Additional Agenda Item 6d

Review of Community Heating Schemes

For Bernselai Homes

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1 Introduction

This report has been prepared by the engineering and architectural team at Leeds Environmental Design Associates for Bernselai Homes and covers 24 housing schemes in the Barnsley area which have communal or small scale district heating systems.

It looks at specific issues in relation to the schemes and these are dealt with in sequence in the body of the report. Data used in this report has been compiled from various figures and spreadsheets provided by Berneslai Homes along with information gathered from the sites. We have also used anonymised data provided to us by the heat metering company EnerG on heat used in properties.

2 Assessment of Communal/non dwelling Areas

2.1 Methodology.

A variety of methods ware used to determine the volumes of heated communal spaces and the total dwelling volumes on each scheme. For schemes with terraces of bungalows, houses and/or 2 storey flats, a combination of on-site measurements and use of Ordinance Survey maps were used. Where fire plans were available for the blocks of flats these were imported into CAD software and on-site check measurements used to ensure the correct scale. For the five recent Ground Source Heat Pump schemes we were able to make use of the CAD design drawings which we previously produced.

Inevitably there will be minor inaccuracies in the calculations but we expect our results to have a tolerance of less than +/- 5%, and this would have minimal impact on the final percentage figure (+/- 1%)

The relative heat-losses from communal areas will differ from scheme to scheme. For example a scheme which mainly has internal corridors for communal circulation will have less communal heat loss than one with glazed corridors on the external perimeter. Where thought relevant we have added notes to the table below to highlight this.

2.2 Table of results

SCHEME	TENANT AREA (m2)	COMMUNAL AREA (m2)	COMMUNAL AREA % OF TOTAL	COMMENTS
Gray Street	2,252	377	14%	Offices over community centre
Kirk View	2,241	377	14%	Offices over community centre
Glebe Court	4,040	1835	31%	Corridors mostly internal (low heat losses)
Heather Court	11,755	1802	13%	School linked to system (on own heat-meter)
Marston Crescent		No communal areas		
Sunrise Manor	2,142	391	15%	Community centre & flat above
King Street	4,543	1568	26%	
Aldam Farm/Hudsons Haven	5,590	2870	34%	Corridors have large area of external walls & windows
Hawthorne House	4172	250	6%	
The Avenues		No communal areas		Tenants Assoc. room has own gas boiler
Honeywell Close	5,985	566	12%	
Rose Tree Ave	336	7,905	4%	Community centre

Milefield Court		No communal areas		
Parkside	2,499	409	14%	Community centre & flat above
Pollyfox	7,650	441	5%	
Elm Court	3,993	336	8%	Flat above community rooms (metered?)
Maltas Court	4,642	558	11%	Community room & offices
Union Street Flats		0		Unheated corridors and stairwells
Saville Court	1,460	1,283	47%	
Churchfield Close	2,145	1,236	37%	
Church St Thurnscoe	3,269	582	15%	Mainly internal corridors
Woodhall Flats	2,166	1,454	40%	Internal corridors & large communal lounge
Willowcroft	3,499	1,544	31%	Mainly internal corridors
Pendon House	4,110	2267	36%	

3 Schemes Where Income is Significantly less than Costs

The following schemes were examined for this section of the review:

Scheme	Boiler Type	Scheme Type
Glebe Court	Gas	Centralised hot-water provision
Gray Street	Gas	Centralised hot-water provision
Kirk View	Gas	Older system to terraces of 2 story flats
Hudsons Haven/ Aldham Farm	Biomass	Central block of flats and terraces of bungalows
Marston Crescent	Biomass	Larger scheme of flats and houses
Heather Court	Biomass	2 storey block of flats & terraced houses
King Street	Biomass	Central block of flats with two smaller blocks
Sunrise Manor	GSHP	Terraces of bungalows with central community centre. Centralised hot-water provision

3.1 General Considerations

Whilst three of these schemes are biomass, the efficiency of the biomass boiler plant should not be a factor as far as costs are concerned as payments to the biomass supplier are for heat delivered rather than wood-chip used. The discrepancy between heat produced and heat paid for on these schemes is thus between the heat meter(s) in the boiler room and the heat meters in the dwellings. Assuming meters are accurate (and not tampered with) this means that the measured difference between heat produced and heat paid-for is entirely due to distribution losses.

For the non-biomass schemes where gas is metered in the boiler room, boiler plant efficiency is an issue and this is looked at in the analysis below.

When looking at the percentage of heat lost annually through pipework distribution losses, one consideration is whether tenants use as much heat as would be expected from typical use. If tenants are reluctant to use their heating because they find the costs too high, the percentage of total heat produced that gets lost in the distribution pipes increases. One way of examining this is to look at expected use for heating on the Energy Performance Certificates for sample properties and comparing this with metered usage. Taking Marston Crescent as an example we see that heat use is only 62% of that expected on the EPC's. The records of heat consumption show that this has been reducing across most of the sites over the last three years as the unit cost of heat has risen.

3.2 Scheme by Scheme Review

3.2.1 Glebe Court

This is a gas fired installation with centralised hot-water provided by direct fired water heaters. The heating boilers have a condensing lead boiler and non-condensing second boiler, and the pumps are inverter driven. Pipework in the boiler house and in a sample roof void was checked and found to be well insulated. In addition the communal corridors are mainly internal so even though the percentage of communal areas is high this will not be the primary reason for poor financial performance.

One suspected reason for the high unit recovery cost on this scheme is the unusually low metered kWh recorded by Switch 2 for tenant usage. A sample EPC for Glebe Court indicates an expected annual consumption of 1931kWh for heating, so expected use for all 35 properties is around 67,585 kWh. This compared with recorded metered consumption of 25,373 kWh. The total metered heat consumption has also dropped by 36% over the last three years.

Hot-water consumption is not metered but the analysis carried for section 5 of this report indicates that the income from the fixed charge to tenants does not cover the fuel costs for delivering hot-water..

Key Issues

- *Hot water not metered & fixed charge does not cover costs*
- *Low demand for heat*

3.2.2 Gray Street

Gray Street consists of a common building with flat above and basement plant room, with small terraces of bungalows on three sides.

The common room was also warm in spite of the radiator valves all being set to 0 or * setting. The heat must be rising up through the floor.

The boiler house installation is relatively old, with two Ideal Concord conventional open flue gas boilers supplying the heating and feeding a horizontal calorifier. One of the heating circulating pumps is a new inverter variable speed type, the other three are standard fixed speed. The plant room was very warm at time of visit. The plant is set up in a traditional way with plant constantly on and with constant flows, and all the equipment and pipework is kept hot or warm at all times. There are quite a number of un-insulated sections of pipework, flanges and valves.

The horizontal hot water calorifier is approximately 2000-3000 litres with an alu-clad insulation. This feeds out to circa. 40yrs old (copper or galvanised steel)underground to the bungalows. The routes of this pipework were not discernible, however pipework of this age will be poorly insulated by modern standards. A reason this pipework will be surviving and has not been replaced is because it has not corroded like the heating pipework will have done.

Pipework to the bungalows is a modern “Duo” system where two carrier pipes are contained in one pre-insulated outer sheaf, these types of pipe have overall less heatloss than single carrier pipe systems, but the flow does tend to warm the return if there is a large difference. These duo pipes distribute underground to the ends of each terrace and rise up in external brick risers and then feed each bungalow internally. It was not possible to inspect the pipework in the bungalows. The pipework is thought to be Uponor and has the least effective insulation type for underground pipework.

Key Issues

- *Inefficient boiler plant*
- *High heat losses from plant room.*
- *Low demand for heat*
- *Hot water not metered*

3.2.3 Kirk View

Kirk View is comprised of a central detached common room with flat above and boiler room basement. Two terraces of flats flank the common room building on either side and these are made up of 10 flats each on two levels with a common ramp and stairs to the upper levels and external walk ways.

The common room was also warm in spite of the radiator valves all being set to 0 or * setting. The heat must be rising up through the floor.

The boiler house installation is relatively old, with two Dietrich conventional open flue gas boilers supplying the heating and feeding a large poorly insulated horizontal calorifier. Circulating pumps are fixed speed (not inverter controlled). The plant is set up in a traditional way with plant constantly on and with constant flows, and all the equipment and pipework is kept hot or warm at all times. The valves and flanges are lagged with insulated jackets that are mostly in place.

