Table 4 – Energy Strategy – carbon balance

DOMESTIC CARBON BALANCE

		JANUARY 31			FEBRUARY 28			MARCH 31			APRIL 30			MAY 31			JUNE 30			JULY 31			AUGUST 31			SEPTEMBER 30			OCTOBER 31			NOVEMBER 30			DECEMBER 31			TOTAL		
		Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving
BASELINE 2006																																							
Gas demand		416,361	82,439		377,187	74,683		356,771	70,641		298,795	59,161		237,302	46,986		181,727	35,982		154,845	30,659		167,364	33,138		193,557	38,324		263,398	52,153		347,099	68,726		409,844	81,149		3,404,251	674,042	
Electricity demand		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		109,650	56,689		1,315,804	680,270	
APEE ENERGY BASELINE																																							
APEE gas demand		189,303	37,482		169,016	33,465		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	21,850		153,535	30,400		185,919	36,812		1,449,535	287,008	
APEE elec demand		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		95,654	49,453		1,147,846	593,437	
SOLAR THERMAL																																							
Installed capacity	kW	35			35			35			35			35			35			35			35			35			35			35			35			35		
Thermal output	kWh/mo	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		637
GAS CHP																																							
Heat output of Gas CHP system	kWth	174			174			174			174			174			174			174			174			174			174			174			174			174		
Electricity output of Gas CHP system	kWe	110			110			110			110			110			110			110			110			110			110			110			110			110		
Efficiency 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		
Heat 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		
hours/d		15			15			14			12			11			14			11			12			16			12			14			15			13		
Hours 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		
Total gas consumption of CHP	kWh	157,412	31,168		136,999	27,126		140,336	27,786		121,460	24,049		115,734	22,915		143,084	28,331		113,173	22,408		127,564	25,258		157,175	31,121		126,781	25,103		139,924	27,705		152,415	30,178		1,632,057	323,147	
Electricity output	kWh	51,946		27,479	45,210		23,916	46,311		24,498	40,082		21,203	38,192		20,204	47,218		24,978	37,347		19,757	42,096		22,269	51,868		27,438	41,838		22,132	46,175		24,427	50,297		26,607	538,579		284,908
BIOMASS BOILER																																							
Heat output of Biomass Boiler	kWth	579			579			579			579			579			579			579			579			579			579			579			579			579		
Efficiency of Boiler		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			-			-			-			-			56,812			99,120			129,339			764,348		
Hours of operation		7			7			6			5			3			-			-			-			-			3			6			7			4		
Total biofuel consumption		225			204			180			138			81			-			-			-			-			98			171			223			1,320		
Total biofuel consumption	kWh	153,585	1,382		138,891	1,250		122,300	1,101		93,858	845		54,987	495		-	-		-	-		-	-		-	-		66,838	602		116,611	1,050		152,163	1,369		899,234	8,093	
PV																																							
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		
Elec output	kWh/mo	29,155		15,423	53,983		28,557	110,471		58,439	136,666		72,296	165,138		87,358	182,221		96,395	176,527		93,383	165,138		87,358	148,055		78,321	108,194		57,234	63,550		33,618	32,800		17,351	1,429,296		756,097
COOKING (gas)	kWh/mo	-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-	
Total 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		
Generated electricity		81,101			99,193			156,782			176,747			203,330			229,439			213,874			207,234			199,922			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			56,689			56,689			56,689			56,689			56,689			56,689			56,689			56,689			56,689			56,689			56,689			680,270		
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			125,415			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%

