resolved:-

a. That the approach, proposals and preferred solution (communal biomass boilers) outlined in this report be noted.

b. That a Member Briefing be arranged on future options available for heating and hot water services.

c. That a detailed report on the technical and financial implications of the final options and the final procurement method be brought back to this Committee in September 2012.

1.4 In accordance with resolution 2 above, a Member Briefing was duly convened on 30 July, 2012 to explain the various technologies in more detail. The briefing covered the following points:-

a. The drawbacks inherent with the current heating arrangement;

b. The basic technology behind each of the proposed technological solutions;

c. The Pros and Cons of each solution from the Councils perspective and the benefits to the residents;

d. The Renewable Heat Incentive and the benefits to the Council.

1.5 The general feedback from the Member Briefing was that it was relevant and beneficial, although the main concerns still centred on the lack of detailed costings to the Council and tenants. Members also were very keen to know what the tenant view was on the proposals (although the need to carry out a full consultation with tenants had already been identified within CAB2358 (HSG) Appendix B).

1.6 In accordance with resolution 3 above, and having given full weight to all the various technical and financial implications of the different options, the purpose of this report is to bring forward, and seek approval for, a preferred final solution. In addition, this report also confirms the preferred procurement method.

1.7 Unfortunately, due to time constraints, officers were not able to meet the deadline for the Cabinet (Housing) Committee on 19 September 2012 and therefore have brought recommendations to this meeting.

1.8 This report concentrates on the results of the tenant consultation, the comparative pros and cons of communal versus individual provision arrangements and detailed costing information. The reasons for replacing the heating/hot water systems, the general property information describing Winnall flats and the detail explaining what the Renewable Heat Incentive (RHI) is and how it works, are all contained within the first report (CAB 2358 (HSG)). This information is still valid and therefore will not be re-iterated here.

2 Tenant Consultation

2.1 All tenants and leaseholders were consulted on the current heating/hot water arrangements within the flats, and what their preferences would be in terms of alternative solutions. Of the 156 questionnaires sent out, 106 (68%) returns were received, which is a fairly disappointing response rate bearing in mind the importance and impact of these primary facilities.

2.2 A summary of the results of those questionnaires is contained in Appendix A. Specific comments provided by tenants/leaseholders in their returned questionnaires can be provided on request.

2.3 The findings from each of the five questions included in the survey can be summarised as follows:-

Q1 A high proportion of tenants (80%) are dissatisfied with their current heating/hot water arrangements. Conversely, a high proportion of leaseholders (73%) appear satisfied with their current heating/hot water arrangements.

Q2 Of those that expressed a specific opinion, the very large majority (62%) would opt for a wet radiator system if given the choice.

Q3 Of those that expressed a specific opinion, 97% would opt for their own individual heating source (i.e. not communal).

Q4 Of those that expressed a specific opinion, 90% confirmed that the running cost was the most important thing to them.

Q5 In drawing up any new scheme, tenants would also like the Council to consider overhauling the window seals, additional extract fans, wall insulation, heat emitters in every room, and the higher risk of leaks with wet radiators.

3 General Pros and Cons of Communal Provision

3.1 Irrespective of the final decision on which energy source should be used, it is important to consider the general differences between communal provision and individual provision. Appendix B summarises the pros and cons of moving away from individual provision to communal provision. In addition, the Appendix includes the added issues surrounding biomass specifically.

3.2 Moving to a communal heating system brings with it the following issues:-

a. The Council becomes an energy provider and needs to set a unit cost for the energy it provides. It will need to periodically review this rate and announce increases from time to time.

b. If the Council was to set a unit price for energy, it is inevitable that there will be some margin of error which means that there will be a difference between the cost of the energy it purchases for the communal boilers and the income received from the residents in the flats. The charge to residents would be based on their actual usage multiplied by the rate per unit that the Council set. Whilst every effort will be made to match income with expenditure, it is inevitable that there will be a limited surplus or deficit each year. Clearly officers would use this information to make better estimates for the following financial year. It would be best practice for this surplus or deficit to be taken into account when setting charges for the following year. With some natural turnover of tenancies it means that current tenants will benefit from, or be charged for, balances generated in earlier years. It would be completely impractical to issue retrospective refunds/bills.

c. The Council needs to collect income from its tenants. To avoid the need for new systems, arrears processes (including disconnection and court processes) and income eventually being lost through bad debts, it is considered that pre-payment meters would have to be installed. These are included in the costings (para. 4 onwards).

4 Options appraisal/ costing analysis

4.1 Ten options have been identified as possible alternatives for the replacement of the current electric night storage heaters for Winnall flats and are summarised within Appendices C, D, E & F. Appendix C summarises the technical information and Appendices D, E and F provide the financial detail. In order to undertake a financial appraisal, it has been necessary to make an assessment of the energy used by a "typical" tenant in one of these flats. This is based on industry standards for usage in this type of block for flats of this size. The actual usage by individual tenants will inevitably vary from this, so the savings achieved by individual tenants will also vary.

4.2 Two of the original identified options, Combined Heat and Power (CHP) and Anaerobic Digestion Plant (ADP), were discounted at an early stage and not included in the detailed financial assessment.

- CHP is a very good option where there is a constant base demand of heat and electricity so the site can benefit from the efficient generation of electricity and heat, such as a commercial site or a leisure centre swimming pool environment. The Flats at Winnall have a variable requirement of heating and electrical needs throughout the year, and whilst the electricity generated can be exported to the grid, the heat generated would be wasted when it is not required, rendering the CHP inefficient during the summer months.