The horizontal hot water calorifier is approximately 2000-3000 litres with a soft depressed insulation jacket. This feeds out to circa. 40yrs old (copper or galvanised steel) underground to the terraces. The routes of this pipework were not discernible, however pipework of this age will be poorly insulated by modern standards. A possible reason this water pipework will be surviving and has not been replaced is because it has not corroded as quickly as the heating pipework will have done.

Pipework to the bungalows uses pre-insulated pipework that runs underground to the ends of each terrace and rises up in external brick risers and then run along exposed under the walkway with branches to each pair of flats. The underground pipework is thought to be Uponor and has the least effective insulation type for underground pipework. The exposed pipework to the blocks of flats, where visible has only 20mm mineral fibre insulation, and there is a considerable amount of external above-ground pipework.

The metered heat consumption by tenants at Kirk View has dropped by 44% between 2012/13 and 2014/15.

Key Issues

- *Poorly insulated external pipework*
- *Inefficient boiler plant*
- *Low demand for heat*

3.2.4 Hudsons Haven / Aldham Farm

Hudsons Haven and Aldham Farm consists of a 2 story sheltered accommodation building (Hudson's Haven) with a number of flats off common internal corridors. Surrounding the main building are a number of short terraces of bungalows. All of these are served from the plant room attached to Hudson's Haven.

In the plant room are gas and biomass boilers. The two 150kW KWB biomass boilers are older than the other installations surveyed and we understand these boilers have been out of action for a considerable time over the last two years. There is no buffer vessel on the biomass installation and the heat-meters are connected to the boiler flow and return. At the time of our visit one biomass boiler was not operational, although hot water was circulating through it resulting in unnecessary heat losses. The two gas back-up boilers are also fairly old conventional gas-fired boilers (Hartley & Sugden 2 x 200kW). Heating circulating pumps are fixed speed (not inverter controlled). Recorded gas consumption for 2013/14 & 2014/15 is high for a biomass site and we presume this is due to biomass boiler downtime and undersized biomass boilers. (The total floor area of 8,460 is likely to have a design heat-loss of over 500kW.)

The estate of bungalows fed by the heating system covers a wide area and although the distribution pipework is pre-insulated, the tee connections in inspection chambers are not insulated and the pipework in these manholes was not buried. The un-insulated pipework and valves will be losing unnecessary heat to the surrounding damp soil and air that also results in condensation on the cooler manhole lids. Within the main building the communal areas have a high percentage of external exposure and we noted that the upper corridor ceiling void was not insulated.

Key Issues

- *Long runs of external pipework*
- *Faulty boiler plant – high gas use*
- *High percentage of communal area*
- *Low demand for heat*

3.2.5 Marston Crescent

64 flats and 12 houses and 16 unmetered properties

Marston Crescent is an interesting scheme to analyse in detail as it has measured heat-output from the boiler house and no communal areas, so the distribution heat-losses can be accurately measured.

The single 840kW Binder biomass boiler is presumably sized to meet a theoretical peak demand and will tend to operate inefficiently as part load. However the issue being examined is the discrepancy between the metered heat from the boiler house and the heat purchased by tenants, so boiler plant efficiency is not a key issue.

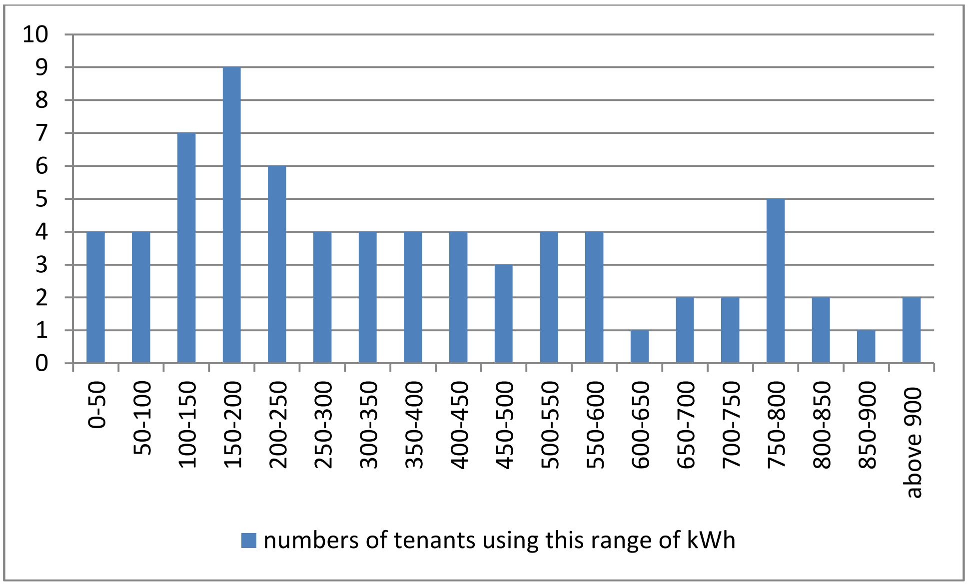
Estimated heat delivered from boiler house 2014/15:	947000 kWh
Metered heat consumption from dwellings	270454
Estimated heat used by unmetered properties:	71172
Heat lost through distribution losses	605374

Even though the properties are widely distributed across the scheme, this figure is considerably greater than expected. We were not able to ascertain the quality of insulation on underground pipework but pipes running up the gable walls and within roof voids are insulated with 25mm wall thickness mineral wool and we understand underground pipes are plastic pre-insulated type.

Sample EPC's for a typical house and flat at Marston Crescent were used to see whether tenants are using as much fuel as is expected from the certificate calculations and the results are shown below:

	Flat	House	Total for 12 houses and 64 flats
EPC predicted heating use	2822	5297	
EPC predicted hot-water use	2430	2800	
EPC total predicted heat use	5252	8097	**433292**
EnerG metered total			**270454**

This implies that tenants are using considerably less heat than the EPC's predict and one reason for this might be the current cost of heat. It is worth noting that metered energy use for this site has decreased by over 30% between 2012/13 and 2014/15 and increases in the unit cost for heat are likely to be a contributing factor. A graph of typical use (kWh/month for a winter month) shows a cluster of low use tenants.



Key Issues

- *Long runs of external pipework*
- *Low demand for heat*
- *Unmetered properties*

3.2.6 Heather Court

Heather Court consists of a 2 story sheltered accommodation building with a number of flats off common internal corridors. Surrounding the main building is a small estate of short terraces of 2 story houses. The housing and flats are served from a nearby energy centre that is within the neighbouring primary school grounds.

In the plant room is a biomass boiler installation with a pair of gas backup boilers and a single 840kW biomass boiler connected to a pair of buffer tanks that are connected in series. The system has 4 heat meters displaying the heat provided from gas boilers, from the biomass boiler via buffers, to the primary school and to the housing estate. The two gas back-up boilers were off at the time of visit and the shunt pumps were off meaning the gas boilers were cold and not losing heat. The buffers were reasonably well insulated, though the lagging had fallen off the bottom of one of the buffers. The pipework valves and flanges are generally insulated though some sections of insulation are damaged or missing.

The housing estate and sheltered accommodation fed by the heating system covers a wide area and it was not possible to determine the type of distribution pipework, although it is assumed that the distribution pipework is pre-insulated.

As the heat distributed from the main plant room via metered circuits it is possible to see what heat is used and what heat is lost.

For the heating to the housing estate it shows that in one year 1,014,700 kWh were delivered from the plant room, and only 256,278 kWh were billed for. Somewhere there is either a very large loss of heat or heat being used that is not billed for or metered. Records also show that heat consumption dropped by 18% between 2013/14 and 2014/15.

As we don't have the pipework route for the site we can only make assumptions of the pipe runs. If we assume there is 500m of 80mm flow and return pipe and 500m of 40mm flow and return pipe then this could potentially account for 375,000 kWh of the losses, however the actual figures are very dependent on pipe specification, sizes and lengths and could easily be twice this.

