Hyder Consulting (UK) Ltd

Table 4 – Energy Strategy – carbon balance

	14	NUARY 3:	1	FEBRUARY 28		MARCH 31		APRIL 30	1	MAY 3	1	JUNE 30		JULY 31	AUGUST 31	CEDT	EMBER 30	OCTOBER 31	1	NOVEMBER 30	1	DECEMBER 31		TOTAL	
	JA	Demand	CO cost CO saving		cost CO saving		CO cost CO saving		CO cost CO savin		CO cost CO saving		CO cost CO saving	Demand CO cost CO saving			emand CO cost CO saving		CO cost CO saving		CO cost CO saving		CO cost CO saving		CO cost CO savi
ASELINE 2006		Demanu	CO COST CO SAVING	Demand CO	CO Saving	Demand	CO COSC CO Saving	Demand	CO COSC CO SAVIII	ig Demand	CO COSC CO SAVING	Demanu	CO COST CO SAVING	Demand Co cost Co saving	Demand Co cost Co	.O Saving	remand CO Cost CO saving	Demand	CO COST CO Saving	Demanu	CO COST CO SAVING	Demanu	CO COST CO SAVING	Demanu	CO COSC CO SAV
Sas demand		416,361	82,439	377,187 74,	692	356,771	70,641	298,795	59,161	237,302	46,986	181,727	25 092	154,845 30,659	167,364 33,138		193,557 38,324	263,398	52 152	347,099	69 726	409,844	91 1/0	3,404,251	674,042
Electricity demand		109.650	56.689	109,650 56			56.689	109.650	56.689	109.650	56.689	109,650		109,650 56,689	109.650 56.689		109,650 56,689	109,650		109,650		109.650			680,270
APEE ENERGY BASELINE		103,030	30,089	103,030	,089	103,030	30,003	103,030	30,003	103,030	30,083	103,030	30,003	103,030 30,083	109,030 30,083		30,089	103,030	30,089	105,050	50,085	109,030	30,089	1,313,004	080,270
APEE gas demand		189,303	37.482	169,016 33.	ACE	158,525	31.388	128,561	25.455	96.860	19.178	68.143	13.492	54,255 10,743	60,782 12,035		74,280 14,707	110.355	21.050	153,535	20.400	185,919	36.812	1,449,535	287.008
APEE elec demand		95.654	49.453	95,654 49.			49.453	95.654	49.453	95,654	49.453	95,654		95.654 49.453	95,654 49,453		95.654 49.453	95.654		95,654			49.453		593.437
AFEE elec demand		93,034	49,433	93,034 49,	,455	93,034	49,455	93,034	49,433	93,034	49,433	93,034	49,455	93,034 49,433	95,054 49,455		93,034 49,433	93,034	49,433	93,034	49,433	93,034	49,455	1,147,640	393,437
OLAR THERMAL																									
nstalled capacity	kW	35		35		35		35		35		35		35	35		35	35		35		35		35	
hermal output	kWh/moi	452	20	677	30	1,129	51	1,355	61	1,637	74	1,806	81	1,750 79	1,637	74	1,467 66	1,129	51	677	30	452	20	14,167	6
GAS CHP																									
Heat output of Gas CHP system	kWth	174		174		174		174		174		174		174	174		174	174		174		174		174	
lectricity output of Gas CHP system	kWe	110		110		110		110		110		110		110	110		110	110		110		110		110	
ifficiency of Gas CHP		85%		85%		85%		85%		85%		85%		85%	85%		85%	85%		85%		85%		85%	
Heat to power ratio of CHP system		1.58		1.58		1.58		1.58		1.58		1.58		1.58	1.58		1.58	1.58		1.58		1.58		1.58	
leat demand	kWh	65,483		56,992		58.380		50.527		48.145		59.523		47.080	53.067		65.385	52,741		58.208		63,405		678,936	
Efficiency of heat distribution system		80%		80%		80%		80%		80%		80%		80%	80%		80%	80%		80%		80%		80%	
Heat output from Gas CHP		81,854		71,239		72,975		63,159		60,182		74,404		58.850	66,333		81,731	65,926		72,760		79,256		848,670	
nours/d		15		15		14		12		11		14		11	12		16	12		14		15		13	
lours of operation	hrs	470		409		419		363		346		427		338	381		469	379		418		455		4,875	
Gas consumption of CHP	kW	335		335		335		335		335		335		335	335		335	335		335		335		335	
otal gas consumption of CHP	kWh	157.412	31.168	136,999 27	126		27.786	121,460	24.049	115.734	22.915	143.084	28.331	113.173 22.408	127.564 25.258	1	57.175 31.121	126.781	25 103	139.924	27 705	152.415	30.178		323.147
Electricity output	kWh	51,946	27,479	45,210	23.916	46.311	24,498	40.082	21.20		20,204	47.218	24,978	37.347 19.757			51.868 27.438	41.838	22.132	46.175	24,427	50.297	26,607	538,579	284.9
BIOMASS BOILER		32,340	27,475	45,210	25,510	40,511	24,430	40,002	22,20	30,132	20,204	47,210	24,570	37,347	42,030	22,203	27,430	41,030	22,252	40,173		30,237	20,007	330,373	204,5
Heat output of Biomass Boiler	kWth	579		579		579		579		579		579		579	579		579	579		579		579		579	
Efficiency of Boiler	KVV CII	85%		85%		85%		85%		85%		85%		85%	85%		85%	85%		85%		85%		85%	
Heat Demand		104,438		94,446		83,164		63,823		37,391				-	-		-	45,450		79,296		103,471		611,479	
Efficiency of heat distribution system		80%		80%		80%		80%		80%		80%		80%	80%		80%	80%		80%		80%		80%	
Heat output from biomass boiler		130.548		118.057		103.955		79,779		46,739		- 3070		-	-		-	56,812		99,120		129,339		764,348	
Hours of operation		7		7		103,333		73,773		30,733								30,012		55,120		7		704,540 A	
otal biofuel consumption		225		204		180		138		81								98		171		223		1,320	
otal biofuel consumption	kWh	153,585	1.382	138.891 1	350	122.300	1.101	93.858	845	54.987	495	_						66.838	602		1.050	152.163	1.369	899.234	8.093
ocal biorder consumption	KVVII	133,363	1,302	150,091 1,	,230	122,500	1,101	33,030	043	34,367	433	-	-					00,030	602	110,011	1,030	152,105	1,309	033,234	0,055
Elec capacity	kWp	1,682		1,682		1,682		1,682		1,682		1,682		1,682	1,682		1,682	1,682		1,682		1,682		1,682	
lec output	kWh/moi	29,155	15,423	53.983	28,557	110,471	58,439	136,666	72.296		87.358	182,221	96,395	176,527 93,383		87.358 1	48,055 78,321	108.194	57,234	63,550	33.618	32.800	17.351		756,0
COOKING (gas)	kWh/moi	29,133	15,425	33,363	20,557	110,471	- 50,439	150,000	72,230	103,136	67,336	102,221	- 90,393	170,327 93,363	103,130	07,550	40,033 70,321	100,194	- 37,234	- 05,550	33,010	32,800	- 17,551	1,429,290	- 750,0:
			•		-		-		•		•		-						-		-		-		
otal available heat generated	kWh	212,853		189,974		178,058		144,293		108,558		76,210		60,600	67,970		83,198	123,868		172,557		209,046		1,627,185	
