

3 Baseline – energy demand estimation

3.1 Energy demand estimation

Baseline energy demand and carbon emissions have been estimated based on a range of benchmarks. Benchmarks are as per the S73 application except where noted below. Benchmarks have been derived from a combination of detailed modelling, industry standard information sources, and project experience.

The following baseline energy benchmarks have been updated from the previous 2010 consent:

- Retail benchmark has been updated following detailed dynamic thermal modelling using IES software of the Retail Centre and applied across retail areas for the whole development;
- Leisure benchmark has been revised based on updated IES modelling for a multi-functional building;
- Healthcare benchmark has been revised based on CIBSE Guide F with a notional reduction applied to space heating and hot water to reflect rapid increases in building energy efficiency;
- Community benchmark has been revised to reflect a split between Education and Community facilities; and
- Industrial benchmark has been revised based on CIBSE TM46 with a notional reduction applied to heat demand in order to account for rapid increases in energy efficiency.

It should be noted that there is inherent uncertainty in grouping building typologies in this way; for instance a community building could have a very high heat and hot water demand if it were a leisure centre, but a low demand if it is a community hall, and a retail could vary from a catering unit to a clothing shop, with inherent variation in heating, hot water, ventilation and electricity demand. This uncertainty around predicted energy demand will remain until detailed design for all plots is undertaken. This will allow detailed energy modelling using approved software to take place to provide more accurate energy demands and carbon emissions.

Table 3-1 Baseline energy demands

		Baseline Energy Demand (MWh/year)					% of Total Energy Demand
		Space Heating	Hot Water	Cooling	Regulated Electricity	Total	
Phase 1	Residential	2,990	4,540	0	1,130	8,660	29%
	Total non-residential	2,890	4,730	1,850	11,440	20,910	71%
	Business	100	20	120	390	630	2%
	Leisure	310	730	130	380	1,550	5%
	Retail	290	860	1,460	4,770	7,380	25%
	Hotel	960	3,030	100	5,450	9,540	32%
	Healthcare	0	0	0	0	0	0%
	Community	180	30	40	160	410	1%
	Industrial	1,050	60	0	300	1,410	5%
	Total	5,880	9,270	1,850	12,570	29,570	100%
Whole Development	Residential	12,250	19,070	0	4,740	36,060	38%
	Total non-residential	11,090	9,550	6,740	32,080	59,460	62%
	Business	3,540	570	4,130	13,910	22,150	23%

	Leisure	420	1,000	180	520	2,120	2%
	Retail	320	950	1,600	5,250	8,120	9%
	Hotel	1,860	5,850	190	10,530	18,430	19%
	Healthcare	1,600	920	460	500	3,480	4%
	Community	730	110	170	640	1,650	2%
	Industrial	2,610	150	0	740	3,500	4%
	Total	23,330	28,620	6,740	36,820	95,510	100%

Table 3-2 Baseline carbon emissions

		Baseline Carbon Emissions (tCO ₂ /year)			% of Total carbon emissions
		Heat and Hot Water	Regulated Electricity (inc. Cooling)	Total	
Phase 1	Residential	1,670	580	2,260	22%
	Total non-residential	1,910	5,920	7,830	78%
	Business	30	200	230	2%
	Leisure	330	200	530	5%
	Retail	260	2,470	2,720	27%
	Hotel	990	2,820	3,810	38%
	Healthcare	0	0	0	0%
	Community	50	80	130	1%
	Industrial	260	150	410	4%
	Total	3,590	6,500	10,090	100%
Whole Development	Residential	6,970	2,450	9,420	30%
	Total non-residential	5,210	16,590	21,800	70%
	Business	1,030	7,190	8,220	26%
	Leisure	450	270	720	2%
	Retail	280	2,710	2,990	10%
	Hotel	1,910	5,440	7,350	24%
	Healthcare	700	260	950	3%
	Community	200	330	530	2%
	Industrial	650	380	1,030	3%
	Total	12,180	19,040	31,210	100%

3.2 Unregulated emissions

In accordance with GLA requirements for Energy Statements, unregulated emissions are estimated. Unregulated emissions are not incorporated into energy targets for the BXC development, however strategies for reducing unregulated emissions are offered here.