Key Issues

- *Long runs of external pipework of unknown specification*
- *Potentially un metered use*
- *High proportion of gas use over biomass that would reduce potential income*
- *Reduced demand for heat*

3.2.7 King Street

The boiler plant installation at King Street is similar to that at Marston Crescent, although a smaller biomass boiler, rated at 500kW is being operated. The main building at King Street has a large volume of communal areas including glazed corridors with significant heat-loss. However radiators in communal areas have tamper-proof covers over the thermostatic valves and are generally set correctly. The heating system also feeds two smaller remote blocks of flats via below ground pipework and although this pipework was not examined the feeds into the ground in the boiler room are clearly old and likely to be poorly insulated.

Interestingly, the recorded metered consumption of 193,339 kWh for tenants in 2014/15 is higher than the figure of 125,000 expected from viewing sample EPC's.

Key Issues

- *Poorly insulated external pipework*
- *Large communal areas*

3.2.8 Sunrise Manor

Sunrise Manor is a heat pump installation feeding 25 bungalows and Community Centre building with a flat above. The system has centralised hot-water and distributes heat at low temperatures (ranging from 27deg to 48deg) and hot-water at 48degrees. It is very similar to Parkside with one difference being that the distribution pipework was replaced at Parkside when the heat-pumps were installed whereas the existing pipes were retained at Sunrise Manor. Although we understand the main distribution pipework at Sunrise is pre-insulated plastic, there does appear to be some older, poorly insulated pipework remaining (see photo below).

Example of connection to existing pipework from boiler house

A review of the EnerG metering records over the winter of 2014/15 shows relatively low hot-water consumption by tenants (typically 25 litres a day). Tenants may perceive the cost to be high and make use of their electric showers (where fitted) as their main washing facility. With respect to metered heating the typical use (in 2014/15) is 23% less than predicted by EPC data.

Energy usage for Sunrise is also much less than its sister estate at Parkside, using less than 70% of that recorded at Parkside and this will contribute to its lower overall efficiency. (Heat meters were only recently introduced at Parkside and Sunrise but records show that these schemes previously used a similar amount of coal a year.)

Key Issues

- *Some poorly insulated external pipework*
- *Low demand for heat & hot-water*

3.3 General Conclusions

Whilst there are specific issues on some sites which are mentioned above, low metered heat consumption is common to most of the sites reviewed and as distribution losses remain constant this clearly contributes to the higher cost to income ratio. The fact that metered heat consumption has generally reduced over the last three years as cost has increased does indicate an issue over affordability. Consideration should be given to carrying out a tenant survey to establish how significant this is. We also recommend that metering should be introduced to any unmetered dwellings on schemes.

In relation to overall system efficiency, there are some items across many of the sites that could be addressed:

- Heat loss from inspection chambers. Pipework and joints should be insulated at these points.

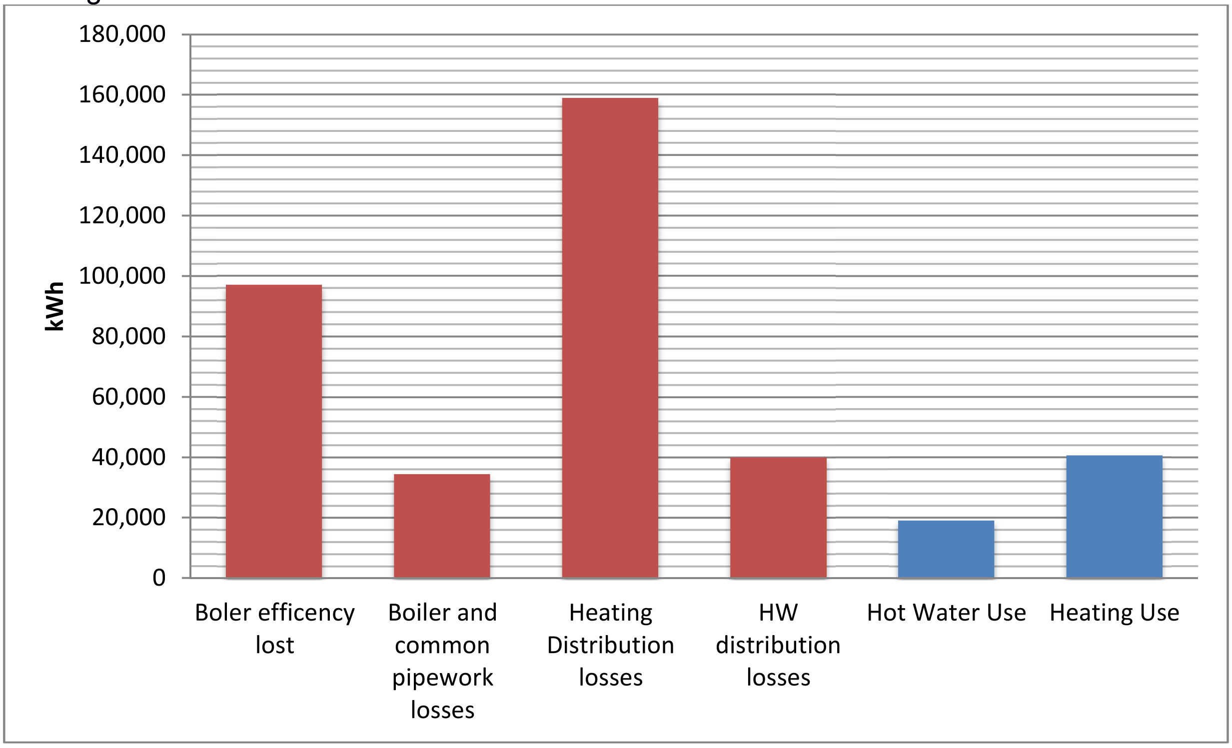
- Heat-loss from building entry points. These should be checked and bare pipework and valves all insulated.

- Installation of time controls to communal areas. The practicalities of this will vary from scheme to scheme but there are a number of community centres and communal spaces that are only used intermittently and could use programmable thermostats for local control.

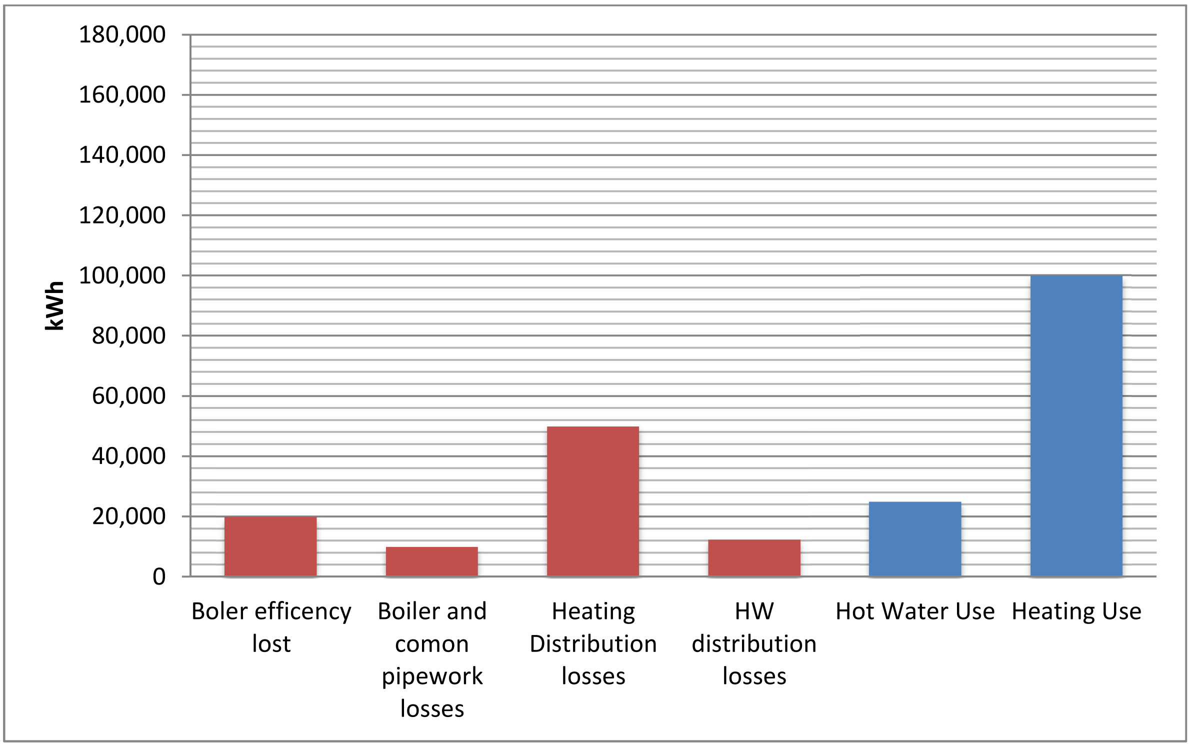
- Review BMS control settings, inverter pump settings and flow rates on schemes. There is the potential to increase the temperature differential between flow and return to 20degrees, reducing distribution losses and pumping costs. Flow temperatures could also be reduced in summer, further reducing distribution heat-loss. Such alterations should be carried out on an incremental basis as ideal settings can only be found by trial and error. On many schemes it should be possible to reduce flow/return temperatures to 60/40degrees in summer with a weekly pasteurisation cycle for Legionella protection.