Senerated electricity		81,101		99,193		156,782		176,747		203,330		229,439		213,874	207,234	1	99,922	150,032		109,724		83,097		1,967,874	
Heat CO2 cost at 2006 baseline			82,439	74	,683		70,641		59,161		46,986		35,982	30,659	33,138		38,324		52,153		68,726		81,149		674,042
Elec CO2 cost at 2006 baseline			56.689		.689		56.689		56.689		56.689		56,689	56.689	56,689		56,689		56,689		56,689		56,689		680,270
and the state of t			23,003	30,	,		,		,,,,,,,		22,003		,	30,003	30,369		30,003		22,303		,-33		22,303		,
Total CO2 at 2006 baseline			139,129	131	,372		127,330		115,851		103,675		92,671	87,349	89,827		95,014		108,842	1	25,415	1	137,838		1,354,312
CO2 emission from option			39,080	25,	,326	-	4,648	-	19,213		34,772	-	43,671	- 41,356	- 34,990		- 25,251	-	4,260		20,133		37,022	-	116,965
			72%		81%	_	104%		117%	_	134%		147%	147%	139%		127%	_	104%		84%		73%		109%

CO2 based on monthly outputs	1,354,312
total CO2 at 2006 baseline	- 86,601
CO2 emission from option	106%

Series 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		J.	ANUARY 3		FEBRUARY	28	N	MARCH 31		APRIL			MAY	31		30	JULY		AUGUST 31		SEPTEMBER 30		OCTOBER 31		NOVEMBER	30	DECEMBER 31	L	TOTAL	
Methodolity of the control of the co	FUNC 2006		Demand	CO cost CO savin	g Deman	d CO cost	CO saving	Demand	CO cost CO	saving	Demand	CO cost CO savir	g Demand	CO cost CO sav	ing Demand	CO cost CO s	aving [Demand CO cost CO saving	Demand	CO cost CO saving	Demand	CO cost CO savir	g Demand	CO cost CO savin	g Demand	CO cost CO saving	Demand	CO cost CO savin	g Demand	CO cost CO s
			65 121	12 904	59.64	11.612		54 726	10.020		44.752	9 961	22 627	6 660	24.025	A 757		10 262 2 924	21 146	4 197	22 217	4 200	29 072	7 520	52.012	10.407	64 106	12 602	502 521	99 501
Separation set shows a set of the set of the separation set shows a set of the																														
See the section of the contribution of the con			,	,	1.,,	,		,	,		11,7.55	,	1.1,1.00	,	11,7.00	,		20,220	1.,,	,	13,133	,	11,100	,	11,7100	,	1	,	33.7.23	
			46,070	9,122	41,21	8,161		38,281	7,580		30,793	6,097	22,457	4,446	15,248	3,019		11,751 2,327	13,089	2,592	16,663	3,299	25,784	5,105	36,989	7,324	45,309	8,971	343,648	68,042
Seminary Sem	PEE elec demand		33,589	17,366	33,58	17,366		33,589	17,366		33,589	17,366	33,589	17,366	33,589	17,366		33,589 17,366	33,589	17,366	33,589	17,366	33,589	17,366	33,589	17,366	33,589	17,366	403,069	208,387
The section of the content of the co	E heat demand		41,463		37,09	1		34,453			27,714		20,211		13,723			10,576	11,780		14,996		23,205		33,290		40,778		309,283	
Marked Works 19 1																											/			
Former Proper																														
		kWh/mor	53	2	80		4	133		6	159		193		9 212		10	206 9	193	9	173		133	(80	4	53	2	1,667	
The state of the s																														
See								39			39		39					39	39		39						39			
See fire for years of the fire fire for years of the fire for years of y		kwe																												
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The state of the s		Idado																												
State 100 10		KVVII																			**									
THE REPORT OF TH																														
The section of the control of the co								-,			13,097		12,517		10,088				, ,		10,330						10,290			
Seminary Composition of the comp		hrs	2.4								335		321		422						474						417			
1			451								333 75		75		432												417			
The content of the co			22 267	6.400					5 7//		25 196	4 997	24 071	4.766	22 477	6.420				C C1C		7.056		E 102		E 709	21 242	6 206		69 520
MAN COME PART OF THE PART OF T							4 928			5 064										-,										6
Second content of Propriets 19		83711	10,001	3,030	5,510		4,520	3,313		3,004	0,311	4,55	1,544	7,0	10,717		,005	0,220	3,132	4,002	11,755	0,22	0,030	4,57	3,314	3,033	10,545	5,472	114,231	·
The second secon		kWth	39		39			39			39		39		39			39	39		39		39		39		39		39	
The presented of the pr			21					21			21		21		21						21						21			
The power parts of Pysham be also with a power part of Pysham be a					555	6							55%						55%		55%		55%							
Second March Mar																														
Service of the control of the contro		kWh																									/			
The second composed of the control o	ciency of heat distribution system		80%		809	6		80%			80%		80%		80%			80%	80%		80%		80%		80%		80%		80%	
ris deprisation hy 1.5 1.0 1	it output from biomass CHP				-			-			-		-		-				-		-		-		-		- /		-	
The second property of	irs/d				-			-			-		-		-			-	-		-		-		-		- /		-	
which we will will will will will will will w	urs of operation	hrs	-		-			-			-		-		-			-	-		-		-		-		- /		-	
Talloy output Wh	mass consumption of CHP	kW	108		10	3		108			108		108		108			108	108		108		108		108		108		108	
MASS DUER Output of Bornas Roller 155	al biomass consumption of CHP		-		-	-		-	-		-	-	-	-	-	-			-	-	-	-	-	-	-	-	- /	-	-	-
Loughed for MVID 155 1		kWh	-	-	-		-	-		-	-	-	-		-		-		-	-	-	-	-	-	-	-	- /	-	-	
Tempor of looler control professors of looks and the professors of looks and looks and the professors of looks and the professors of looks and	MASS BOILER																										4			
Chemand Capacity	t output of Biomass Boiler	kWth																												
Book															85%			85%	85%		85%									
Configuration Configuratio															-			-	-		-									
rs of operation 7															80%			80%	80%		80%									
blofuel consumption 225			34,931		31,589			27,816			21,347		12,506		-			-	-		-		15,202		26,522		34,608		204,520	
A place of the properties of t			7		7			6			5		3		-			-	-		-		3		6		7		4	
Capacity kWp 315															-			-	-		-									