- ADP is not generally considered suitable for installation near multi-storey domestic properties and is typically used in agricultural and rural areas where the waste is produced locally. The waste material used to generate the gas would be required to be delivered and stored locally to the flats. ADP is only used to produce the gas, and additional CHP plant is then required to burn the gas and produce heat and electricity for the flats. The same problems regarding the base loading apply with ADP and CHP.

Of the remaining ten options, four involved conventional new systems in individual flats whilst six involved different forms of communal heating. There is a substantial difference in the capital costs of each system. There are also significant differences in running costs for tenants, and some options would attract grant from the governments in the form of the Renewable Heat Incentive (RHI) (see CAB2358 (HSG) for detail on this).

4.4 Each of the options was evaluated against four different assumptions for energy demand and take-up. The base scenario was centred around the

current estimated demand for all the flats. The alternative scenarios assumed that:

a. No leaseholders would want to take part in any new heating provision because of the capital outlay they would need to meet. This makes no difference to the costs of the conventional options, but increases the unit costs for the communal options as there are fewer flats to meet the capital costs involved.

b. There is a 10% reduction in energy usage through a combination of efficiency measures and reduced demand.

c. There is a 20% reduction in energy usage through a combination of efficiency measures and reduced demand.

Appendix D shows the detailed assessment of the costs to tenants of each heating option under each scenario. It also highlights the difference in costs for each case compared to the assessment of current costs.

4.5 The first part of the financial appraisal was to examine the four conventional systems. This clearly showed that individual gas boilers would provide the greatest savings to tenants under all of the scenarios for take up and energy usage. If this option was accepted then the HRA would need to fund an estimated capital cost of £276,500 per block. There would also be an increase in revenue costs of approximately £3,000 per block pa.

4.6 The communal options all require a higher level of capital investment and incur higher annual revenue costs. It would therefore be appropriate for these additional costs to be included in the calculation of the costs to tenants under a communal system. The analysis shows that the only options that could provide a realistic alternative to individual gas boilers is a communal biomass system, fuelled by either wood chip or wood pellet,

4.7 A more detailed analysis was therefore undertaken of these 3 options. The communal biomass options both qualify for RHI grant. However, whilst it is possible to get an “in principle” agreement that the scheme will qualify for grant, the rate of grant is not fixed until the plant starts to operate. The Government has indicated that it does not intend to change current grant rates until April 2015 but it is always possible that a review could be brought forward if government expenditure in this area exceeds its budget.

4.8 The availability of RHI grant is significant because the biomass options are generally cheaper than individual gas boilers at current RHI grant levels. However, if there was no RHI available then individual gas boilers would be cheaper.

4.9 The graphs in Appendices E show the comparison of the anticipated savings compared to current costs from the 3 most viable options under the different energy usage scenarios.

5. Energy Company Obligation (ECO)

5.1. The Energy Company Obligation (ECO) will take over from the existing obligations, the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP). These existing obligations are due to end in December 2012 and the ECO will take over in addressing energy efficiency in the domestic sector.

5.2. Details of what this obligation will look like are yet to be confirmed. However, it is likely that this form of support will target the poorest and most vulnerable householders and those types of property (e.g. hard to treat) which cannot achieve financial savings without an additional or different measure of support.

5.3. Although officers have already confirmed their reluctance to cavity fill the walls at Winnall, some form of additional wall insulation remains a priority. The external walls of Winnall flats are deemed “hard to treat” under the ECO guidelines, due to their position and detailing, and officers are currently investigating options for support funding on this front. Officers are also investigating whether or not support funding can be obtained from one of the energy company partnerships for bringing a gas main (including all metering) into each of the blocks at Winnall.

6. Leaseholders

6.1. Leaseholders have purchased their flats under the Government’s right to buy initiative. Of the 156 flats in this scheme, 22 are owned by leaseholders.

6.2. Under the terms of the lease, leaseholders retain responsibility for the provision, maintenance and safe operation of the heating and hot water system within their flat. Even if there was a legal way of forcing leaseholders to take part in any new communal scheme, from a public relations perspective the Council would not want to do this.

6.3. Although any new communal proposal could be made available to leaseholders at an appropriate capital and revenue cost, the general response from the consultation exercise suggests that there would be little interest from leaseholders. Therefore, in assessing the viability of any new communal scheme, it should be assumed that there would be no leaseholder uptake. However, should any leaseholders wish to take advantage of the new heating system, it would be possible for this to be installed, subject to the leaseholder meeting the costs involved.

7. Procurement

7.1. Works of this magnitude would be deemed to be a “Service Contract”, and above the threshold in the Public Contracts Regulations. Therefore the Council is bound by law to follow EU procurement procedures in both the

procurement, assessment and awarding of this contract, unless the works are within the ambit of an existing contract that has been procured in accordance with the Regulations.

7.2. The contracts for installing individual gas boilers has recently been re-tendered and awarded in accordance with the Public Contracts regulations (CAB 2391 refers). If the decision is taken to replace the existing storage heaters with individual gas systems, then this work can be called off from those successful contractors (Liberty and Ray Williams) under these newly tendered contracts.

7.3. If the decision is taken to move away from individual provision, then the intention would be to follow the OJEU Restricted tendering procedure for the communal elements of the project. This is a two stage process where prospective tenderers register their interest in the works by returning a completed pre-qualification questionnaire (PQQ). The PQQ will allow officers to ensure that all those shortlisted, following the PQQ stage, are capable of fulfilling the service requirements. The contract would then be awarded to the shortlisted tenderer who submits the lowest sustainable price.