Example of building entry with uninsulated pipes at The Avenues

The following chart shows the calculated energy losses and uses at Kirk View. This is present as an example of a central gas site with metered heating and un-metered hot water. It shows the significant losses in proportion to the actual useful heat delivered. Overall 85% of the gas used at the meter is lost.



The chart below shows the same data from Kirk View with simulated improvements and every one of the losses reduced, together with increased usage. Here only 43% of the gas used at the meter is lost.



4 Biomass Schemes and RHI Income

A 20 year calculation based on the lifetime of the Renewable Heat Incentive has been carried out for all the biomass schemes and these are shown on the following pages.

The consumption of wood chip on the schemes can be erratic due to boiler breakdowns and in some cases we have had to estimate consumption based on cost figures for gas and biomass along with heat-meter readings and records of fuel deliveries. For the purposes of the following spreadsheets we have assumed the biomass boilers will be working through the year (apart from an annual service) and gas consumption will be around 10% of total fuel use. The only exception to this is on the sites where the gas boilers are designed to provide a significant amount of heat during winter months.

The following notes apply to all the following spreadsheets:

- RHI income based on rates set for schemes registered in the first half of 2015.
- Gas cost is for gas used by back-up gas boilers (assumed as 10% of total in a normal year)
- Electricity costs are for boiler room consumption (pumps, fuel feed motors, etc)
- Heat sales based on EnerG figure for total customer metered consumption in 2014/15
- An allowance of £2,500 p.a. for boiler room repairs on biomass and £1,000 p.a for gas included in maintenance costs
- The net saving is the income from the RHI and tenants payments less the cost of fuel, electricity and maintenance
- Assumed that gas equivalent installation would have half the electricity consumption of biomass system
- The additional costs for biomass are the extra costs of fuel, electricity and maintenance compared to an equivalent gas boiler system and this is the amount of the RHI income that can be attributed to the higher cost of operating the biomass systems.

4.1 The Avenues

biomass boiler size	600	kw				Charge out rate	0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	£12,211
gas boilers efficiency	90	%	gas cost	2.964	p/kwh	HSU gas	£187
Annual equivalent hours	970		RHI rate	5.18	p/kwh		
Annual chip consumption	684706	kwh	reduced RHI	2.24	p/kwh		
Annual gas consumption	68471	kwh	Inflation rate	2	%		
			Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£30,148	£2,029	£29,203	£3,273	£29,750	£14,711	£10,681		£25,148	£24,069
2	£30,751	£2,070	£29,787	£3,338	£30,345	£15,005	£10,895	£21,576	£25,651	£24,550
3	£31,366	£2,111	£30,382	£3,405	£30,952	£15,305	£11,113	£32,689	£26,164	£25,041
4	£31,993	£2,154	£30,990	£3,473	£31,571	£15,611	£11,335	£44,024	£26,687	£25,542
5	£32,633	£2,197	£31,610	£3,543	£32,202	£15,924	£11,562	£55,586	£27,221	£26,053
6	£33,285	£2,241	£32,242	£3,614	£32,846	£16,242	£11,793	£67,379	£27,765	£26,574
7	£33,951	£2,286	£32,887	£3,686	£33,503	£16,567	£12,029	£79,408	£28,320	£27,105
8	£34,630	£2,331	£33,545	£3,760	£34,173	£16,898	£12,270	£91,678	£28,887	£27,647
9	£35,323	£2,378	£34,216	£3,835	£34,857	£17,236	£12,515	£104,193	£29,464	£28,200
10	£36,029	£2,425	£34,900	£3,912	£35,554	£17,581	£12,765	£116,958	£30,054	£28,764
11	£36,750	£2,474	£35,598	£3,990	£36,265	£17,933	£13,021	£129,979	£30,655	£29,339
12	£37,485	£2,523	£36,310	£4,070	£36,990	£18,291	£13,281	£143,259	£31,268	£29,926
13	£38,234	£2,574	£37,036	£4,151	£37,730	£18,657	£13,547	£156,806	£31,893	£30,525
14	£38,999	£2,625	£37,777	£4,234	£38,485	£19,030	£13,817	£170,623	£32,531	£31,135
15	£39,779	£2,678	£38,532	£4,319	£39,254	£19,411	£14,094	£184,717	£33,182	£31,758
16	£40,575	£2,731	£39,303	£4,405	£40,040	£19,799	£14,376	£199,093	£33,845	£32,393
17	£41,386	£2,786	£40,089	£4,493	£40,840	£20,195	£14,663	£213,756	£34,522	£33,041
18	£42,214	£2,842	£40,891	£4,583	£41,657	£20,599	£14,956	£228,713	£35,213	£33,702
19	£43,058	£2,899	£41,709	£4,675	£42,490	£21,011	£15,256	£243,968	£35,917	£34,376
20	£43,919	£2,957	£42,543	£4,768	£43,340	£21,431	£15,561	£259,529	£36,635	£35,063

Biomass heat meter readings: 336mWh used between 16/11/14&29/3/15

4.2 Marston Crescent

biomass boiler size		840	kw							Charge out rate	0.11
biomass boiler efficiency		90	%			chip cost	4.265	p/kwh		HSU biomass	£12,211
gas boilers efficiency		90	%			gas cost	2.964	p/kwh		HSU gas	£187
Annual equivalent hours		1000				RHI rate	5.18	p/kwh			
Annual chip consumption		933333	kwh			reduced RHI	2.24	p/kwh			
Annual gas consumption		93333	kwh			Inflation rate	2	%			
						Discount Rate	3	%			
Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass	
1	£43,512	£2,766	£39,807	£4,553	£29,750	£14,711	£11,425		£33,894	£27,943	
2	£44,382	£2,822	£40,603	£4,644	£30,345	£15,005	£11,653	£23,078	£34,572	£28,502	
3	£45,270	£2,878	£41,415	£4,737	£30,952	£15,305	£11,886	£34,965	£35,263	£29,072	
4	£46,175	£2,936	£42,243	£4,832	£31,571	£15,611	£12,124	£47,089	£35,968	£29,654	
5	£47,099	£2,994	£43,088	£4,928	£32,202	£15,924	£12,367	£59,455	£36,688	£30,247	
6	£48,041	£3,054	£43,950	£5,027	£32,846	£16,242	£12,614	£72,069	£37,422	£30,852	
7	£49,002	£3,115	£44,829	£5,127	£33,503	£16,567	£12,866	£84,936	£38,170	£31,469	
8	£49,982	£3,178	£45,725	£5,230	£34,173	£16,898	£13,124	£98,059	£38,933	£32,098	
9	£50,981	£3,241	£46,640	£5,335	£34,857	£17,236	£13,386	£111,445	£39,712	£32,740	
10	£52,001	£3,306	£47,573	£5,441	£35,554	£17,581	£13,654	£125,099	£40,506	£33,395	
11	£53,041	£3,372	£48,524	£5,550	£36,265	£17,933	£13,927	£139,026	£41,316	£34,063	
12	£54,102	£3,440	£49,495	£5,661	£36,990	£18,291	£14,205	£153,231	£42,143	£34,744	
13	£55,184	£3,508	£50,484	£5,774	£37,730	£18,657	£14,490	£167,721	£42,986	£35,439	
14	£56,287	£3,579	£51,494	£5,890	£38,485	£19,030	£14,779	£182,500	£43,845	£36,147	
15	£57,413	£3,650	£52,524	£6,008	£39,254	£19,411	£15,075	£197,575	£44,722	£36,870	
16	£58,561	£3,723	£53,575	£6,128	£40,040	£19,799	£15,376	£212,951	£45,617	£37,608	
17	£59,733	£3,798	£54,646	£6,250	£40,840	£20,195	£15,684	£228,635	£46,529	£38,360	
18	£60,927	£3,874	£55,739	£6,375	£41,657	£20,599	£15,998	£244,633	£47,460	£39,127	
19	£62,146	£3,951	£56,854	£6,503	£42,490	£21,011	£16,318	£260,950	£48,409	£39,910	
20	£63,389	£4,030	£57,991	£6,633	£43,340	£21,431	£16,644	£277,594	£49,377	£40,708	

