

Committee:	Dated:
Corporate Asset Sub-Committee (CASC)	August 2019
Subject: 2019/20 Quarter 1 Energy Performance Report	Public
Report of: The City Surveyor	For Information
Report author: James Rooke, Assistant Director, Energy & Sustainability	

SUMMARY

This report presents the 2019/20 Quarter 1 Energy Performance Report with results and commentary for the year-on-year and long-term performance for CoL operational sites.

The weather corrected energy consumption decreased 2.0% over Q1 of 2019/20 compared to 2018/19. Smithfields Market was the main contributor to the energy reduction, supported by reductions at Guildhall Complex, Central Criminal Court, and Milton Court.

The annual performance up to Q1 2019/20 indicates a 18.7% reduction in absolute energy consumption, translating to a 16.3% reduction when corrected for the weather against the 2008/09 baseline.

The report also includes position updates on energy projects, power purchase agreements, Citigen negotiations and an additional carbon measurement metric.

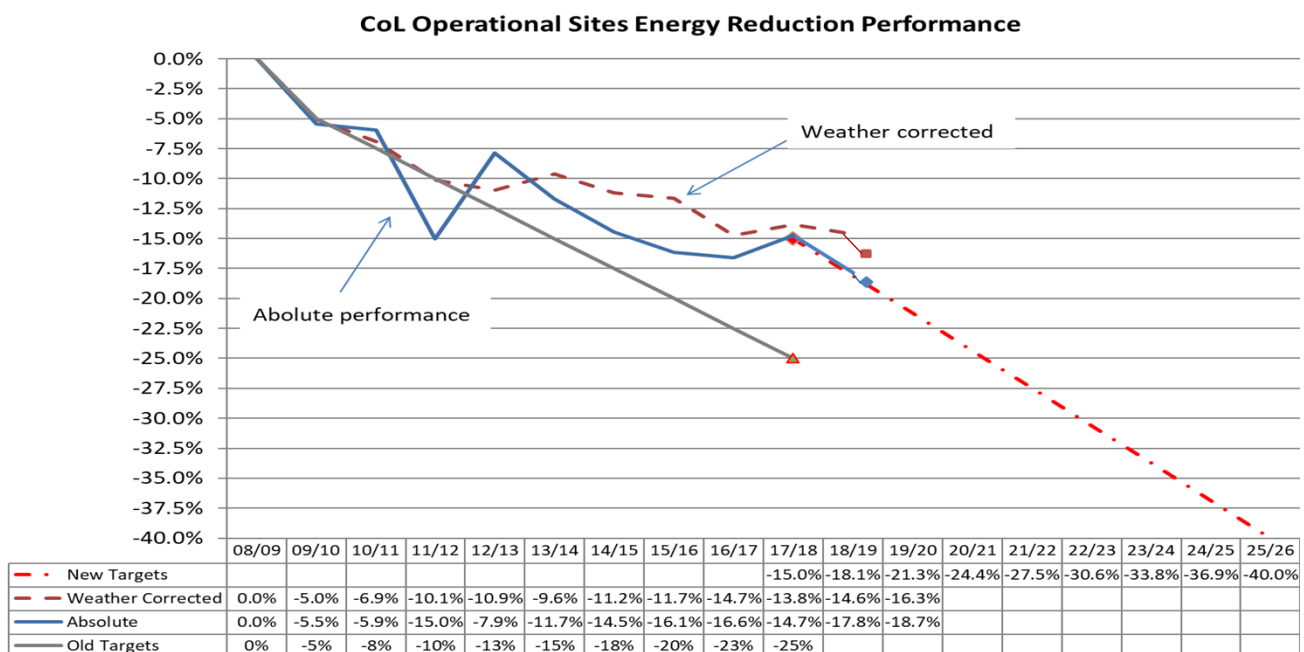
Recommendation

Members are asked to note the contents of this report.

MAIN REPORT

Performance update

Chart 1. Overall performance change from the 2008/09 base year.



1.1 **Long-term:** chart 1 presents an update on the long-term performance against target, including the interim performance up to Q1 19/20 (dotted lines). Compared to the 2008/09 baseline the performance up to Q1 2019/20 indicates a 18.7% reduction in absolute energy consumption, translating to a 16.3% reduction when corrected for the weather. This represents good progress towards achieving the 2019/20 end of year targets to be on course for a 40% reduction by 2025/26. It should be noted that 21 New Street has been added to the portfolio recently, adding ~1.5% to the total portfolio energy consumption. This additional energy should however be reversed when other properties occupied by CoL Police are disposed of in the coming years.