Unregulated emissions are emissions from energy consumed in processes not covered by Part L and include occupancy related emissions through activities such as cooking and by electrical appliances such as televisions and computers.

Unregulated emissions are not included in the carbon emissions calculation methodologies for the London Plan, Code for Sustainable Homes or BREEAM. By their nature, unregulated emissions are hard to predict and require a detailed knowledge of the future building occupants. As this information is not currently known for the BXC development, these emissions have been estimated only for a baseline scenario for typical buildings. Unregulated energy benchmarks are based on past Buro Happold projects and CIBSE guidance.

Table 3-3 Baseline estimate of unregulated emissions

	Unregulated CO ₂ Emissions (tCO ₂ /yr.)	
	Phase 1	Whole Development
Business	170	6,050
Apartments	380	1,600
Townhouses	15	40
Leisure	480	660
Retail	1,390	1,530
Hotels	260	490
Healthcare	0	120
Community	130	520
Industrial	160	385
Total	2,985	11,395

Opportunities to reduce unregulated emissions include;

- Use of small power equipment (e.g. IT equipment, washing machines and small appliances) with an "A" energy rating
- Efficient facility management to monitor commercial power usage
- Improvements in power efficiencies of computers and use of laptops rather than desktop computers
- Server rooms may be used to beneficial effect if heat recovery from the spaces is used elsewhere to offset heating (though not representing a reduction in unregulated emissions).
- Efficient energy monitoring to reduce energy wastage
- Smart metering and use of in-home energy displays.

Unregulated emissions represent up to 35% of the BXC carbon emissions. Specific measures to reduce unregulated emissions will be considered in detail for each of the reserved matters applications of individual plots at BXC, based on more detailed information for building design and usage.

8 Summary of carbon emission performance

The overall performance of the development is summarised in Table 8-1 and Figure 8-1 below and overleaf.

Table 8-1 Overall carbon emission reductions

Whole Development Total (Residential and Non-residential)	Regulated Carbon Dioxide Emissions													
	Residential	Business	Leisure	Retail	Hotel	Healthcare	Community	Industrial	Total non-residential emissions	Total Carbon Dioxide Emissions (tCO ₂ /year)	Carbon Dioxide Emissions Savings (tCO ₂ /year)	Total % Reduction	Residential % Reduction	Non-residential % reduction
Baseline	9,420	8,220	720	2,990	7,350	950	530	1,030	21,800	31,210	0	-	-	-
Energy Efficiency 'Lean'	8,320	5,900	690	2,520	6,760	900	480	930	18,180	26,490	4,720	15%	12%	17%
Heat Network 'Clean'	4,730	5,900	690	2,362	5,540	440	360	930	16,260	21,000	5,490	33%	50%	25%
Renewable Energy 'Green'	4,730	5,900	540	2,250	5,510	440	360	770	15,800	20,450	550	34%	50%	28%

From Table 8-1 Overall carbon emission reductions it can be seen that residential developments exceed the target for a 40% reduction, achieving a 50% reduction in regulated carbon emissions. Non-residential developments achieve a 28% reduction in regulated carbon emissions, exceeding the target of a 25% reduction.

This is achieved through following the energy hierarchy, prioritising passive design of the building envelope to minimise energy demand, which responds to the energy demand profile of each building typology. Due to the inherent variation in energy demand profile associated with non-domestic buildings it is important that the energy strategy retains flexibility for each design team to assess where their energy demands and carbon emissions come from, and reduce them in the most appropriate way for their own building typology. Thus the Revised Energy Strategy sets a binding target for each non-domestic building, and provides the option to connect to the district heat network should each building elect to do so, but allows each individual design team to assess feasibility and viability of connection, and to achieve the 25% reduction target in the most appropriate way for their building typology.

It should be noted that due to rounding there may be error of plus or minus 2% when calculating percentage reductions.

