Air Source Heat Pump Calculations following demand reduction of Gas Consumption - No data for Sports Pavilion, and Leisure Centre to be assessed nearer 2030

1) Total (ballpark) T/CO2e savings from replacement of gas heating with Air Source Heat Pumps	***304.52***	***66.38%***	From a total CO2e emissions of all gas heating of	***458.74***	Leaving **165.49** to be offset by PV, thus reducing future running costs.
2) HP solution reduces annual running costs (before any solar PV added) of	***£6,510***	If Solar PV installed to offset remaining emissions, savings from the avoided cost of imported elec (based on current costs):		***£53,331***	With potential additional revenue from exporting excess generated energy of: ***£7,202***

	TBC Offices	*TBC Office comments*	Roses Theatre	*Theatre comments*	Hat Shop	*HAT Shop comments*	5 x Domestic	*Domestic Houses comments*	Leisure Centre	*Leisure Centre comments*	Totals		
Current Annual Heat Demand - Gas in kWh	568,569	Represents current consumption for whole building	233,897		11,794		71,428	Data based on EPC extrapolation	1,632,377		2,518,065		
Demand Reduction (DR) from time savings	74,161	15% from optimisation of heating to match demand through weather controls	120,835	Main Air Handling Unit currently running 24/7. Est 80% of all usage. 58 hrs p/w req'd	5,307	45% possible from optimisation of heating to match demand through weather controls	22,657	Total savings have been extrapolated to include property for which no data available, and is 79% of total savings based on DEFRA published consumption (2017)	0	Detail of all data is contained in Scenario 2 (TLC HP&PV), but replicated here to show impact of all Heat Pump solution opportunity	222,960		
Demand Reduction from temp savings (after savings from time reductions applied)	82,491	20% reduction (2.5oC) would still provide in office temp of 21	0	No savings estimated as controls broken	0	Control Temps set high but necessary based on building type	N/A		0		82,491		
New potential demand from DR savings	411,916	Savings in order of 30% minimum anticipated	113,062	Minimum 50% savings available - likely to be higher	6,487		48,771		1,632,377		2,212,613		
Demand after Combustion losses removed	288,341	Old plant generously assumed to be 70% efficient	79,143	Old plant generously assumed to be 70% efficient	4,541	Old Nemeha Quinta Boiler - 70% efficient at best	39,017	Taken 80% Boiler Efficiency	1,469,139	Taken 90% Boiler Efficiency	1,880,182		
COP of A-2-A	4	50/50 split of demand between both heat pump technologies	4	80% A-2-A system 20% A-2-W estimated	N/A	100% A-2-W	N/A	100% A-2-W	4				
COP of A-2-W	3		3		3		3		3				
Demand of A-2-A	36,043		15,829		0		0		257,099	70% of demand Estimated	308,971		
Demand of A-2-W	48,057		5,276		1,514		13,006		146,914	30% of demand estimated	214,766		
Total New Heat Demand	84,100		21,105		1,514		13,006		**404,013**		523,737		
Assumed cost of gas/kWh (incl. Climate Chage Levy	2.65p/kWh	Taken from billings data prior to discounts	3.35p/kWh	No costs available, unit rates estimated	4.8p/kWh	No costs available, unit rates estimated	4.5p/kWh	No costs available, unit rates estimated	2.24		2.51		
Assumed cost of elec/kWh (incl. Climate Chage Levy	15.85p/kWh		17p/kWh		17p/kWh		17p/kWh		12.8		13.58		Average £/kWh based on total consumption and total estimated costs
Estimated current annual operating cost	£15,067	Based on current tariffs and exclusive of VAT	£7,836		£566		£3,214		£36,565		63,248		
Estimated annual operating cost of new system	£13,330		£3,588		£257		£2,211		£51,714		71,100		
Potential revenue - Renewable Heat Incentive (2.75p/kWh)	£2,313	Based on 2019/20 rates	£580	Based on 2019/20 rates	N/A		£358	Based on 2019/20 rates	£11,110		14,403		
Total potential annual cost benefit	£4,050		£4,828		£309		£1,361		-£4,038		6,510		
Current Annual Emissions from heating system	118.13	Tonnes/CO2e p.a for whole building	48.59		2.45		14.84		339.14		**458.74**		data apportioned for only TBC area of office.
Proportionate Annual Emissions for Council based on approtioned floor area	53.71		N/A		N/A		N/A		N/A				
Estimated Annual Emissions from Heat Pump system based on 2019 emissions	26.57		6.67		0.48		4.11		127.66	using 2019 conversion factors	**165.49**	**154.22**	Reduces to **154.22** when apportioned area for TBC office applied
Estimated emissions from Heat Pump System applying projected 2030 CF data	8.16		2.05		0.15		1.26		39.19		**50.80**		Factors in all TBC Building as extent of tenant occupied area in 2030 is not known
Tonnes CO2e annual saving	91.55	77.50%	**41.93**	**86.28%**	**1.97**	**80.48%**	**10.73**	**80.48%**	**211.48**	**62.35%** reduction in emissions	**304.52**		
CO2e savings allocating occupied floor area of t	**38.41**	41.95% total office area allocated to council, so actual saving is **32.5%**	N/A										