Nutry of Mark Mark Mark Mark Mark Mark Mark Mark	biofuel consumption	kWh	41,096	370	37,164	334		32,724	295		25,114	226	14,713	132	-				-	-	-	-	17,884	161	31,202	281	40,715	366	240,612	2,166
Output NM/mo 8,539 4,517 12,008 6,776 21,347 11,293 25,617 13,551 30,953 16,374 34,155 31,068 33,068 17,00 2,494 494																											4			
KING (gas)							6.775			4 202							000			46.55										
available heat generated kWh 51,815 46,348 43,033 34,603 25,216 17,100 13,168 14,677 18,702 28,974 41,593 50,999 386,187 rated electricity 19,200 22,124 30,920 33,928 38,897 44,873 41,514 40,145 39,510 30,003 22,322 18,882 382,137 electricity 22,154 23,1							6,776			1,293																				14:
rated electricity 19,220 22,124 30,920 33,928 38,897 44,873 41,314 40,145 39,510 30,003 22,322 18,882 382,137 CCO cost at 2006 baseline 12,894 11,613 10,838 8,861 6,660 4,757 3,834 4,187 4,399 7,538 10,497 12,693 95,01 CCO cost at 2006 baseline 23,154				494					494			494		494		494				494	7 .	494		494				494		5,925
COZ cost at 2006 baseline 12,894 11,613 10,838 8,861 6,660 4,757 3,834 4,187 4,399 7,538 10,497 12,693 99,501 1,000 1,00		kWh																												
CO2 cost at 2006 baseline 23,154 23,1	rated electricity		19,220		22,124			30,920			33,928		38,897		44,873			41,314	40,145		39,510		30,003		22,322		18,882		382,137	
LCQ at 2006 baseline 36,048 34,767 33,992 32,015 29,814 27,911 26,988 27,341 27,553 30,693 33,651 35,847 377,350 emission from option 14,468 12,076 7,535 5,117 2,173 543 931 2,129 4,006 7,336 12,036 14,441 82,790																														
emission from option 14,668 12,076 7,555 5,117 2,173 543 931 2,129 4,006 7,336 12,036 14,441 82,790	CO2 cost at 2006 baseline			23,154		23,154			23,154			23,154		23,154		23,154		23,154		23,154		23,154		23,154		23,154		23,154		277,849
emission from option 14,668 12,076 7,555 5,117 2,173 543 931 2,129 4,006 7,336 12,036 14,441 82,790	I CO2 at 2006 baseline			36,048		34,767			33,992			32,015		29,814		27,911		26,988		27,341		27,553		30,693	T	33,651		35,847		377,350
CON CEN 789																								7,336	T					
				60%				_	700/			0.49/				089/					_	85%		76%	T		7	60%		78%

CO2 based on monthly outputs 376,618
total CO2 at 2006 baseline 82,790
CO2 emission from option 78%

CHP_Bicester (9F) Final Energy Calcs 21.06.11-NOT ISSUED

4. PV-Gas CHP-Biomass Monthly Hyder Consulting (UK) Ltd

BASELINE 2006	132 9.926 120 3,474 199 7,167 199 7,167 190 3,257 199 199 199 199 199 199 199 199 199 199	CO cost CO saving Di 9,926 3,474 7,167 3,257 1	ASP 28 CO cost CO savin	41,873 8,291 6,720 3,474 30,005 5,941 6,300 3,257 27,004 2,006 30 19 85% 1.58 8,952 8,952 8,952 1,190 12 375 57 21,1519 4,261	APRIL 30 CO saving Demand CO cost CO saving 33,964 6,725 6,220 3,474 24,073 4,766 6,300 3,257 21,666 35 80 30 19 85% 1,58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 3,26	MAY 31 Demand CO cost CO savir 25,024	17,398 3,445 6,720 3,474 7,233 1,432 6,300 3,257 10,483 35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	Demand CO cost CO saving 13,695 6,720 3,474 6,702 1,327 6,300 3,257 7,984 35 103 5 30 19 85% 1,58 7,881 80% 9,851 11 330 5,7 18,945 3,751 6,252 3,307	Demand CO cost CO saving 15,014 2,973 3,474 9,860 1,952 6,300 3,257 8,874 35 96 4 30 19 85% 1.58 8,778 8,778 8,778 8,778 7,78 6,763 367 57 21,101 4,178 6,963 3,684	Demand CO cost CO saving 18,854 6,720 3,474 12,740 6,300 3,257 11,466 35 86 4 30 19 85% 1,58 11,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	TOBER 91 Demand CO cost CO saving 28,523 6,720 3,474 19,993 3,959 6,300 3,257 17,993 35 66 3 30 19 19 19 18 8,097 8,097 8,097 10,122 11 339 57 19,465 3,854 6,423 3,384	NOVEMBER 30 Demand CO cost CO saving 40,494 8,018 6,720 3,474 28,970 5,736 6,300 3,257 26,073 35 40 2 30 19 85% 1,1,105 11,2 372 57 21,356 4,228 7,047 3,728	49,356 9,772 6,720 3,474 35,617 7,052 6,300 3,257 32,055 35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	379,400 75,121 80,640 41,691 267,750 53,015 75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 51,354
	132 9.926 120 3,474 199 7,167 199 7,167 190 3,257 199 199 199 199 199 199 199 199 199 199	9,926 3,474 7,167 3,257 1	45,075 8,925 6,720 3,474 32,406 6,300 3,257 32,5	41,873 8,291 6,720 3,474 30,005 5,941 6,300 3,257 27,004 35 66 30 19 85% 1.58 8,952 8,0% 11,190 12 375 57 21,1519 4,261 51 7,101	33,964 6,725 6,720 3,474 24,073 4,766 6,300 3,257 21,666 3 35 800 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 3,26	25,024 4,955 6,720 3,474 17,368 3,439 6,300 3,257 7,544 4 96 30 30 3,257 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,123 30 16	17,398 3,445 6,720 3,474 7,233 1,432 6,300 3,257 10,483 35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	13,695 2,712 6,720 3,474 6,702 1,327 6,300 3,257 7,984 35 103 5 30 19 85% 1,58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307 30	15,014 2,973 6,720 3,474 9,860 1,952 6,300 3,257 8,874 35 96 4 4 30 19 85% 1,58 8,778 8,678 8,778 8,678 10,972 12 367 57 21,101 4,178 6,963 3,684	18,854 3,733 6,720 3,474 12,740 2,523 6,300 3,257 11,466 35 86 4 30 19 85% 11,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	28.523 5.648 6.720 3,474 19.993 3,959 6.300 3,257 17.993 35 66 3 30 19 8.5% 1.58 8.097 8.0% 10.122 111 339 57 19,465 3,854 6.423 3,398	40,494 8,018 6,720 3,474 28,970 5,736 6,300 3,257 26,073 35 40 2 30 19 85% 1,158 8,884 80% 11,105 12 37 2 37 2 40 2 30 30 19 85% 1,158 8,884 8,884 8,884 8,884 8,884 8,704 1,705 1,7	49,356 9,772 6,720 3,474 35,617 7,052 6,300 3,257 32,055 35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	379,400 75,121 80,640 41,691 267,750 53,015 75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 51,354