8. Programme

8.1. If the decision is taken to retain individual/self contained heating systems, then these works could form the start of next year's heating programme. Subject to the necessary infrastructure being in place by third parties, this could mean works starting on site as early as April 2013.

8.2. If a communal option is adopted, works are unlikely to start on site before next winter due to tender preparation and EU timescales (see Appendix G).

8.3. For either option, works on site are estimated to take 6 months.

9. Summary

9.1. In terms of looking at any new solutions, the salient findings from the detailed tenant consultation and financial appraisal exercises can be summarised as follows:-

a. In broad terms, approximately 2/3rds of tenants would like wet radiators as their heat emitters. The other 1/3rd would prefer to have dry heat emitters (i.e. either storage heaters or electric radiators).

b. Of those that expressed an opinion, 97% would prefer to have their own self- contained heat source within the flat.

c. Apart from communal biomass, individual gas boilers is the only option likely to bring appreciable savings to tenants in terms of running costs (i.e. lower energy bills). The difference in running costs between these two becomes negligible if either take-up, or energy demand, falls, (i.e. the

benefit reduces as RHI income is lost). Therefore, insulating the walls a later date would not prove cost-effective.

d. Moving to any form of communal provision brings with it substantially more risk to the Council. Consideration therefore needs to be given to whether the risks associated with a communal heating system are acceptable in view of the level of savings to tenants.

9.2. In addition to the standard risks mentioned in d. above, communal biomass brings with it additional risks and is only worthwhile if the Council accepts the RHI. If the Council is not prepared to take the RHI, individual gas boilers are the only option.

9.3. Woodchip is the cheaper overall of the two communal biomass options, but will require larger storage areas.

9.4. If the Council does not wish to get involved in communal provision, individual gas boilers are the only realistic option for reducing energy bills.

10. Conclusions

10.1. From a tenant and leaseholder perspective the message is clear - there is no appetite for any communal system, primarily because they would like to retain direct control of their running costs.

10.2. In terms of running costs to tenants, the financial appraisal has shown that estimated differences between communal biomass and individual gas boilers are not significantly different - and certainly not different enough to warrant taking on the additional risks associated with communal heating , and/or complaints from the primary users should the estimated savings not materialise.

10.3. If such a fundamental change is proposed (i.e. move from individual provision to communal provision and with it the loss of self-determination), the Council has to be absolutely certain that significant net benefits will follow - unfortunately, it is not possible to confirm that in this case.

10.4. If communal provision is therefore put to one side, only individual gas or electric systems are left as options.

OTHER CONSIDERATIONS:

11. SUSTAINABLE COMMUNITY STRATEGY AND CHANGE PLANS (RELEVANCE TO):

11.1 Replacing existing heating systems, which are inefficient and expensive for tenants to run, supports the Council key priority of improving the quality of life for its residents.

12. RESOURCE IMPLICATIONS:

12.1 Provision (£200k) had originally been ear-marked within this year's programme to make a start at Winnall Flats. These works will not now start before next April, so other heating schemes have been brought forward and worked up to backfill this year's programme.

12.2 The estimated cost of the recommended option is £1,106,000. This expenditure can be met from the capital budget for planned improvements for 2013/14. It should be noted however, that this scheme would utilise the majority of the heating element of this budget. On the basis that the Committee agree to the recommended option, it is proposed that this capital expenditure is recommended to Cabinet for approval under Financial Procedure Rule 6.4. It is also recommended the additional revenue cost of £12,000 pa be approved for inclusion in the detailed revenue estimates for 2013/14 and longer term HRA business plan.

13. RISK MANAGEMENT ISSUES

13.1 As contained within the body of the report.

14 TACT COMMENT

14.1 TACT supports these proposals and is particularly pleased to note the Council has supported the views of tenants. We were delighted to know that these properties are going to get what is so sorely needed.

APPENDICES:

Appendix A - Tenant consultation – main summary.

Appendix B - Summary - Pros and cons of communal provision

Appendix C - Technologies appraisal

Appendix D – Assessment of the change in heating costs to tenants of the different options

Appendix E 1 - Graph of the estimated annual energy savings for a "typical" tenant of the 3 most viable options with the Council taking the RHI risk

Appendix E 2 - Graph of the estimated annual energy savings for a "typical" tenant of the 3 most viable option with no RHI income for the Council.

Appendix F - Capital Costs

Appendix G - Programme (for Communal option)

Summary of Winnall Heating Feedback (WCC tenant figures are in bold)

	Nos.	%
Total Tenants	156 (**134** / 22)	100% **(86%**/16%)
Questionnaires returned	106 (**92** / 14)	68% **(69%**/64%)

Qu. 1 - How satisfied are you with your current heating arrangements ? (see Appendix B for reasons)

Dissatisfied	Satisfied	Both/mixed view	Blank	Totals
76	25	3	2	106
73 / 3	**15** / 10	**3** / 0	**1** / 1	**92** / 14
72%	24%	3%	1%	100%
80% / 21%	**16%** / 72%	**3%** / 0%	**1%** / 7%	**100%** / 100%

Qu.2 - If the Council were to change your heating and hot water system, could you please confirm your preference from one of the following (see Appendix C for reasons)

Electric Storage Heaters	Electric Radiators	Traditional Radiators	Unconcerned	Totals
15	22	60	9	106
13 / 2	**21** / 1	**54** / 6	**4** / 5	**92** / 14
14%	21%	57%	8%	100%
14% / 14%	**23%** / 7%	**59% /** 43%	**4%** / 36%	**100%** / 100%