NON-DOMESTIC CARBON BALANCE

		JANUARY 31			FEBRUARY 28			MARCH 31			APRIL 30			MAY 31			JUNE 30			JULY 31			AUGUST 31			SEPTEMBER 30			OCTOBER 31			NOVEMBER 30			DECEMBER 31			TOTAL		
		Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving
BASELINE 2006																																							
Gas demand		65,121	12,894		58,649	11,613		54,736	10,838		44,752	8,861		33,637	6,660		24,025	4,757		19,362	3,834		21,146	4,187		22,217	4,399		38,073	7,538		53,013	10,497		64,106	12,693		502,531	99,501	
Electricity demand		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		44,785	23,154		537,425	277,849	
APEE ENERGY BASELINE																																							
APEE gas demand		46,070	9,122		41,216	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	
APEE elec demand		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		33,589	17,366		33,589	17,366		403,069	208,387	
APEE heat demand		41,463			37,094			34,453			27,714			20,211			13,723			10,576			11,780			14,996			23,205			33,290			40,778			309,283		
SOLAR THERMAL																																							
Installed capacity	kW	35			35			35			35			35			35			35			35			35			35			35			35			35		
Thermal output	kWh/mo	53		2	80		4	133		6	159		7	193		9	212		10	206		9	193		9	173		8	133		6	80		4	53		2	1,667		75
GAS CHP																																							
Heat output of Gas CHP system	kWth	39			39			39			39			39			39			39			39			39			39			39			39			39		
Electricity output of Gas CHP system	kWe	25			25			25			25			25			25			25			25			25			25			25			25			25		
Efficiency 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		
Heat demand	kWh	13,465			11,743			12,067			10,477			10,014			13,510			10,370			11,587			14,824			10,911			11,993			13,038			144,000		
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from Gas CHP		16,831			14,679			15,084			13,097			12,517			16,888			12,962			14,484			18,530			13,639			14,991			16,298			180,000		
hours/d		14			13			12			11			10			14			11			12			16			11			13			13			13		
Hours of operation	hrs	431			376			386			335			321			432			332			371			474			349			384			417			4,609		
Gas consumption of CHP	kW	75			75			75			75			75			75			75			75			75			75			75			75			75		
Total gas consumption of CHP	kWh	32,367	6,409		28,229	5,589		29,008	5,744		25,186	4,987		24,071	4,766		32,477	6,430		24,927	4,936		27,854	5,515		35,634	7,056		26,229	5,193		28,829	5,708		31,342	6,206		346,154	68,539	
Electricity output	kWh	10,681		5,650	9,316		4,928	9,573		5,064	8,311		4,397	7,944		4,202	10,717		5,669	8,226		4,352	9,192		4,862	11,759		6,221	8,656		4,579	9,514		5,033	10,343		5,471	114,231		60,428
BIOMASS CHP																																							
Heat output of biomass CHP system	kWth	39			39			39			39			39			39			39			39			39			39			39			39			39		
Electricity output of biomass CHP system	kWe	21			21			21			21			21			21			21			21			21			21			21			21			21		
Efficiency of biomass CHP		55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%		
Heat to power ratio of CHP system		1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90		
Heat demand	kWh																																							
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from biomass CHP		-			-			-			-			-			-			-			-			-			-			-			-			-		
hours/d		-			-			-			-			-			-			-			-			-			-			-			-			-		
Hours of operation	hrs	-			-			-			-			-			-			-			-			-			-			-			-			-		
Biomass consumption of CHP	kW	108			108			108			108			108			108			108			108			108			108			108			108			108		
Total biomass consumption of CHP	kWh	-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-	
Electricity output	kWh	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	
BIOMASS BOILER																																							
Heat output of Biomass Boiler	kWth	155			155			155			155			155			155			155			155			155			155			155			155			155		
Efficiency of Boiler		85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%		
Heat Demand		27,945			25,271			22,253			17,078			10,005			-			-			-			-			12,161			21,218			27,686			163,616		
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from biomass boiler		34,931			31,589			27,816			21,347			12,506			-			-			-			-			15,202			26,522			34,608			204,520		
Hours of operation		7			7			6			5			3			-			-			-			-			3			6			7			4		
Total biofuel consumption		225			204			180			138			81			-			-			-			-			98			171			223			1,320		
Total 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	
PV																																							
Elec capacity	kWp	315			315			315			315			315			315			315			315			315			315			315			315			315		
Elec output	kWh/mo	8,539		4,517	12,808		6,776	21,347		11,293	25,617		13,551	30,953		16,374	34,155		18,068	33,088		17,504	30,953		16,374	27,751		14,680	21,347		11,293	12,808		6,776	8,539		4,517	267,906		141,722
COOKING (gas)	kWh/mo	2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		2,494	494		29,925	5,925	
Total 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			50,959			386,187		
Generated 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		
Heat CO2 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		
Elec 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		
Total CO2 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		
CO2 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		
			60%			65%			78%			84%			93%			98%			97%			92%			85%			76%			64%			60%			78%		