	720 3,474 199 7,167 800 3,257 779 35 27 1 30 199 5% 56 66 60 66 67 77 117 77 57 57 4,743 65 4,743 65 9,90	3,474 7,167 3,257 1 4,743 4,182	6,720 3,474 32,406 6,416 6,300 3,257 29,165 35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 304 57 4,141 6,901 3,651	6,720 3,474 30,005 5,941 6,300 3,257 27,004 2 66 30 19 85% 1.158 8,952 8,0% 11,190 12 375 57 21,1519 4,261 7,101	6,720 3,474 24,073 4,766 6,300 3,257 21,666 3 35 80 30 19 85% 1,58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 3,26	6,720 3,474 17,368 3,439 6,300 3,257 7,544 4 35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,125 30 16	6,720 3,474 7,233 1,432 6,300 3,257 10,483 35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	6,720 3,474 6,702 1,327 6,300 3,257 7,984 35 103 5 30 19 85% 1,58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	6,720 3,474 9,860 1,952 6,300 3,257 8,874 35 96 4 30 19 85% 1.58 8,778 8,0% 10,972 12 367 57 21,101 4,178 6,963 3,684	6,720 3,474 12,740 2,523 6,300 3,257 11,466 35 86 4 30 19 85% 1,130 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	6,720 3,474 19,993 3,959 6,300 3,257 17,993 35 666 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 6,423 3,354 6,423 3,398	6,720 3,474 28,970 5,736 6,300 3,257 26,073 35 40 2 30 19 85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	6,720 3,474 35,617 7,052 6,300 3,257 32,055 35 27 1 30 19 85% 1,58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	80,640 41,691 267,750 53,015 75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 259,365 51,354
Exterity demand 6,720	720 3,474 199 7,167 800 3,257 779 35 27 1 30 199 5% 56 66 60 66 67 77 117 77 57 57 4,743 65 4,743 65 9,90	3,474 7,167 3,257 1 4,743 4,182	6,720 3,474 32,406 6,416 6,300 3,257 29,165 35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 304 57 4,141 6,901 3,651	6,720 3,474 30,005 5,941 6,300 3,257 27,004 2 66 30 19 85% 1.158 8,952 8,0% 11,190 12 375 57 21,1519 4,261 7,101	6,720 3,474 24,073 4,766 6,300 3,257 21,666 3 35 80 30 19 85% 1,58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 3,26	6,720 3,474 17,368 3,439 6,300 3,257 7,544 4 35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,125 30 16	6,720 3,474 7,233 1,432 6,300 3,257 10,483 35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	6,720 3,474 6,702 1,327 6,300 3,257 7,984 35 103 5 30 19 85% 1,58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	6,720 3,474 9,860 1,952 6,300 3,257 8,874 35 96 4 30 19 85% 1.58 8,778 8,0% 10,972 12 367 57 21,101 4,178 6,963 3,684	6,720 3,474 12,740 2,523 6,300 3,257 11,466 35 86 4 30 19 85% 1,130 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	6,720 3,474 19,993 3,959 6,300 3,257 17,993 35 666 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 6,423 3,354 6,423 3,398	6,720 3,474 28,970 5,736 6,300 3,257 26,073 35 40 2 30 19 85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	6,720 3,474 35,617 7,052 6,300 3,257 32,055 35 27 1 30 19 85% 1,58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	80,640 41,691 267,750 53,015 75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 259,365 51,354
See	7,167 3,257	7,167 3,257 1 1 4,743 2	32,406 6,416 6,300 3,257 29,165 35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	30,005 5,941 6,300 3,257 27,004 35 2 66 30 19 85% 1,58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	24,073 4,766 6,300 3,257 21,666 35 80 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,757 6,174 30 16	17,368 3,439 6,300 3,257 7,544 35 96 4 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,125	7,233 1,432 6,300 3,257 10,483 35 106 5 5 30 19 55% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	6,702 1,327 6,300 3,257 7,984 35 103 5 103 5 109 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307 30	9,860 1,952 6,300 3,257 8,874 35 96 4 30 19 85% 1,58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	12,740 2,523 6,300 3,257 11,466 35 86 4 30 19 85% 11,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	19,993 3,959 6,300 3,257 17,993 35 66 3 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	28,970 5,736 6,300 3,257 26,073 35 40 2 30 19 85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	35,617 7,052 6,300 3,257 32,055 35 27 1 3 9 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050 30	267,750 53,015 75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 51,354
PEE eac demand PEE heat demand 32,579 PEE heat demand 32,579 JART HERMAL stalled capacity kW 35 remail output KWh/mo 27 AS CHP AS CHP AS CHP Bet output of Gas CHP system stricincy of Gas CHP system at output of Gas CHP system tricincy of Gas CHP system at the period of CHP system at demand kWh 9,966 ficiency of heat distribution system at output from Gas CHP at output from Gas CHP between the period of CHP system at output from Gas CHP at output from Gas CHP between the period of	3,257 3,257 3,257 3,257 3,30 3,0 3,0 3,0 3,0 3,0 3,0 3,0 3,0 3,	1 4,743 4,182	6,300 3,257 29,165 35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 364 57 4,141 6,901 3,651	6,300 3,257 27,004 35 2 66 30 19 85% 1,58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	6,300 3,257 21,666 3 5 8 00 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,757 6,174 30 16	6,300 3,257 7,544 35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,121 30 16	6,300 3,257 10,483 35 106 5 30 19 85% 1,58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	6,300 3,257 7,984 35 103 5 30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	6,300 3,257 8,874 35 96 4 30 19 85% 1,58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	6,300 3,257 11,466 35 86 4 30 19 55% 1,1,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	6,300 3,257 17,993 35 66 3 30 19 85% 1.58 8.097 80% 40,122 11 339 57 19,465 6,423 3,3854 6,423 3,398	6,300 3,257 26,073 35 40 2 30 19 85% 1,58 8,884 80% 11,105 12 372 7 21,556 7,047 3,728	6,300 3,257 32,055 35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	75,600 39,085 232,888 35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