4.3 Milefield Court

biomass boiler size	440	kw				Charge out rate	£0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	£12,211
gas boilers efficiency	90	%	gas cost	2.964	p/kwh	HSU gas	£187
Annual equivalent hours	2100		RHI rate	5.18	p/kwh		
Annual chip consumption	1087059	kwh	reduced RHI	2.24	p/kwh		
Annual gas consumption	108706	kwh	Inflation rate	2	%		
			Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£37,696	£3,222	£46,363	£3,096	£29,750	£14,711	£53		£38,177	£29,215
2	£38,449	£3,286	£47,290	£3,158	£30,345	£15,005	£54	£108	£38,941	£29,799
3	£39,218	£3,352	£48,236	£3,221	£30,952	£15,305	£55	£163	£39,720	£30,395
4	£40,003	£3,419	£49,201	£3,285	£31,571	£15,611	£57	£220	£40,514	£31,003
5	£40,803	£3,488	£50,185	£3,351	£32,202	£15,924	£58	£278	£41,325	£31,623
6	£41,619	£3,557	£51,189	£3,418	£32,846	£16,242	£59	£336	£42,151	£32,255
7	£42,451	£3,629	£52,212	£3,487	£33,503	£16,567	£60	£397	£42,994	£32,900
8	£43,300	£3,701	£53,257	£3,556	£34,173	£16,898	£61	£458	£43,854	£33,558
9	£44,166	£3,775	£54,322	£3,627	£34,857	£17,236	£62	£520	£44,731	£34,230
10	£45,050	£3,851	£55,408	£3,700	£35,554	£17,581	£64	£584	£45,626	£34,914
11	£45,951	£3,928	£56,516	£3,774	£36,265	£17,933	£65	£649	£46,538	£35,612
12	£46,870	£4,006	£57,647	£3,849	£36,990	£18,291	£66	£715	£47,469	£36,325
13	£47,807	£4,086	£58,800	£3,926	£37,730	£18,657	£68	£783	£48,418	£37,051
14	£48,763	£4,168	£59,976	£4,005	£38,485	£19,030	£69	£852	£49,387	£37,792
15	£49,738	£4,251	£61,175	£4,085	£39,254	£19,411	£70	£922	£50,374	£38,548
16	£50,733	£4,336	£62,399	£4,167	£40,040	£19,799	£72	£994	£51,382	£39,319
17	£51,748	£4,423	£63,647	£4,250	£40,840	£20,195	£73	£1,068	£52,409	£40,105
18	£52,783	£4,512	£64,919	£4,335	£41,657	£20,599	£75	£1,142	£53,458	£40,908
19	£53,838	£4,602	£66,218	£4,422	£42,490	£21,011	£76	£1,218	£54,527	£41,726
20	£54,915	£4,694	£67,542	£4,510	£43,340	£21,431	£78	£1,296	£55,617	£42,560

4.4 Rose Tree Avenue

biomass boiler size	500	kw				Charge out rate	£0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	£12,211
gas boilers efficiency	90	%	gas cost	2.964	p/kwh	HSU gas	£187
Annual equivalent hours	1710		RHI rate	5.18	p/kwh		
Annual chip consumption	1005882	kwh	reduced RHI	2.24	p/kwh		
Annual gas consumption	100588	kwh	Inflation rate	2	%		
			Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£38,468	£2,981	£42,901	£7,100	£29,750	£14,711	£524		£37,533	£30,161
2	£39,237	£3,041	£43,759	£7,242	£30,345	£15,005	£535	£1,059	£38,283	£30,764
3	£40,022	£3,102	£44,634	£7,387	£30,952	£15,305	£546	£1,605	£39,049	£31,379
4	£40,822	£3,164	£45,527	£7,535	£31,571	£15,611	£557	£2,161	£39,830	£32,007
5	£41,639	£3,227	£46,437	£7,685	£32,202	£15,924	£568	£2,729	£40,627	£32,647
6	£42,472	£3,292	£47,366	£7,839	£32,846	£16,242	£579	£3,308	£41,439	£33,300
7	£43,321	£3,358	£48,313	£7,996	£33,503	£16,567	£591	£3,899	£42,268	£33,966
8	£44,187	£3,425	£49,280	£8,156	£34,173	£16,898	£602	£4,501	£43,113	£34,645
9	£45,071	£3,493	£50,265	£8,319	£34,857	£17,236	£614	£5,116	£43,976	£35,338
10	£45,973	£3,563	£51,271	£8,485	£35,554	£17,581	£627	£5,742	£44,855	£36,045
11	£46,892	£3,634	£52,296	£8,655	£36,265	£17,933	£639	£6,382	£45,752	£36,766
12	£47,830	£3,707	£53,342	£8,828	£36,990	£18,291	£652	£7,034	£46,667	£37,501
13	£48,786	£3,781	£54,409	£9,005	£37,730	£18,657	£665	£7,699	£47,601	£38,251
14	£49,762	£3,857	£55,497	£9,185	£38,485	£19,030	£678	£8,377	£48,553	£39,016
15	£50,757	£3,934	£56,607	£9,368	£39,254	£19,411	£692	£9,069	£49,524	£39,796
16	£51,773	£4,013	£57,739	£9,556	£40,040	£19,799	£706	£9,775	£50,514	£40,592
17	£52,808	£4,093	£58,894	£9,747	£40,840	£20,195	£720	£10,495	£51,524	£41,404
18	£53,864	£4,175	£60,072	£9,942	£41,657	£20,599	£734	£11,229	£52,555	£42,232
19	£54,941	£4,258	£61,273	£10,141	£42,490	£21,011	£749	£11,978	£53,606	£43,077
20	£56,040	£4,343	£62,498	£10,343	£43,340	£21,431	£764	£12,742	£54,678	£43,938

Berneslai Homes Community Heating

4.5 King Street

biomass boiler size	500	kw	capital cost	£200,000		Charge out rate	0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	12,211
gas boilers efficiency	90	%	gas cost	4	p/kwh	HSU gas	187
Annual equivalent hours	845		RHI rate	5.18	p/kwh		
Annual boiler heat output	497059	kwh	reduced RHI	2.24	p/kwh		
Annual gas consumption	49706	kwh	Inflation rate	2	%		
Heat Sales	270454	kwh	Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£21,886	£1,988	£21,200	£4,758	£21,267	£14,711	£496		£25,436.59	£17,220
2	£22,323	£2,028	£21,624	£4,853	£21,692	£15,005	£506	£1,001	£25,945	£17,565
3	£22,770	£2,069	£22,056	£4,950	£22,126	£15,305	£516	£1,517	£26,464	£17,916
4	£23,225	£2,110	£22,497	£5,049	£22,569	£15,611	£526	£2,043	£26,994	£18,274
5	£23,690	£2,152	£22,947	£5,150	£23,020	£15,924	£537	£2,580	£27,533	£18,640
6	£24,163	£2,195	£23,406	£5,253	£23,481	£16,242	£547	£3,127	£28,084	£19,012
7	£24,647	£2,239	£23,874	£5,358	£23,950	£16,567	£558	£3,686	£28,646	£19,393
8	£25,140	£2,284	£24,352	£5,465	£24,429	£16,898	£569	£4,255	£29,219	£19,781
9	£25,642	£2,330	£24,839	£5,575	£24,918	£17,236	£581	£4,836	£29,803	£20,176
10	£26,155	£2,376	£25,335	£5,686	£25,416	£17,581	£592	£5,429	£30,399	£20,580
11	£26,678	£2,424	£25,842	£5,800	£25,924	£17,933	£604	£6,033	£31,007	£20,991
12	£27,212	£2,472	£26,359	£5,916	£26,443	£18,291	£616	£6,649	£31,627	£21,411
13	£27,756	£2,522	£26,886	£6,034	£26,972	£18,657	£629	£7,278	£32,260	£21,839
14	£28,311	£2,572	£27,424	£6,155	£27,511	£19,030	£641	£7,919	£32,905	£22,276
15	£28,877	£2,623	£27,972	£6,278	£28,061	£19,411	£654	£8,574	£33,563	£22,722
16	£29,455	£2,676	£28,532	£6,404	£28,623	£19,799	£667	£9,241	£34,234	£23,176
17	£30,044	£2,729	£29,102	£6,532	£29,195	£20,195	£681	£9,922	£34,919	£23,640
18	£30,645	£2,784	£29,685	£6,662	£29,779	£20,599	£694	£10,616	£35,617	£24,112
19	£31,258	£2,840	£30,278	£6,796	£30,375	£21,011	£708	£11,324	£36,330	£24,595
20	£31,883	£2,896	£30,884	£6,932	£30,982	£21,431	£722	£12,046	£37,056	£25,087