Qu. 3 - Traditional water filled radiators can be heated either locally (i.e. via a domestic boiler within your own flat) or centrally, from a much larger boiler located in a separate boiler house (i.e. one boiler heating the whole of the block – all 39 flats). If you can accurately control the amount of heat and hot water that you use, and you are only charged for the heat and hot water that you use, could you please confirm your preference from one of the following :-

Own Boiler	Central Boiler	Don`t mind	Blank	Totals
62	2	31	11	106
60 / 2	**1** / 1	**24** / 7	**7** / 4	**92** / 14
59%	2%	29%	10%	100%
65% / 14%	**1%** / 7%	**26%** / 50%	**8% /** 29%	**100%** / 100%

Qu. 4 - If new boilers were fitted, please rate the following in order of importance to you :-

	1 (most important)	Number 2	Number 3	4 (least important)
The running cost to the tenant ?	83 (**74**/ 9)	8 (**6** / 2)	0 (**0** / 0)	2 (**2** / 0)
The type of fuel it uses ?	4 (**3** / 1)	44 (**40** / 4)	30 (**28** / 2)	4 (**2** / 2)
How environmentally friendly it is '	4 (**3** / 1)	29 (**27** / 2)	47 (**41** / 6)	2 (**1** / 1)
Other (control heating ourselves)	1 (**1** / 0)			
Other (how effective it is)		1 (**1** / 0)		
Other (installation cost to us)		1 (**0** / 1)		
Other (reliability)		1 (**0** / 1)		
Other (how it is monitored)			1 (**0** / 1)	
Other (if it can be controlled by thermostat)			1 (**1** / 0)	
Other (sustainability)			1 (**0** / 1)	
Other (easy maintenance)				1 (**0** / 1)
Other (but nothing specified)			1 (**1** / 0)	27 (**27** / 0)
Blank	14 (**11** / 3)	22 (**18** / 4)	25 (**21** / 4)	70 (**60** / 10)
Totals	106 (**92** / 14)	106 (**92** / 14)	106 (**92** / 14)	106 (**92** / 14)

Qu. 5 - Is there anything else you would like the Council to consider when drawing up the scheme ? (see App D)

Pros and Cons (risks) of Communal provision (irrespective of energy source)

Pros	Cons/risks
Less servicing/ maintainance issues	**Council becomes energy provider and will need to set unit rates**
	How surpluses/deficits are managed (can be mitigated by "Pay as you go" metering but costly to install + ongoing annual management charge)
	Recovery of costs from tenants/bad debts (can be mitigated by "Pay as you go" metering but costly to install + ongoing annual management charge)
	Inherent perception from tenants that they are paying an unfair share (can be mitigated by "Pay as you go" metering but costly to install + ongoing annual management charge)
	Planning permission for external plant/fuel storage rooms
	Tenant issues with location of external boiler/fuel storage rooms
	Loss of tenant independence/self determination
	Tenant choice of utility supplier removed
	Tenant choice of heating type removed
	Separate billing systems (can be mitigated by "Pay as you go" metering but costly to install + ongoing annual management charge)

Extra over above, for biomass solution

Pros	Cons/risks
Sustainable/ renewable fuel source	**Security of supply**
Lower emissions	**Additional storage space for pellets/chippings**
Capital grants (RHI)	**Council would need to take the RHI risk (and therefore also provide the upfront capital funding) to make this option worthwhile**
	Unpredictability of RHI grant levels
	Impact on RHI of reduced demand (eg if we externally insulate the walls at a later date)