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APEE heat demand 32,579	35 35 1 1 30 19 9 19 9 19 19 19 19 19 19 19 19 19 19	1 4,743 4,182	29,165 35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	27,004 27,004 35 66 30 19 85% 1.58 8,952 80% 11,190 12 375 7,101 30 16 55%	21,666 3	7,544 35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,121 30 16	10,483 35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	7,984 35 103 5 30 19 85% 1,58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	8,874 35 96 4 30 19 85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	11,466 35 86 4 30 19 85% 1,58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	17,993 35 66 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	26,073 35 40 2 30 19 85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	32,055 35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 12,03 13 404 7,655 4,593 7,655 4,050	232,888 35 833 30 19 85% 1.58 107,996 80% 134,870 12 4,517 57 259,365 51,354
SOLAR THERMAL SOLAR THERMAL SOLAR THERMAL SOLAR THERMAL SOLAR THERMAL SOLAR THERMAL SOLAR THE SOLAR TH	35 27 1 30 19 556 66 60 60 60 60 60 60 60 60 6	1 4,743 4,182	35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	35 66 30 19 85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	35 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 30 16	35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,12:	35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	35 103 5 30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	35 96 4 30 19 85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	35 86 4 30 19 55% 1.58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	35 66 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	35 40 2 30 19 85% 1.58 8.884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 51,354
SOLAR THERMAL	35 27 1 30 19 556 66 60 60 60 60 60 60 60 60 6	1 4,743 4,182	35 40 2 30 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	35 66 30 19 85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	35 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 30 16	35 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,12:	35 106 5 30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	35 103 5 30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	35 96 4 30 19 85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	35 86 4 30 19 55% 1.58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	35 66 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	35 40 2 30 19 85% 1.58 8.884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	35 27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	35 833 30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 51,354
installed capacity kW 35 Inhermal output (kWh/mo) 27 GAS CHP Heat output of Gas CHP system kWh 130 Efficiency of Gas CHP system kWh 19 Efficiency of Gas CHP system kWh 19 Efficiency of Gas CHP system kWh 9,966 Efficiency of Heat distribution system 80 Heat opewer and 18 Hours of operation hrs 12,457 Hours of operation hrs 13 Hours of operation hrs 17 Hours of operation of CHP kWh 23,956 Electricity output Wh 23,956 Electricity output of Blomass CHP system kWh 30 Electricity output of Blomass CHP system kWh 10 Efficiency of blomass CHP system 19 Heat output of blomass CHP system 19 Heat output of heat distribution system 19 Heat output from blomass CHP 19 Heat output from blomass CHP 19 Hours of operation hrs 19 Heat output of Blomass CHP 19 Heat output for CHP 19 Hours of operation 19 Hours of operation 19 Hours of operation 22,587 Efficiency of peat sitribution system 19 Heat output from blomass Boller 19 Hea	27 1 30 30 19 95 556 66 60 006 57 13 17 57 56 4,743 05 4,182 30 16	4,743 4,182 2	40 2 30 19 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	2 66 30 19 85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	3 80 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 3,757 6,174 3,26	4 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,121 30 16	106 5 30 19 55% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	103 5 30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	30 19 85% 1.58 8,778 8,0% 10,972 12 367 57 21,101 4,178 6,963 3,684	86 4 30 19 85% 1.58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	66 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	40 2 30 19 85% 15.8 8.884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	833 30 19 85% 1.58 107,896 80% 124,870 12 4,517 57 259,365 51,354
Thermal output GAS CHP Heat output of Gas CHP system	27 1 30 30 19 95 556 66 60 006 57 13 17 57 56 4,743 05 4,182 30 16	4,743 4,182 2	40 2 30 19 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	2 66 30 19 85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	3 80 30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 3,757 6,174 3,26	4 96 30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,121 30 16	106 5 30 19 55% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	103 5 30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	30 19 85% 1.58 8,778 8,0% 10,972 12 367 57 21,101 4,178 6,963 3,684	86 4 30 19 85% 1.58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	66 3 30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	40 2 30 19 85% 15.8 8.884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	27 1 30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	833 30 19 85% 1.58 107,896 80% 124,870 12 4,517 57 259,365 51,354