Berneslai Homes Community Heating

4.6 Heather Court

biomass boiler size	840	kw				Charge out rate	£0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	£12,211
gas boilers efficiency	90	%	gas cost	2.964	p/kwh	HSU gas	£187
Annual equivalent hours	1200		RHI rate	5.18	p/kwh		
Annual chip consumption	1185882	kwh	reduced RHI	2.24	p/kwh		
Annual gas consumption	118588	kwh	Inflation rate	2	%		
			Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	net saving	accumulated saving	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£57,175	£3,515	£50,578	£7,029	£29,750	£14,711	£11,092		£43,366	£32,467
2	£58,318	£3,585	£51,589	£7,170	£30,345	£15,005	£11,314	£22,406	£44,233	£33,116
3	£59,485	£3,657	£52,621	£7,313	£30,952	£15,305	£11,540	£33,946	£45,118	£33,778
4	£60,674	£3,730	£53,674	£7,459	£31,571	£15,611	£11,771	£45,716	£46,020	£34,454
5	£61,888	£3,805	£54,747	£7,608	£32,202	£15,924	£12,006	£57,723	£46,941	£35,143
6	£63,126	£3,881	£55,842	£7,761	£32,846	£16,242	£12,246	£69,969	£47,880	£35,846
7	£64,388	£3,958	£56,959	£7,916	£33,503	£16,567	£12,491	£82,460	£48,837	£36,563
8	£65,676	£4,038	£58,098	£8,074	£34,173	£16,898	£12,741	£95,201	£49,814	£37,294
9	£66,989	£4,118	£59,260	£8,236	£34,857	£17,236	£12,996	£108,197	£50,810	£38,040
10	£68,329	£4,201	£60,445	£8,400	£35,554	£17,581	£13,256	£121,453	£51,826	£38,801
11	£69,696	£4,285	£61,654	£8,568	£36,265	£17,933	£13,521	£134,974	£52,863	£39,577
12	£71,090	£4,370	£62,887	£8,740	£36,990	£18,291	£13,791	£148,765	£53,920	£40,368
13	£72,511	£4,458	£64,145	£8,914	£37,730	£18,657	£14,067	£162,832	£54,999	£41,176
14	£73,962	£4,547	£65,428	£9,093	£38,485	£19,030	£14,349	£177,181	£56,099	£41,999
15	£75,441	£4,638	£66,736	£9,275	£39,254	£19,411	£14,635	£191,816	£57,221	£42,839
16	£76,950	£4,731	£68,071	£9,460	£40,040	£19,799	£14,928	£206,745	£58,365	£43,696
17	£78,489	£4,825	£69,433	£9,649	£40,840	£20,195	£15,227	£221,971	£59,532	£44,570
18	£80,058	£4,922	£70,821	£9,842	£41,657	£20,599	£15,531	£237,503	£60,723	£45,461
19	£81,660	£5,020	£72,238	£10,039	£42,490	£21,011	£15,842	£253,345	£61,937	£46,371
20	£83,293	£5,121	£73,682	£10,240	£43,340	£21,431	£16,159	£269,503	£63,176	£47,298

Berneslai Homes Community Heating

4.7 Hudsons Haven/ Aldham Farm

biomass boiler size	300	kw							Charge out rate	£0.11
biomass boiler efficiency	80	%			chip cost	4.265	p/kwh		HSU biomass	£12,211
gas boilers efficiency	90	%			gas cost	2.964	p/kwh		HSU gas	£187
Annual equivalent hours	1100				RHI rate	n/a	p/kwh			
Annual chip consumption	412500	kwh			reduced RHI	n/a	p/kwh			
Annual gas consumption	825000	kwh			Inflation rate	2	%			
					Discount Rate	3	%			
Year	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	costs less income		Fuel & maintenance cost for gas equivalent	Additional costs for biomass	
1	£24,453	£17,593	£4,262	£41,386	£14,711	£19,633		£39,998	£21,022	
2	£24,942	£17,945	£4,347	£42,213	£15,005	£20,026		£40,797	£21,442	
3	£25,441	£18,304	£4,434	£43,058	£15,305	£20,427		£41,613	£21,871	
4	£25,950	£18,670	£4,523	£43,919	£15,611	£20,835		£42,446	£22,308	
5	£26,469	£19,043	£4,613	£44,797	£15,924	£21,252		£43,295	£22,754	
6	£26,998	£19,424	£4,706	£45,693	£16,242	£21,677		£44,160	£23,210	
7	£27,538	£19,813	£4,800	£46,607	£16,567	£22,110		£45,044	£23,674	
8	£28,089	£20,209	£4,896	£47,539	£16,898	£22,553		£45,945	£24,147	
9	£28,651	£20,613	£4,994	£48,490	£17,236	£23,004		£46,863	£24,630	
10	£29,224	£21,025	£5,093	£49,460	£17,581	£23,464		£47,801	£25,123	
11	£29,808	£21,446	£5,195	£50,449	£17,933	£23,933		£48,757	£25,625	
12	£30,404	£21,875	£5,299	£51,458	£18,291	£24,412		£49,732	£26,138	
13	£31,012	£22,312	£5,405	£52,487	£18,657	£24,900		£50,727	£26,661	
14	£31,633	£22,759	£5,513	£53,537	£19,030	£25,398		£51,741	£27,194	
15	£32,265	£23,214	£5,624	£54,608	£19,411	£25,906		£52,776	£27,738	
16	£32,911	£23,678	£5,736	£55,700	£19,799	£26,424		£53,831	£28,292	
17	£33,569	£24,152	£5,851	£56,814	£20,195	£26,952		£54,908	£28,858	
18	£34,240	£24,635	£5,968	£57,950	£20,599	£27,491		£56,006	£29,435	
19	£34,925	£25,127	£6,087	£59,109	£21,011	£28,041		£57,126	£30,024	
20	£35,623	£25,630	£6,209	£60,291	£21,431	£28,602		£58,269	£30,625	

Berneslai Homes Community Heating

4.8 Union St/ Sheffield Road Flats

biomass boiler size	450	kw				Charge out rate	£0.11
biomass boiler efficiency	85	%	chip cost	4.265	p/kwh	HSU biomass	£12,211
gas boilers efficiency	90	%	gas cost	2.964	p/kwh	HSU gas	£187
Annual equivalent hours	1460		RHI rate	n/a	p/kwh		
Annual chip consumption	772941	kwh	reduced RHI	n/a	p/kwh		
Annual gas consumption	618353	kwh	Inflation rate	2	%		
			Discount Rate	3	%		