Winnal Heating Technologies Appraisal

Appendix F

	Option	Est Capital to WCC per Block	Externally funded Capital Per Block	Annual Revenue Cost to WCC	Estimated Annual Energy Demand	Potential Energy Efficiency	Estimated Annual Energy Consumption	Energy Cost	Typical p.a. Running costs to Residents	Potential Running Cost Reduction compared with existing heating system	Additional RHI Payment	Carbon Emission Associated with Energy Consumption	Potential Carbon Reduction compared with existing heating system	Potential Carbon Reduction compared with existing heating system	Simple Payback	HG Notes and Comments		
		£	£	£/annum	kWh/annum	%	kWh/annum	£/kWh	£/annum	£/annum	£/annum	$kgCO_2$/annum	$kgCO_2$/annum	tonnes/annum	Years	Installation Issues	Benefits	Disadvantages
0	Existing Electric Night Storage Heaters	N/A	N/A	N/A	340000	75%	453333	0.046	£20,853	£0	Not available	234373	0	0	N/A	Existing System	No works required	High running costs. Disliked by residents
1	Individual new storage heaters with better controls facilities	£100,000	None	None	340000	75%	453333	0.046	£20,853	£0	Not available	234373	0	0	Not available	Upgrade of the existing electrical supplies might be required	Individual Control. Use of night time tariff. Low installation Cost.	Inflexible, expensive to run and difficult to control.
2	Individual electric radiators	£60,000	None	None	340000	100%	340000	0.137	£46,580	-£25,727	Not available	175780	58593	59	Not available	Upgrade of the existing electrical supplies might be required	Individual Control. Low installation Cost.	Very expensive to run due to high cost of electricity.
3	Individual electric boilers	£198,000	None	None	340000	100%	340000	0.137	£46,580	-£25,727	Not available	175780	58593	59	Not available	Upgrade of the existing electrical supplies. Wet heating system including radiators and heating pipework required.	Individual Control.	Very expensive to run due to high cost of electricity.
4	Individual gas boilers	£276,500	None	£3k	340000	92%	369565	0.041	£15,152	£5,701	Not available	73174	161199	161	Not available	Gas infrastructure required to site and to each flat. Wet heating system including radiators, heating pipework and new boilers required.	Individual Control. Heating and hot water (if required) on demand. Very good efficiency.	High installation cost due to lack of gas infrastructure as well as the lack of wet heating system in each flat. Rising gas prices.
5	Communal gas boiler	£331,694	None	5095	340000	87%	390805	0.041	£16,023	£4,830	Not available	77379	156994	157	Not available	Gas infrastructure required to main plantroom. Plantroom space to accommodate the new boilers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	One location for plant, fairly good efficiency.	All flats relay on one source of heating. Rising gas prices.
6	Communal oil fired boiler	£311,694	None	5095	340000	80%	425000	0.06	£25,500	-£4,647	Not available	126225	108148	108	Not available	Oil storage required. Plantroom to accommodate the new boilers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site. One location for plant.	Low efficiency, oil deliveries required. Cost of oil fairly high. Dirty due to heating oil required and not very environmentally friendly.
7	Communal biomass boilers. Wood Chip	£411,694	£170k For boilers	5095	340000	80%	425000	0.032	£13,600	£7,253	£15,980	5525	228848	229	18	Plantroom to accommodate the new biomass boilers c/w buffer vessel and associated fuel feed system and ash removal system required. Fuel store room required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	Low carbon Emission. Income form feed in tariffs. Sustainable technology if local fuel supplies available.	Plantroom and fuel storage space required. Fuel Deliveries. Planning permission associated with the flue. Fairly high capital cost.
8	Communal biomass boilers. Wood Pellet	£391,694	£150k For boilers	5095	340000	80%	425000	0.042	£17,850	£3,003	£15,980	5525	228848	229	21	Plantroom to accommodate the new biomass boilers c/w buffer vessel and associated fuel feed system and ash removal system required. Fuel store room required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site. Low carbon Emission. Income form feed in tariffs. Sustainable technology if local fuel supplies available.	Plantroom and fuel storage space required. Fuel Deliveries. Planning permission associated with the flue. Fairly high capital cost.
9	Communal air source heat pump	£491,694	None	6095	340000	300%	113333	0.137	£15,527	£5,327	Not available	58593	175780	176	Not available	External space required to accommodate the external air source heat pumps. Plantroom to accommodate the new heat exchangers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site.	Effciency decreases in colder weather
10	Communal ground source heat pump	£741,694	£250k for heating plant	6095	340000	350%	97143	0.137	£13,309	£7,545	£10,200	50223	184150	184	42	Ground space required to accommodate the bore holes. Approximately 48 boreholes has been used for similar size of installation, all spaced 10 meters apart. Plantroom required to accommodate the new heat exchangers and associated equipment required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site.	Suitable highly insulated, well performing buildings with low grade heating system installation like underfloor or low temperature radiators which are normally double the size of standard radiators for traditional heating system.
11	Combined Heat and Power Plant (CHP)	£531,694	£30K for centralised plant room utility	5595	340000	50%	680000	0.041	£27,880	-£7,027	Not available	134640	99733	100	Not available	Base Load Required to ensure the energy efficient use od CHP plant. Figures based on assumption that the base load is available and CHP can generate all the electricity required to cover the block demand	On site Electricity generation and associated reduced electricity cost. Reduction in CO2	Efficient to run, possible noise issue, could be more suitable to an industrial application. External funding only available if Biomass CHP is used.
					195000	30%	650000	0.137	-£26,715	-£26,715			103155	103				
12	Anaerobic Digestion Plant	Not Viable.	?????	?????	340000	90%	377778	0	£0	£20,853	£22,100	112200	122173	122	Not available	Large plantroom space required to accommodate the anaerobic digester which only produces gas which then need to be converted to heating using biogas boiler or similar. Store to accommodate the waste required for gas production.	Not viable.	Very expensive. Delivery of the material required for anaerobic digestion if not available on site. Storage space required to Lots of space required to accommodate the plant generating gas and associated heating plant. There are no commercially available system that have been applied to any commercial or residential buildings in UK. Usually used on site where the material is available. The small plant capable of generating 15 kW cost approximately £250,000.

RHI Payments			
Biomass			
Boiler Plant	300	kWh	
Tier Break	1314	hrs	
	394200	kWh	
Tier 1 Payment	4.7	p/kWh	up to Tier Break

Daily energy demand consumption - Per flat				
kW/m2 of flat	m2/flat	kW	weeks/annum	days/week
0.1	75	7.5	26	7
kwh/block/annum	kwh/flat/annum	hour/annum	hours/week	hors per day
340000	8717.9	1162.4	44.7	6.4

Tier 2 Payment	1.9	p/kWh	above Tier Break
GSHP			
Payment	3	p/kWh	
Anaerobic Digestion			
Payment	6.5	p/kWh	

The heat loss calculation need to be carried out to ensure that the Biomass boiler is sized correctly to ensure the optimum capital costs and benefits from RHI.

Number of hours per year has been calculated dividing the annual energy consumption in kWh/flat /annum by total heat load of 7.5kW

Unit Fuel Prices and CO2 Emission data

	Fuel Prices	CO_2 Emission
	£/kWh	kgCO_2/kWh
Gas	0.041	0.198
Electricity	0.137	0.517
Night time Electricity	0.046	0.517
Displaced Electricity	0	0.529
Wood Chip	0.032	0.013
Wood Pellet	0.05	0.013
Biogas	0	0.018
Oil	0.06	0.297

Estimated Annual Energy demand has been calculated based on the annual gas consumption by the purpose built flat based on the Energy Summary Report prepared by BRE. The efficiency of the gas boiler of 85% and 78% of energy consumed by heating and 22% consumed by Hot Water.