GAS CHP	30 19 19 5% 5% 58 66 00% 57 7 7 57 56 4,743 05 4,182 30 16 65% 59 90 0	4,743 4,182 2	30 19 85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651	30 19 85% 1.58 8,952 8,952 8,00% 11,190 12 375 57 21,519 4,261 7,101	30 19 85% 1.58 7,783 80% 9,728 11 326 57 18,709 3,704 6,174 3,26	30 19 85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,129 30	30 19 85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355	30 19 85% 1.58 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	30 19 85% 1.58 8,778 8,0% 10,972 12 367 57 21,101 4,178 6,963 3,684	30 19 85% 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	30 19 85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	30 19 85% 1.58 8,884 80% 11,105 12 372 57 21,556 4,228 7,047 3,728	30 19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	30 19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
Read output of Gas CHP system With 30	5% 5.58 6.66 0.06 5.7 1.3 1.3 1.7 5.5 6. 4,743 0.5 4,182 3.0 1.6 6.5% 9.90	4,743 4,182 2	85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651 30 16 55%	85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	85% 1.58 7.783 80% 9.728 11 326 57 18,709 3,704 3,757 6,174 30 16	85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,12	85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	85% 158 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	19 85% 1.58 11,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
Identicity output of Gas CHP ystem S5% Identicity output of Gas CHP Identicity output Identicity	5% 5.58 6.66 0.06 5.7 1.3 1.3 1.7 5.5 6. 4,743 0.5 4,182 3.0 1.6 6.5% 9.90	4,743 4,182 2	85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651 30 16 55%	85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	85% 1.58 7.783 80% 9.728 11 326 57 18,709 3,704 3,757 6,174 30 16	85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,12	85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	85% 158 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	19 85% 1.58 11,380 80% 14,225 16 476 57 27,356 5,416 9,027 4,776	85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	19 85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	19 85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
SSK	5% 5.58 6.66 0.06 5.7 1.3 1.3 1.7 5.5 6. 4,743 0.5 4,182 3.0 1.6 6.5% 9.90	4,743 4,182 2	85% 1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651 30 16 55%	85% 1.58 8,952 80% 11,190 12 375 57 21,519 4,261 7,101 30 16 55%	85% 1.58 7.783 80% 9.728 11 326 57 18,709 3,704 3,757 6,174 30 16	85% 1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 3,12	85% 1.58 10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	85% 158 7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	85% 1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	85% 1.38 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	85% 1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	85% 1.58 8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	85% 1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	85% 1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
1.58	.58 66 60% 57 13 117 57 56 4,743 05 4,182 30 16 55% 90	4,743 4,182 2	1.58 8,700 80% 10,874 13 364 57 20,912 4,141 6,901 30 16	1.58 8,952 8,952 8,952 11,190 12 375 57 21,519 4,261 7,101	1.58 7,783 80% 9,728 11 326 57 18,709 3,704 3,757 6,174 30 16	1.58 7,448 80% 9,310 10 312 57 17,904 3,545 5,908 30 16	1.58 10,377 80% 12,971 14 434 57 24,945 8,232 4,355 30 16	1.58 7,881 80% 9,851 11 330 57 18,945 6,252 3,307	1.58 8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	1.58 11,380 80% 14,225 16 476 57 27,356 9,027 4,776	1.58 8,097 80% 10,122 11 339 57 19,465 3,854 6,423 3,398	1.58 8.884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	1.58 9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	1.58 107,896 80% 134,870 12 4,517 57 259,365 85,590
teat demand fifciency of heat distribution system leat output from Gas CHP lours of geration lours of geration lours of geration lass consumption of CHP lours as consumption of CHP lours as consumption of CHP lours as consumption of CHP lours of geration lectricity output lours of geration lours of geration lours of geration lectricity output lours of geration lectricity output of biomass CHP system leat output of biomass CHP system leat output of biomass CHP system leat of geration leat of geration leat of geration lours of geration lours of geration lours of geration lours of operation lours of operation lours of operation lours of cHP lours of	66 076 57 13 13 17 57 56 4,743 05 4,182 30 16 55 59 90	4,743 4,182 2	8,700 80% 10,874 13 364 57 20,912 4,141 6,901 3,651 30 16	8,952 80% 11,190 12 375 57 21,519 4,261 51 7,101	7,783 80% 9,728 11 326 57 18,709 3,757 6,174 30 16	7,448 80% 9,310 10 312 57 17,904 3,545 5,908 30 16	10,377 80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	7,881 80% 9,851 11 330 57 18,945 3,751 6,252 3,307	8,778 80% 10,972 12 367 57 21,101 4,178 6,963 3,684	11,380 80% 14,225 16 476 57 27,356 9,027 4,776	8,097 80% 10,122 111 339 57 19,465 3,854 6,423 3,398	8,884 80% 11,105 12 372 57 21,356 4,228 7,047 3,728	9,651 80% 12,063 13 404 57 23,198 4,593 7,655 4,050	107,896 80% 134,870 12 4,517 57 259,365 85,590