Year	RHI income	Gas cost	chip cost	Electricity costs	Heat sales income	maintenance	total cost less income	Fuel & maintenance cost for gas equivalent	Additional costs for biomass
1	£0	£18,328	£32,966	£3,502	£66,898	£14,711	£2,609	£44,176	£25,331
2	£0	£18,695	£33,625	£3,572	£68,236	£15,005	£2,661	£45,059	£25,838
3	£0	£19,068	£34,298	£3,643	£69,600	£15,305	£2,715	£45,961	£26,354
4	£0	£19,450	£34,984	£3,716	£70,993	£15,611	£2,769	£46,880	£26,881
5	£0	£19,839	£35,683	£3,791	£72,412	£15,924	£2,824	£47,817	£27,419
6	£0	£20,236	£36,397	£3,866	£73,861	£16,242	£2,881	£48,774	£27,967
7	£0	£20,640	£37,125	£3,944	£75,338	£16,567	£2,938	£49,749	£28,527
8	£0	£21,053	£37,868	£4,023	£76,845	£16,898	£2,997	£50,744	£29,097
9	£0	£21,474	£38,625	£4,103	£78,381	£17,236	£3,057	£51,759	£29,679
10	£0	£21,904	£39,397	£4,185	£79,949	£17,581	£3,118	£52,794	£30,273
11	£0	£22,342	£40,185	£4,269	£81,548	£17,933	£3,180	£53,850	£30,878
12	£0	£22,789	£40,989	£4,354	£83,179	£18,291	£3,244	£54,927	£31,496
13	£0	£23,244	£41,809	£4,441	£84,843	£18,657	£3,309	£56,026	£32,126
14	£0	£23,709	£42,645	£4,530	£86,539	£19,030	£3,375	£57,146	£32,768
15	£0	£24,183	£43,498	£4,621	£88,270	£19,411	£3,443	£58,289	£33,424
16	£0	£24,667	£44,368	£4,713	£90,036	£19,799	£3,512	£59,455	£34,092
17	£0	£25,160	£45,255	£4,807	£91,836	£20,195	£3,582	£60,644	£34,774
18	£0	£25,664	£46,160	£4,904	£93,673	£20,599	£3,653	£61,857	£35,469
19	£0	£26,177	£47,083	£5,002	£95,547	£21,011	£3,726	£63,094	£36,179
20	£0	£26,700	£48,025	£5,102	£97,457	£21,431	£3,801	£64,356	£36,902

5 Hot Water Consumption on Unmetered Centralised Schemes

The hot water was turned off for 48 hours on the three sites with unmetered central hot-water systems and the gas consumption from the boilers measured.

Scheme	gas meter 20/7	gas meter 22/7	Gas used (m3)	Annual gas used	Annual kWh	Annual gas cost	Total annual cost
Glebe Court	274598.21	274723.1	124.89	24228.35	275234	£8,158	£8,736
Grey Street	533644.04	533772.11	128.07	24845.26	282242	£8,366	£8,944
Kirk View	359096.79	359153.4	56.61	10982.2	124758	£3,698	£4,276

The calculation uses a factor to take account of the change in incoming cold water temperature in winter.

Gas cost based on calorific value of 40 and price of 2.964p/kWh for gas.

The total cost includes an addition for pumping costs based on a nominal 600watts and an electricity price (including fixed charges) of 11p/kWh

6 Water Quality Testing

Samples of heating system water and mains cold water were taken at all sites and sent for laboratory testing. The results are provided on the test sheets accompanying this report.

A number of the reports note a lack of corrosion inhibitor and Ferxox have given us the following detail on the wording for this section:

“Inhibitor Absent – i.e., nothing at all present; neither Fernox nor competitor. Note that very, very dilute traces of inhibitor will also flag up as ‘absent’.

“Not a Fernox Product” – where a competitor treatment is found. We ID Fernox by a number of parameters, not all of which appear on the report and also the ratio between these parameters. Parameters not used by Fernox (nitrite, nitrate for example are also used in this calculation.

“Fernox Low” – Fernox confirmed as being the inhibitor used, but dose rate is insufficient. This may occur through incorrect system sizing, poor mixing if addition is recent or water losses.

“Satisfactory” – means it’s treated with Fernox and the concentration is at or above the minimum acceptable level. The pass point is actually slightly less than the stated recommended concentration in the literature. i.e., we pass samples at only 2/3rds of recommended concentration to allow for real world field variations. This fits in with the wording of our field test kit (37906) – ‘minimum dose’ and ‘recommended dose’. It will also pass if over-dosed as this is not regarded as harmful.

A Fernox document giving further explanation of the water quality test is attached to this report.

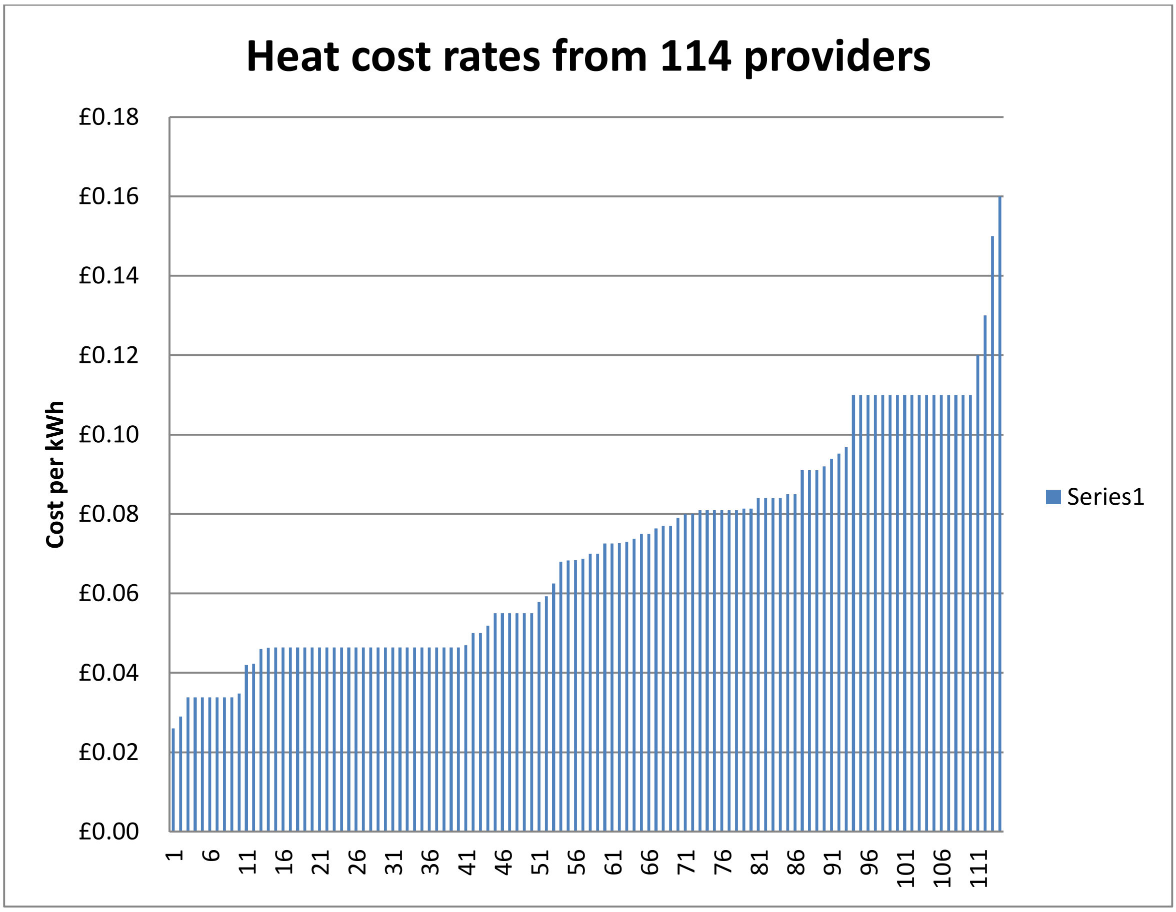
7 Survey of Comparative Charges for Metered Heat

Although we approached twenty housing providers with community/district heating schemes we have only received useful responses from very few of them. We have gained the impression that many providers do not check in detail whether their schemes are self-financing. Some responses below were obtained from published documents uncovered by internet searches.

Details of responses received by 30th July are shown below, some of these are anonymous at the supplier's request.:

Organisation	Unit Charge	Standing Charge	Comments
H.A. 1	12.7p	no	Electric heat-pump system covering costs (and probably working at low efficiency?)
L.A.1	6.0p	not known	Pre-payment meters "majority of schemes break even"
H.A.2	5.4p	no	"not subsidised"
Q.E.Olympic Park	7.0p	60p/day	Commercial-presumed not subsidised
Rotherham Council	8.72p	no	Recently increased to cover costs
Doncaster Council	5.8p	no	Biomass - forecast to break even
Hull Council	3.9p	no	Starting a 5 year phased increases in price in order to cover costs
Leeds Council	7.4p	29p/day	Believed to cover costs although full analysis including maintenance, etc, not carried out
Manchester City Council	7.05	no	Currently trying to assess whether self-financing

One useful information source has been EnerG who have provided anonymised data on unit charges from over 100 heat providers in the UK. The average unit cost is 7.1p/kWh and a graph of all providers is shown on the following page.