Infrastructure to enable connection to the district heat network will be provided in the form of pipework to all plot boundaries. Principal residential building plots will connect to the district heat network. For the purpose of this RES the decision for each plot to connect to the heat network has been assumed to be based on building typology heat demand and major physical constraints to connection. A Phase 1 energy centre is proposed on the Northern site, with a site wide energy centre located on the Southern site. The two energy centres will be linked through the replacement Tempelhof bridge via pit and sleeve infrastructure (the pipework installation is subject to agreement of the connection of the Southern developer when they are identified). If connection of all building plots on the Southern site was mandated by the Southern developer, this would strongly enhance the viability of the scheme for an ESCo.

Where a building typology does not elect to connect to the heat network, the RES demonstrates that alternative means such as building based solutions and solar PV can still achieve the carbon emission reduction targets. This approach is consistent with the current planning permission for the development.

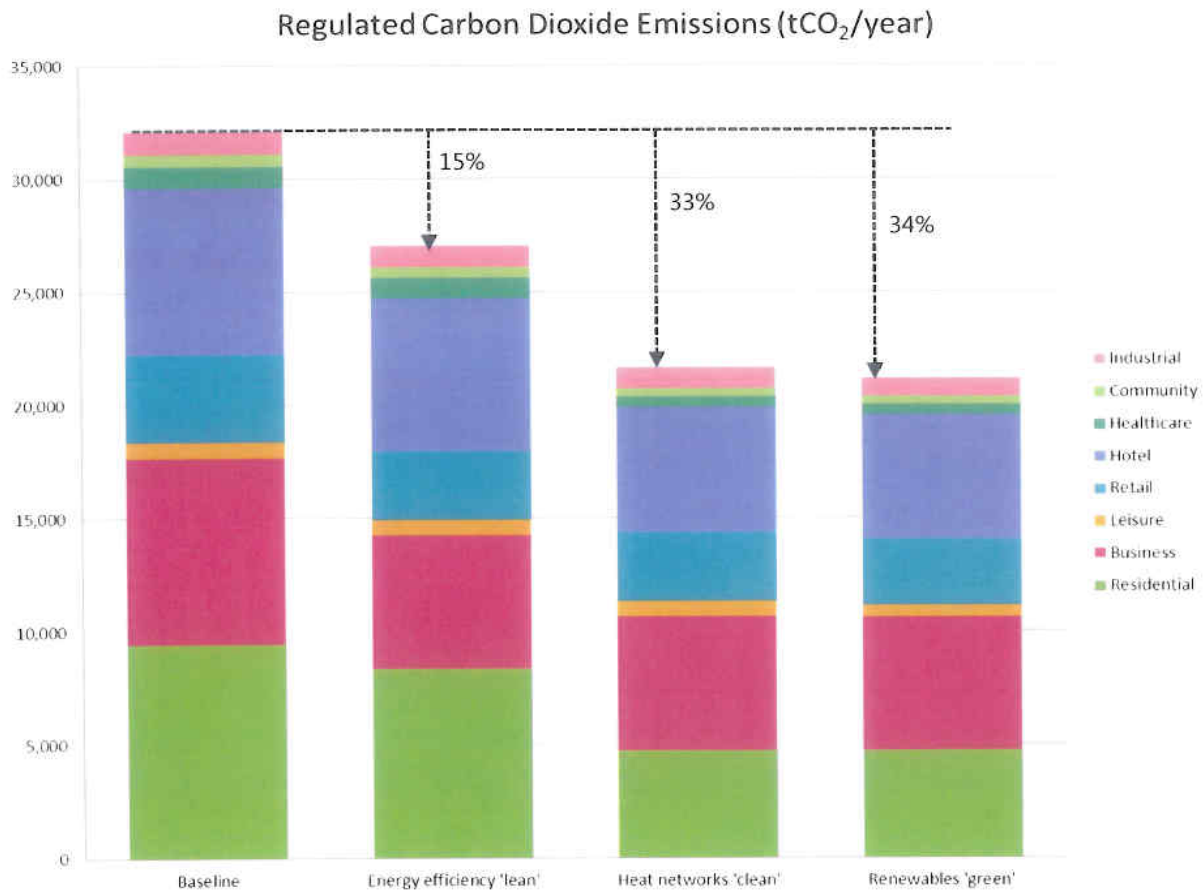


Figure 8-1 Overall development regulated CO₂ emissions