SM SM SM SM SM SM SM SM	0% 57 13 17 57 56 4,743 05 4,182 30 16 55%	4,743 2 4,182	80% 10,874 13 364 57 20,912 4,141 6,901 3,651 30 16 55%	80% 11,190 12 375 57 21,519 4,261 7,101	80% 9,728 11 326 57 18,709 3,704 3,757 6,174 3,26	80% 9,310 10 312 57 17,904 3,545 66 5,908 30 16	80% 12,971 14 434 57 24,945 4,939 8,232 4,355 30	80% 9,851 11 330 57 18,945 3,751 6,252 3,307	80% 10,972 12 367 57 21,101 4,178 6,963 3,684	80% 14,225 16 476 57 27,356 5,416 9,027 4,776	80% 10,122 11 339 57 19,465 3,854 6,423 3,398	80% 11,105 12 372 57 21,356 4,228 7,047 3,728	80% 12,063 13 404 57 23,198 4,593 7,655 4,050	80% 134,870 12 4,517 57 259,365 51,354 85,590
teat output from Gas CHP 12,457 bours/d 13 tours of operation hrs 417 as consumption of CHP kWh 23,956 lectricity output kWh 23,956 lectricity output kWh 7,905 BIOMASS CHP Weth 30 teact output of biomass CHP system kWe 16 fifticiency of biomass CHP system kWh 55% teat to power ratio of CHP system kWh 60 teat demand kWh 60 ficiency of heat distribution system kWh 6 teat output from biomass CHP - - ours/d - - ours of operation hrs - slomass consumption of CHP kW 83 otab biomass consumption of CHP kWh - lectricity output kWh - slowAMSS BOILER - - teat output follomass Boiler KWth 10 fficiency of beal distribution system 22,587	57 13 17 57 56 4,743 05 4,182 30 16 5%	4,743 4,182 2	10,874 13 364 57 20,912 4,141 6,901 3,651 30 16	11,190 12 375 57 21,519 4,261 51 7,101 30 16 55%	9,728 11 326 57 18,709 3,704 6,174 3,26	9,310 10 312 57 17,904 3,545 56 5,908 3,12:	12,971 14 434 57 24,945 4,939 8,232 4,355 30 16	9,851 11 330 57 18,945 3,751 6,252 3,307	10,972 12 367 57 21,101 4,178 6,963 3,684	14,225 16 476 57 27,356 9,027 4,776	10,122 11 339 57 19,465 3,854 6,423 3,398	11,105 12 372 57 21,356 4,228 7,047 3,728	12,063 13 404 57 23,198 4,593 7,655 4,050	134,870 12 4,517 57 259,365 51,354 85,590
13	13 17 57 56 4,743 05 4,182 30 16 55%	4,743 2 4,182	13 364 57 20,912 4,141 6,901 3,651 30 16 55%	12 375 57 21,519 4,261 7,101 30 16 55%	11 326 57 18,709 3,704 3,757 6,174 3,24	10 312 57 17,904 3,545 5,908 3,129	14 434 57 24,945 4,939 8,232 4,355 30	11 330 57 18,945 3,751 6,252 3,307	12 367 57 21,101 4,178 6,963 3,684	16 476 57 27,356 5,416 9,027 4,776	11 339 57 19,465 3,854 6,423 3,398	12 372 57 21,356 4,228 7,047 3,728	13 404 57 23,198 4,593 7,655 4,050	12 4,517 57 259,365 85,590
Hours of operation	17 57 56 4,743 05 4,182 30 16 55% ,90	4,182	364 57 20,912 4,141 6,901 3,651 30 16 55%	375 57 21,519 4,261 51 7,101 30 16 55%	326 57 18,709 3,704 6,174 3,26 30 16	57 17,904 3,545 56 5,908 3,12 ! 30	434 57 24,945 4,939 8,232 4,355 30	330 57 18,945 3,751 6,252 3,307	367 57 21,101 4,178 6,963 3,684	476 57 27,356 5,416 9,027 4,776	339 57 19,465 3,854 6,423 3,398	372 57 21,356 4,228 7,047 3,728	404 57 23,198 4,593 7,655 4,050	4,517 57 259,365 51,354 85,590
Gas consumption of CHP kW 23,956 Electricity output Wh 7,905 Electricity output Wh 7,905 Electricity output Wh 7,905 BIOMASS CHP Wheta output of biomass CHP system kWe 16 Electricity output of biomass CHP system kWe 16 Electricity output of biomass CHP system kWe 16 Electricity output of biomass CHP 55% Heat to power ratio of CHP system wheta output from biomass CHP 55% Electricity of biomass CHP 800 Mours/d	57 56 4,743 05 4,182 30 16 5% 990	4,182	57 20,912 4,141 6,901 3,651 30 16 55%	57 21,519 4,261 51 7,101 30 16 55%	57 18,709 3,704 3,757 6,174 3,24 30 16	57 17,904 3,545 56 5,908 3,12 ! 30	57 24,945 4,939 8,232 4,355 30 16	57 18,945 3,751 6,252 3,307	57 21,101 4,178 6,963 3,684	57 27,356 5,416 9,027 4,776	57 19,465 3,854 6,423 3,398	57 21,356 4,228 7,047 3,728	57 23,198 4,593 7,655 4,050	57 259,365 51,354 85,590
Total gas consumption of CHP Electricity output BIOMASS CHP West output of biomass CHP system Lectroticy output of biomass CHP system Electricity output of biomass CHP system Electricity output of biomass CHP system L190 L80 L80 L80 L80 L80 L80 L80 L	56 4,743 05 4,182 30 16 5%	4,182	20,912 4,141 6,901 3,651 30 16 55%	21,519 4,261 7,101 30 16 55%	18,709 3,704 3,757 6,174 3,26 30 16	17,904 3,545 56 5,908 3,12 ! 30 16	24,945 4,939 8,232 4,355 30 16	18,945 3,751 6,252 3,307	6,963 3,684	27,356 5,416 9,027 4,776	19,465 3,854 6,423 3,398	21,356 4,228 7,047 3,728	23,198 4,593 7,655 4,050	259,365 51,354 85,590
Electricity output	05 4,182 30 16 55% 990	4,182	6,901 3,651 30 16 55%	7,101 30 16 55%	3,757 6,174 3,26 30 16	30 16	8,232 4,355 30 16	6,252 3,307	6,963 3,684	9,027 4,776	6,423 3,398	7,047 3,728	7,655 4,050	85,590
BIOMASS CHP Heat output of biomass CHP system kWth 16 Electricity output of biomass CHP system kWe 16 Efficiency of biomass CHP system 19 Heat of the property	30 16 5% .90		30 16 55%	30 16 55%	30 16	30 16	30 16	30					30	
Heat output of biomass CHP system W/Wh 30	16 5% .90		16 55%	16 55%	16	16	16		20		20	30		30
Electricity output of biomass CHP system	16 5% .90		16 55%	16 55%	16	16	16		20		20	30		30
Efficiency of biomass CHP 55% Heat to power ratio of CHP system 1.90 Heat demand kWh Efficiency of heat distribution system 80% Heat output from biomass CHP - Hours of operation hrs - Biomass consumption of CHP kW 38 Total biomass consumption of CHP kWh - Electricity output kWh - BIOMASS BOILER Heat output of Biomass Boiler kWth 100 Efficiency of Boiler KWth 100 Efficiency of Point and distribution system 22,587 Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 28	.90		55%	55%					30	30				
Efficiency of biomass CHP 55% Heat to power ratio of CHP system 1.90 Heat demand 80% Heat demand 80% Heat output from biomass CHP hours/d hours of operation hrs Biomass consumption of CHP 80% Biomass boilts Heat output of Biomass Boiler 80% Heat output of Biomass Boiler 80% Heat output of Biomass Boiler 80% Heat output of Biomass boiler 90% Heat output of Biomass boiler 90% Heat output for biomass boiler 90% Biomass Boiler 90% Heat output for Biomass boiler 90%	.90				55%	55%		16	16	16	16	16	16	16