Around half of these providers also impose a standing charge for heat and this averages at 20pence a day.

8 General Conclusions

The review of high cost sites raised a number of issues that apply in varying degrees to all the schemes..

The key issue in our view is the impact of the cost of heat on usage by tenants, and this is shown both by the dramatic drop in heat use recorded over the last three years, by the low use at most sites we checked in comparison to EPC predictions. It is also apparent that the current charge of 11p/kWh is higher than the average charge for heat.

There are various possible ways the unit cost of heat could be reduced. These include introducing a standing (or availability) charge, apportioning maintenance costs to another budget, and general energy efficiency improvements. A review of requirements for maintenance on the biomass schemes could show opportunities for cost reductions: carrying out 3 site visits a week rather than 5, for example.

A reduction in unit cost would be expected to create a higher demand for heat and thus a greater income, but predicting this in advance will involve some financial risk.

The recommendations given in section 3.3. apply to most sites and can be summarised as:

- Rectify gaps in insulation on boiler room and distribution pipework (building entry points, inspection chambers, etc).
- Review BMS settings and adjust to reduce flow temperatures and increase flow/return temperature differential.
- Introduce time control where practical to community centres & communal lounges.
- Introduce metering to unmetered dwellings

We were not asked to survey all plant rooms but it is clear that there are some older installations with inefficient gas boilers and fixed speed pumps which should be prioritised for renewal. These include Kirk View, Gray Street and Heather Court. Sites with older conventional gas boilers such as Saville Court should also be programmed for upgrade.

The tendency to oversize heating plant (apparent on newer biomass schemes) should be avoided on any new installations, as this reduces efficiency, and any new distribution pipework should be specified with a high insulation standard.

9 Appendix: supplementary information

9.1. Anonymised Unit Cost Data

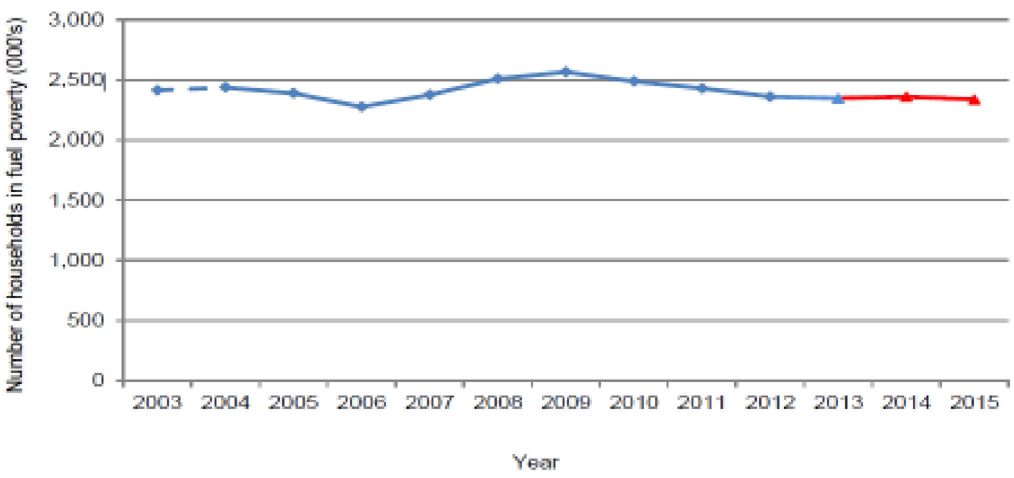
Shown in descending order of unit cost

daily standing charge	unit cost/kWh		daily standing charge	unit cost/kWh
£ -	£ 0.16000		£ 0.20000	£ 0.07000
£ 0.14280	£ 0.15000		£ -	£ 0.07000
£ 0.40000	£ 0.13000		£ 0.32000	£ 0.06870
£ -	£ 0.12000		£ 0.48850	£ 0.06840
£ -	£ 0.11000		£ 0.44150	£ 0.06830
£ -	£ 0.11000		£ 0.31050	£ 0.06800
£ -	£ 0.11000		£ 0.22920	£ 0.06250
£ -	£ 0.11000		£ -	£ 0.05930
£ -	£ 0.11000		£ 0.38740	£ 0.05780
£ -	£ 0.11000		£ 0.20000	£ 0.05500
£ -	£ 0.11000		£ -	£ 0.05500
£ -	£ 0.11000		£ -	£ 0.05500
£ -	£ 0.11000		£ -	£ 0.05500
£ -	£ 0.11000		£ -	£ 0.05500
£ -	£ 0.11000		£ -	£ 0.05500
£ -	£ 0.11000		£ 0.31980	£ 0.05190
£ -	£ 0.11000		£ -	£ 0.05000
£ -	£ 0.11000		£ -	£ 0.05000
£ -	£ 0.11000		£ 0.56000	£ 0.04700
£ -	£ 0.11000		£ 0.56020	£ 0.04640
£ -	£ 0.11000		£ 0.14500	£ 0.04640
£ -	£ 0.09680		£ 0.14500	£ 0.04640
£ -	£ 0.09520		£ 0.14500	£ 0.04640
£ 0.23070	£ 0.09390		£ 0.14500	£ 0.04640
£ -	£ 0.09200		£ 0.14500	£ 0.04640
£ -	£ 0.09100		£ 0.14500	£ 0.04640
£ -	£ 0.09100		£ 0.14500	£ 0.04640
£ -	£ 0.09100		£ 0.14500	£ 0.04640
£ 0.22000	£ 0.08500		£ 0.14500	£ 0.04640
£ 0.17810	£ 0.08500		£ 0.14500	£ 0.04640
£ 0.24250	£ 0.08400		£ 0.14500	£ 0.04640
£ 0.77260	£ 0.08400		£ 0.14500	£ 0.04640
£ 0.24660	£ 0.08400		£ 0.14500	£ 0.04640
£ -	£ 0.08400		£ 0.14500	£ 0.04640
£ 0.15750	£ 0.08140		£ 0.14500	£ 0.04640
£ 0.24150	£ 0.08140		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ -	£ 0.08100		£ 0.14500	£ 0.04640
£ 0.31000	£ 0.08010		£ 0.14500	£ 0.04640
£ 0.39000	£ 0.08000		£ 0.14500	£ 0.04640
£ 0.20720	£ 0.07900		£ 0.14500	£ 0.04640
£ 0.19200	£ 0.07700		£ 0.26010	£ 0.04630
£ 0.19200	£ 0.07700		£ -	£ 0.04600
£ 0.21270	£ 0.07640		£ -	£ 0.04230
£ -	£ 0.07500		£ -	£ 0.04200
£ 0.10000	£ 0.07500		£ -	£ 0.03480
£ -	£ 0.07380		£ -	£ 0.03380
£ 0.90620	£ 0.07300		£ -	£ 0.03380
£ 0.20260	£ 0.07270		£ -	£ 0.03380
£ 0.33200	£ 0.07260		£ -	£ 0.03380
£ 0.23000	£ 0.07260		£ -	£ 0.03380
			£ -	£ 0.03380
			£ -	£ 0.03380
			£ -	£ 0.02900
			£ -	£ 0.02600

9.2. Statistics on Fuel Poor

Fuel poverty status	Year	Number of households (000's)	Proportion of households fuel poor (%)	Aggregate fuel poverty gap (£m): Real Terms[1]	Average fuel poverty gap (£): Real Terms[1]	Median fuel poverty gap (£) Excel method: Real Terms[1]
Fuel poor	2003	2414	11.6	556	231	148
	2004	2438	11.6	575	236	145
	2005	2389	11.3	608	254	152
	2006	2276	10.7	744	327	208
	2007	2376	11.1	773	325	197
	2008	2510	11.7	852	339	210
	2009	2567	11.9	911	355	225
	2010	2490	11.5	869	349	212
	2011	2433	11.1	926	380	222
	2012	2360	10.8	909	385	234
	2013	2347	10.4	877	374	238

Chart 6.1 Number of households in fuel poverty 2003 to 2013, and projections for 2014 and 2015.



From DECC Annual Fuel Poverty Statistics published May 2015