Estimated Annual Energy demand

BRE published data for annual gas consumption in purpose built flat	Boiler Efficiency	Percentage of heating against the hot water. CIBSE Guide F	Heating energy demand	No of flats	Total Heating energy demand for block
kWh/annum	%	%	kWh/annum	-	kWh/annum
13000	85%	78%	8619	39	336141

Communal Plant Sizing Calculations (estimate)

Average heat loss for properties built in 1960	Size of flat from the drawing	No of flats	Estimated plant size required
W/m^2	m^2	-	kW
100	75	39	292.5

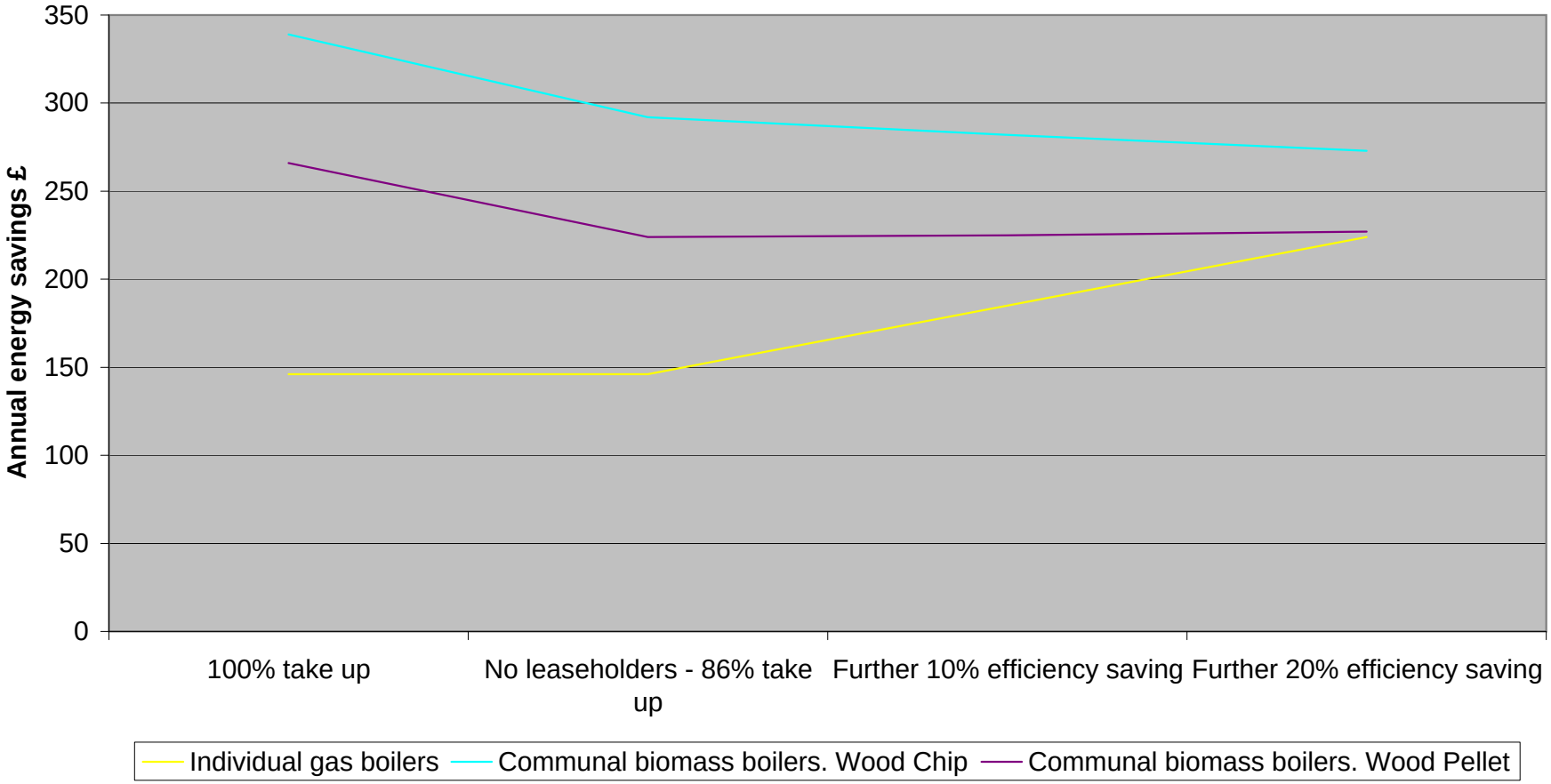
Winnal Heating Technologies Appraisal

	Option	Estimated Annual Energy Demand	Potential Energy Efficiency	Estimated Annual Energy Consumption	Energy Cost	Carbon Emission Associated with Energy Consumption	Potential Carbon Reduction compared with existing heating system	Potential Carbon Reduction compared with existing heating system	HG Notes and Comments		
		kWh/annum	%	kWh/annum	£/kWh	$kgCO_2$/annum	$kgCO_2$/annum	tonnes/annum	Installation Issues	Benefits	Disadvantages
0	Existing Electric Night Storage Heaters	340000	75%	453333	0.046	234373	0	**0**	Existing System	No works required	High running costs. Disliked by residents
1	Individual new storage heaters with better controls facilities	340000	75%	453333	0.046	234373	0	**0**	Upgrade of the existing electrical supplies might be required	Individual Control. Use of night time tariff. Low installation Cost.	Inflexible, expensive to run and difficult to control.
2	Individual electric radiators	340000	100%	340000	0.137	175780	58593	**59**	Upgrade of the existing electrical supplies might be required	Individual Control. Low installation Cost.	Very expensive to run due to high cost of electricity.
3	Individual electric boilers	340000	100%	340000	0.137	175780	58593	**59**	Upgrade of the existing electrical supplies. Wet heating system including radiators and heating pipework required.	Individual Control.	Very expensive to run due to high cost of electricity.
4	Individual gas boilers	340000	92%	369565	0.041	73174	161199	**161**	Gas Infrastructure required to site and to each flat. Wet heating system including radiators, heating pipework and new boilers required.	Individual Control. Heating and hot water (if required) on demand. Very good efficiency.	High installation cost due to lack of gas infrastructure as well as the lack of wet heating system in each flat. Rising gas prices.
5	Communal gas boiler	340000	87%	390805	0.041	77379	156994	**157**	Gas Infrastructure required to main plantroom. Plantroom space to accommodate the new boilers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	One location for plant, fairly good efficiency.	All flats relay on one source of heating. Rising gas prices.