Heat to power ratio of CHP system Heat demand kWh Efficiency of heat distribution system Heat output from biomass CHP Learn output from Learn output	.90						55%	55%	55%	55%	55%	55%	55%	55%
Heat demand Efficiency of heat distribution system Heat output from biomass CHP hours of operation Hours of operation Biomass consumption of CHP Electricity output Biomass consumption of CHP Electricity output Biomass Boiler Heat output of Biomass Boiler Efficiency of Boile Heat output of Biomass Boiler Efficiency of Boile Heat output of Hours of Boiler Heat output of heat distribution system Heat output from biomass boiler Jesus States Hours of operation Jesus States Jesus St					1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Efficiency of heat distribution system Heat output from biomass CHP hours/d Hours of operation Biomass consumption of CHP kW Biomass consumption of CHP kWh Electricity output kWh BIOMASS BOILER Heat output of Biomass Boiler S% Heat output from biomass boiler Lead output	ne/				2.00									
Heat output from biomass CHP hours/d - hours of operation hrs - hours of operation hrs - hours of operation of CHP kW 83 hours of total biomass consumption of CHP kWh - Electricity output kWh - Blomass Soutier kWh - Blomass Boiler kWh 100			80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Hours of operation hrs Islamass consumption of CHP kW 83 Total bineass consumption of CHP kWh 9- Electricity output kWh 9- BIOMASS BOILER kWh 1- Electricity output 61 Biomass Boiler kWth 100 Efficiency of Boiler 88% Heat output of Biomass Boiler 82,587 Efficiency of heat distribution system 88% Heat output from biomass boiler 28,234 Hours of operation 99 Total biofuel consumption 2838			-	5070	50%	-	-	5575	-	-	-	-	-	-
Hours of operation			-					-	-	-	-			-
Biomass consumption of CHP kW - 38 Total biomass consumption of CHP kWh 10 kWh - 10 kW			-	-		-	-	-	-	-	-	-		
Total bidivages consumption of CHP	02		83	83	- 02	-	83	- 02	-	-	- 02	- 02		
Electricity output	83		83	83	83	83		83	83	83	83	83	83	83
BIOMASS BOILER LWth Heat output of Blomass Boiler kWth Efficiency of Boiler 85% Heat Demand 22,587 Efficiency of heat distribution system 80% Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 283	-	-												
Heat output of Biomass Boiler kWth 100 Efficiency of Boiler 85% Heat Demand 22,587 Efficiency of heat distribution system 80% Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 283	-	-	•	-		-	-							-
Efficiency of Boiler 85% Heat Demand 22,587 Efficiency of heat distribution system 80% Heat output from biomass boiler 28,234 Hours of operation 9 Total bidules Lonsumption 283														
Heat Demand 22,587 Efficiency of heat distribution system 80% Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 283			100	100	100	100	100	100	100	100	100	100	100	100
Efficiency of heat distribution system 80% Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 283			85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Heat output from biomass boiler 28,234 Hours of operation 9 Total biofuel consumption 283		2	20,426	17,986	13,803			-	÷	-	9,830	17,149	22,378	124,159
Hours of operation 9 Total biofuel consumption 283			80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Total biofuel consumption 283	34	2	25,532	22,482	17,254	-	-	-	-	-	12,287	21,437	27,972	155,199
	9		9	7	6		-	-	-	-	4	7	9	4
	83		256	225	173	-	-	-	-	-	123	215	280	1,553
Total biofuel consumption kWh 33,216	16 299	299 3	30,038 270	26,450 238	20,299 183						14,455 130	25,220 227	32,909 296	182,587 1,643
PV														
Elec capacity kWp 189	89		189	189	189	189	189	189	189	189	189	189	189	189
Elec output kWh/mor 5,120		2,709	7,680 4,063		6,772 15,361 8,12		20,481 10,835		18,561 9,819	16,641 8,803	12,801 6,772			
COOKING (gas) kWh/moi -														
Total available heat generated kWh 40,717	17	3	36.447	33,739	27,062	9.406	13,078	9.954	11,069	14,311	22,475	32,582	40,062	290,902
Generated electricity 13,026			14.582	19.902	21,535	24,469	28,713	26,093	25,524	25,669	19.224	14,728	12,776	246,240
Jenerated electricity 13,026			14,302	19,902	21,333	24,409	20,713	20,095	23,324	23,009	19,224	14,720	12,770	240,240
Heat CO2 cost at 2006 hazeling			8,925	0.204	6 725	4.055	3,445	2,712	2.072	3,733	5,648	9.019	0.773	75,121
Heat CO2 cost at 2006 baseline	26		8,925	8,291	6,725 3,474	4,955			2,973			8,018	9,772	
Elec CO2 cost at 2006 baseline	9,926					3,474	3,474	3,474	3,474	3,474	3,474	3,474	3,474	41,691
	26		3,474	3,474	3,474									
Total CO2 at 2006 baseline	9,926 3,474	3,474	3,474									11,492	13,247	116,812
CO2 emission from option	9,926 3,474 13,400	3,474 13,400	3,474 12,399	11.765	10,199	8,429	6,919	6,186	6,447	7,207	9,122			
	9,926 3,474 13,400 1,407	3,474 13,400 1,407	3,474 12,399 - 47	11,765 - 2,775	10,199	- 6,147	- 6,998	- 6,800	- 6,072	- 4,909	- 2,931	- 80	1,387	- 38,216
	9,926 3,474 13,400	3,474 13,400 1,407 89%	3,474 12,399			- 6.147								- 38,216 1339

NOTES 1 CO2 factors Gas Electricity Displaced Electricity woodchip 2 Solar Photo-Voltaic (PV) 1.25 kWp output per 10 m2 3 Gas CHP 52% Thermal efficiency 33% Electrical efficiency 85% efficiency 1.58 Heat/Power Ratio 4 Biomass CHP 55% Thermal efficiency 29% Electrical efficiency 84% efficiency 1.90 Heat/Power Ratio 5 Biomass Boiler 85% efficiency 6 Gas Boiler 90% efficiency

7 Heat Distribution System (Including Storage)

80% efficiency

CHP_Bicester (9F) Final Energy Calcs 21.06.11-NOT ISSUED 2 of 2