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

SCHOOL CARBON BALANCE

		JANUARY 31			FEBRUARY 28			MARCH 31			APRIL 30			MAY 31			JUNE 30			JULY 31			AUGUST 31			SEPTEMBER 30			OCTOBER 31			NOVEMBER 30			DECEMBER 31			TOTAL		
		Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving	Demand	CO cost	CO saving
BASELINE 2006																																							
Gas demand		50,132	9,926		45,075	8,925		41,873	8,291		33,964	6,725		25,024	4,955		17,398	3,445		13,695	2,712		15,014	2,973		18,854	3,733		28,523	5,648		40,494	8,018		49,356	9,772		379,400	75,121	
Electricity demand		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		6,720	3,474		80,640	41,691	
APEE ENERGY BASELINE																																							
APEE gas demand		36,199	7,167		32,406	6,416		30,005	5,941		24,073	4,766		17,368	3,439		7,233	1,432		6,702	1,327		9,860	1,952		12,740	2,523		19,933	3,959		28,970	5,736		35,617	7,052		267,750	53,015	
APEE elec demand		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		6,300	3,257		75,600	39,085	
APEE heat demand		32,579			29,165			27,004			21,666			7,544			10,483			7,984			8,874			11,466			17,993			26,073			32,055			232,888		
SOLAR THERMAL																																							
Installed capacity	kW	35			35			35			35			35			35			35			35			35			35			35			35			35		
Thermal output	kWh/mo	27		1	40		2	66		3	80		4	96		4	106		5	103		5	96		4	86		4	66		3	40		2	27		1	833		37
GAS CHP																																							
Heat output of Gas CHP system	kWth	30			30			30			30			30			30			30			30			30			30			30			30			30		
Electricity output of Gas CHP system	kWe	19			19			19			19			19			19			19			19			19			19			19			19			19		
Efficiency 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		
Heat demand	kWh	9,966			8,700			8,952			7,783			7,448			10,377			7,881			8,778			11,380			8,097			8,884			9,651			107,896		
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from Gas CHP		12,457			10,874			11,190			9,728			9,310			12,971			9,851			10,972			14,225			10,122			11,105			12,063			134,870		
hours/d		13			13			12			11			10			14			11			12			16			11			12			13			12		
Hours of operation	hrs	417			364			375			326			312			434			330			367			476			339			372			404			4,517		
Gas consumption of CHP	kW	57			57			57			57			57			57			57			57			57			57			57			57			57		
Total gas consumption of CHP	kWh	23,956	4,743		20,912	4,141		21,519	4,261		18,709	3,704		17,904	3,545		24,945	4,939		18,945	3,751		21,101	4,178		27,356	5,416		19,465	3,854		21,356	4,228		23,198	4,593		259,365	51,354	
Electricity output	kWh	7,905		4,182	6,901		3,651	7,101		3,757	6,174		3,266	5,908		3,125	8,232		4,355	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		45,277
BIOMASS CHP																																							
Heat output of biomass CHP system	kWth	30			30			30			30			30			30			30			30			30			30			30			30			30		
Electricity output of biomass CHP system	kWe	16			16			16			16			16			16			16			16			16			16			16			16			16		
Efficiency of biomass CHP		55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%			55%		
Heat to power ratio of CHP system		1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90			1.90		
Heat demand	kWh																																							
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from biomass CHP		-			-			-			-			-			-			-			-			-			-			-			-			-		
hours/d		-			-			-			-			-			-			-			-			-			-			-			-			-		
Hours of operation	hrs	-			-			-			-			-			-			-			-			-			-			-			-			-		
Biomass consumption of CHP	kW	83			83			83			83			83			83			83			83			83			83			83			83			83		
Total biomass consumption of CHP	kWh	-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-	
Electricity output	kWh	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-
BIOMASS BOILER																																							
Heat output of Biomass Boiler	kWth	100			100			100			100			100			100			100			100			100			100			100			100			100		
Efficiency of Boiler		85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%			85%		
Heat Demand		22,587			20,426			17,986			13,803			-			-			-			-			-			9,830			17,149			22,378			124,159		
Efficiency of heat distribution system		80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%			80%		
Heat output from biomass boiler		28,234			25,532			22,482			17,254			-			-			-			-			-			12,287			21,437			27,972			155,199		
Hours of operation		9			9			7			6			-			-			-			-			-			4			7			9			4		
Total biofuel consumption		283			256			225			173			-			-			-			-			-			123			215			280			1,553		
Total biofuel consumption	kWh	33,216	299		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			189			189			189			189			189			189			189			189			189			189			189			189		
Elec output	kWh/mo	5,120		2,709	7,680		4,063	12,801		6,772	15,361		8,126	18,561		9,819	20,481		10,835	19,841		10,496	18,561		9,819	16,641		8,803	12,801		6,772	7,680		4,063	5,120		2,709	160,650		84,984
COOKING (gas)	kWh/mo	-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-	
Total available heat generated	kWh	40,717			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		
Heat CO2 cost at 2006 baseline			9,926			8,925			8,291			6,725			4,955			3,445			2,712			2,973			3,733			5,648			8,018			9,772			75,121		
Elec CO2 cost at 2006 baseline			3,474			3,474			3,474			3,474			3,474			3,474			3,474			3,474			3,474			3,474			3,474			3,474			41,691		
Total CO2 at 2006 baseline			13,400			12,399			11,765			10,199			8,429			6,919			6,186			6,447			7,207			9,122			11,492			13,247			116,812		
CO2 emission from option			1,407			- 47			- 2,775			- 4,251			- 6,147			- 6,998			- 6,800			- 6,072			- 4,909			- 2,931			- 80			1,387			- 38,216		
			89%			100%			124%			142%			173%			201%			210%			194%			168%			132%			101%			90%			133%		

CO2 based on monthly outputs	116,812
total CO2 at 2006 baseline	- 38,216
CO2 emission from option	133%

CARBON BALANCE - DOMESCTIC & NON-DOMESTIC	- 3,810
CARBON BALANCE - DOMESCTIC, NON-DOMESTIC & SCHOOL	- 42,026

NOTES

1 CO2 factors

Gas	0.198	from mains
Electricity	0.517	from mains
Displaced Electricity	0.529	
woodchip	0.009	

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