6	Communal oil fired boiler	340000	80%	425000	0.06	126225	108148	**108**	Oil storage required. Plantroom to accommodate the new boilers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site. One location for plant.	Low efficiency, oil deliveries required. Cost of oil fairly high. Dirty due to heating oil required and not very environmentally friendly.
7	Communal biomass boilers. Wood Chip	340000	80%	425000	0.032	5525	228848	**229**	Plantroom to accommodate the new biomass boilers c/w buffer vessel and associated fuel feed system and ash removal system required. Fuel store room required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	Low carbon Emission. Income form feed in tariffs. Sustainable technology if local fuel supplies available.	Plantroom and fuel storage space required. Fuel Deliveries. Planning permission associated with the flue. Fairly high capital cost.
8	Communal biomass boilers. Wood Pellet	340000	80%	425000	0.042	5525	228848	**229**	Plantroom to accommodate the new biomass boilers c/w buffer vessel and associated fuel feed system and ash removal system required. Fuel store room required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site. Low carbon Emission. Income form feed in tariffs. Sustainable technology if local fuel supplies available.	Plantroom and fuel storage space required. Fuel Deliveries. Planning permission associated with the flue. Fairly high capital cost.
9	Communal air source heat pump	340000	300%	113333	0.137	58593	175780	**176**	External space required to accommodate the external air source heat pumps. Plantroom to accommodate the new heat exchangers required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site.	Effciency decreases in colder weather
10	Communal ground source heat pump	340000	350%	97143	0.137	50223	184150	**184**	Ground space required to accommodate the bore holes. Approximately 48 boreholes has been used for similar size of installation, all spaced 10 meters apart. Plantroom required to accommodate the new heat exchangers and associated equipment required. District heating and metering system required. Wet heating system including radiators and heating pipework required within each flat.	No gas required to the site.	Suitable highly insulated, well performing buildings with low grade heating system installation like underfloor or low temperature radiators which are normally double the size of standard radiators for traditional heating system.

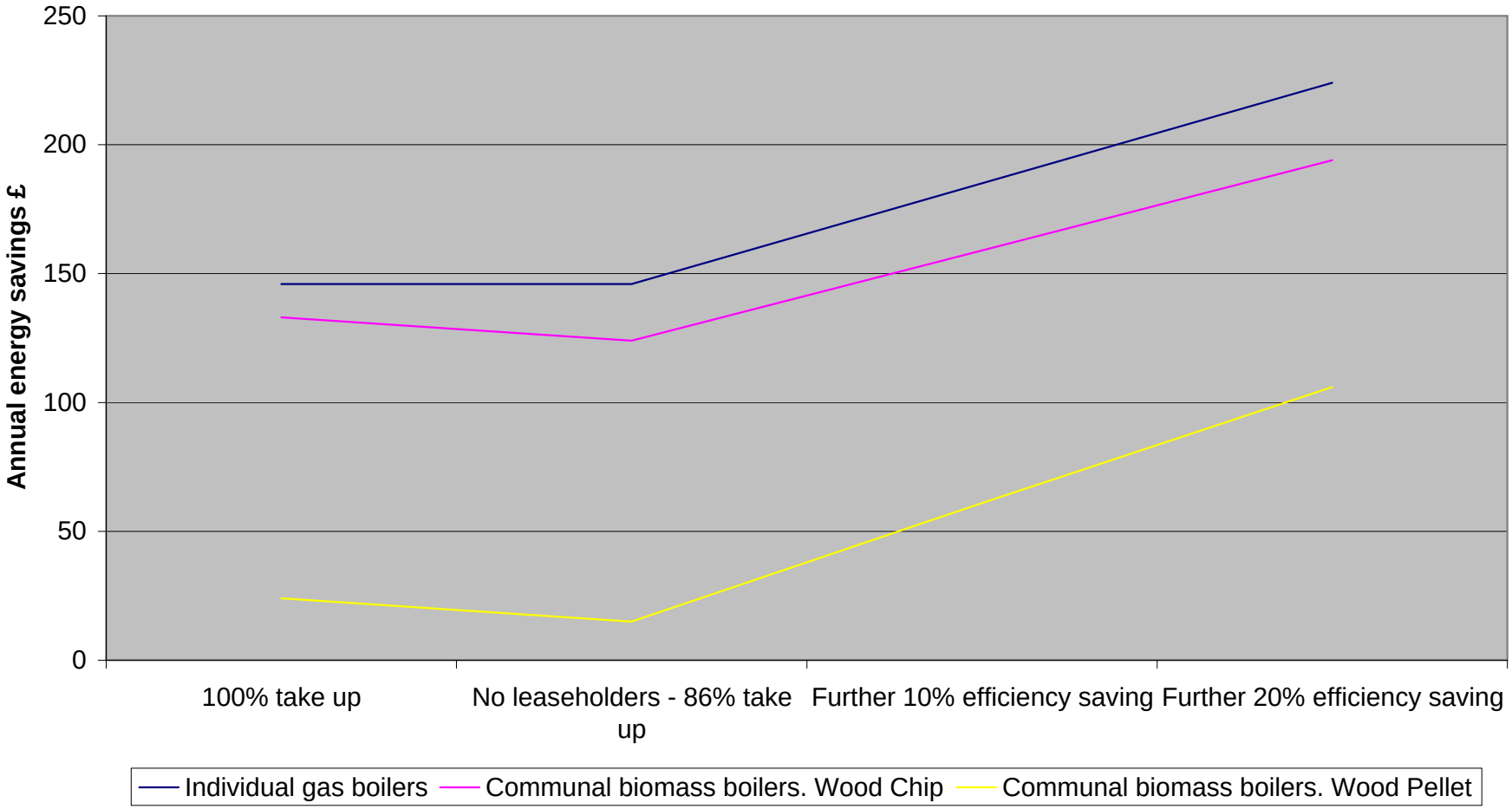
ASSESSMENT OF CHANGE IN HEATING COSTS TO TENANTS OF DIFFERENT OPTIONS

		Include RHI at current rates				No RHI received by Council			
		100% take up	No leaseholders - 86% take up	Further 10% efficiency saving	Further 20% efficiency saving	100% take up	No leaseholders - 86% take up	Further 10% efficiency saving	Further 20% efficiency saving
	Annual heating cost per flat								
0	Existing Electric Night Storage Heaters	535	535	481	428	535	535	481	428
1	Individual new storage heaters with better controls facilities	535	535	481	428	535	535	481	428
2	Individual electric radiators	1,194	1,194	1,075	955	1,194	1,194	1,075	955
3	Individual electric boilers	1,194	1,194	1,075	955	1,194	1,194	1,075	955
4	Individual gas boilers	389	389	350	311	389	389	350	311
5	Communal gas boiler	562	586	545	504	562	586	545	504
6	Communal oil fired boiler	769	788	723	658	769	788	723	658
7	Communal biomass boilers. Wood Chip	196	243	253	262	402	411	376	341
8	Communal biomass boilers. Wood Pellet	269	311	310	308	511	520	474	429
9	Communal air source heat pump	856	930	891	851	856	930	891	851
10	Communal ground source heat pump	942	1,088	1,084	1,079	942	1,088	1,084	1,079
	Change in annual heating costs per flat								
0	Existing Electric Night Storage Heaters	0	0	-54	-107	0	0	-54	-107
1	Individual new storage heaters with better controls facilities	0	0	-54	-107	0	0	-54	-107
2	Individual electric radiators	659	659	540	420	659	659	540	420
3	Individual electric boilers	659	659	540	420	659	659	540	420
4	Individual gas boilers	-146	-146	-185	-224	-146	-146	-185	-224
5	Communal gas boiler	27	51	10	-31	27	51	10	-31
6	Communal oil fired boiler	234	253	188	123	234	253	188	123
7	Communal biomass boilers. Wood Chip	-339	-292	-282	-273	-133	-124	-159	-194
8	Communal biomass boilers. Wood Pellet	-266	-224	-225	-227	-24	-15	-61	-106
9	Communal air source heat pump	321	395	356	316	321	395	356	316
10	Communal ground source heat pump	407	553	549	544	407	553	549	544

Annual energy savings for tenants. Council takes RHI risk in Heating Account



Annual energy savings to tenants - No RHI.



Capital Costs

Option		Main Plant and associated equipment	Gas supply to the site	Htg Risers	Radiators and Heating pipework installation in flats	"Pay As You Go" Metering equipment Costs	Individual Gas boilers installation in flats	Gas installation to flats	Cost Of individual Electric Heaters	Individual Electric Boilers	Upgrade of electrical Installation	Total Estimated Cost
		£	£	£	£		£	£	£	£	£	£
0	Existing Electric Night Storage Heaters	-	-	-	-		-	-	-	-	-	£0
1	Individual storage heaters	-	-	-	-		-	-	£100,000	-	TBC	£100,000
2	Individual electric radiators	-	-	-	-		-	-	£60,000	-	TBC	£60,000
3	Individual electric boilers	-	-	-	£78,000		-	-	-	£120,000	TBC	£198,000
4	Individual gas boilers	-	£40,000	-	£78,000		£58,500	£100,000	-	-	-	£276,500
5	Communal gas boiler	£50,000	£40,000	£80,000	£78,000	£83,694	-	-	-	-	-	£331,694
6	Communal oil fired boiler	£70,000	-	£80,000	£78,000	£83,694	-	-	-	-	-	£311,694
7	Communal biomass boilers. Wood Chip	£170,000	-	£80,000	£78,000	£83,694	-	-	-	-	-	£411,694
8	Communal biomass boilers. Wood Pellet	£150,000	-	£80,000	£78,000	£83,694	-	-	-	-	-	£391,694
9	Communal air source heat pump	£250,000	-	£80,000	£78,000	£83,694	-	-	-	-	TBC	£491,694
10	Communal ground source heat pump	£500,000	-	£80,000	£78,000	£83,694	-	-	-	-	-	£741,694

Winnal Flats - Programme for communal provision - 2012/13/14