Table 2. Performance comparison by top 30 sites: 2019/20 Q1 with 2018/19

Site Name	Weather corrected kWh 12-month trend				Absolute kWh Q1 18/19 to Q1 19/20	
	12 months to Mar-19	12 months to Jun-19	Diff.	Diff. %	Diff.	% Diff
London Central Market (Smithfield - landlord & tenant)	18,242,591	17,200,515	-1,042,076	-5.7%	-938,643	-20.3%
Guildhall Complex	17,366,450	17,069,879	-296,571	-1.7%	-157,581	-3.7%
Barbican Arts Centre	17,149,546	17,208,021	58,475	0.3%	43,973	1.0%
Central Criminal Court	8,090,943	7,834,203	-256,740	-3.2%	-108,248	-6.4%
New Spitalfields Market (landlord)	6,800,091	6,795,799	-4,292	-0.1%	-51,284	-3.0%
City of London Freeman's School	4,906,582	4,767,663	-138,919	-2.8%	-48,494	-5.3%
GSMD - Milton Court	3,879,176	3,549,576	-329,600	-8.5%	-217,963	-22.9%
Streetlighting	3,628,421	3,654,499	26,077	0.7%	62,784	8.0%
Billingsgate Market (landlord & tenant)	3,573,990	3,543,426	-30,564	-0.9%	-30,564	-4.3%
Bishopsgate Police Station	3,403,005	3,381,704	-21,302	-0.6%	45,274	6.9%
City of London School	3,023,669	3,030,139	6,469	0.2%	53,234	8.8%
City of London Crematorium	2,812,736	2,807,546	-5,190	-0.2%	43,544	7.9%
Tower Bridge	2,326,102	2,391,835	65,733	2.8%	136,837	48.6%
GSMD – Silk St.	2,311,250	2,315,644	4,394	0.2%	11,698	2.3%
Mansion House	2,306,203	2,231,032	-75,171	-3.3%	-40,376	-9.0%
City of London School for Girls	2,250,196	2,237,544	-12,651	-0.6%	30,749	7.1%
New Street (21)	1,807,778	1,699,756	-108,022	-6.0%	-88,996	-19.0%
GSMD - Sundial Court	1,777,505	1,828,879	51,373	2.9%	93,798	28.5%
Walbrook Wharf	1,725,223	1,637,698	-87,525	-5.1%	-51,014	-13.1%
Wood Street Police Station	1,600,081	1,565,973	-34,108	-2.1%	-34,108	-8.3%
London Metropolitan Archives	1,345,486	1,328,468	-17,018	-1.3%	9,867	5.1%
Snowhill Police Station	863,679	852,885	-10,794	-1.2%	1,858	1.2%
Animal Reception Centre	764,249	750,205	-14,044	-1.8%	108	0.1%
Open Spaces Hampstead Heath Leisure	660,653	667,958	7,305	1.1%	7,324	4.5%
Open Spaces Epping Forest	648,255	636,349	-11,906	-1.8%	6,079	6.0%
Tower Hill Coach & Car Park	542,795	549,416	6,621	1.2%	6,621	5.1%
Open Spaces Golders Hill & Extension	371,809	374,914	3,105	0.8%	15,318	18.5%
Upper Thames Street Tunnel Lighting	304,116	280,973	-23,143	-7.6%	-23,143	-28.0%
Open Spaces Parliament Hill	258,042	264,128	6,086	2.4%	12,851	37.9%
Minories Car Park	246,730	239,947	-6,783	-2.7%	-6,783	-10.8%
Total	114,987,355	112,696,574	-2,290,780	-2.0%	-1,215,280	-4.6%

1.2 **Last quarter:** table 2 presents the performance of the 30 largest energy consuming sites. The actual (absolute) difference in energy consumption for Apr-Jun 2019/20 compared to Apr-Jun 2018/19 is presented as well as the weather corrected trend for the 12-months of energy

consumption over the period up to the previous and latest quarter. Comparing the absolute performance provides an indication of recent performance changes but is influenced by the weather which was 33% colder over Q1 19/20 compared to Q1 18/19 and hence resulting in higher heating consumption and lower cooling consumption. The 12-month weather corrected results provide an indication of the latest annual performance when excluding the differences in the weather.

Smithfields Market was the main contributor to the overall energy reduction, supported by reductions at Guildhall Complex, Central Criminal Court, and Milton Court. Commentary focused on the key sites and contributors to performance change is provided below with further commentary provided on others in Appendix 1.

1.3 **LCM (Smithfield)**: overall energy reduced by ~20% in Q1 compared to the previous year, with electricity, heat and cooling all reduced significantly across the East and West market. This was partly a result of the reduced demand for cooling due to the weather, but mostly a result of the measures instigated by the Energy Team since Sep-18 for improved Car Park ventilation control and ongoing control improvements to the other ventilation, heating and cooling systems. This has been supported by site maintenance actions and additional LED lighting installation. Jun-19 consumption compared to Jun-18 was down by 13% for East & West Market electricity, 46% for heating, and 64% for cooling. The Energy Team continue deliver BEMS improvements and are seeking funding towards LED lighting for the car park.

1.4 **Guildhall Complex (GHC)**: consumption reduced across most energy supplies. During Q1:

- 14% reduction in gas for steam generation due to an earlier switch-off for the summer.
- 15% reduction in North Wing electricity due to BEMS improvements by the Energy Team.
- 6% reduction in West Wing electricity due to BEMS improvements by the Energy Team.
- 8% increase in East Wing public areas electricity. Levels remains high, especially overnight; FM are looking into potential issues with the lighting control system.
- 2% increase in East Wing office electricity but ongoing maintenance issues causing plant to operate 24/7 are being investigated by Energy Team and FM.
- 27% increase in actual heat consumption across the site, apart from the East Wing, but when corrected for the colder weather this indicates performance remained unchanged.
- 15% decrease in heat consumption for the East Wing, which may be a result of the VRF system displacing some of the heat demands for the offices.

The Energy Team are in progress with delivering many more BEMS control improvements and are also looking to secure funding towards ventilation motor controls, funding for additional sub-metering and supporting improved site-wide solutions for cooling and humidification.

1.5 **Barbican Arts Centre (BAC)**: overall energy consumption increased slightly in Q1 due to higher cooling demands which were partly offset by lower heating and electricity. The increase in cooling demand is likely related to extended ventilation plant times due to higher service demands but also potential waste due to poor control settings. Heating consumption was lower in part due to a maintenance issue at the Exhibition Halls. Electricity reductions were a result of improved BEMS strategy for the chilled water pumps, and improved control of the Exhibition Hall plant. Increases in electricity for other supplies indicate higher service demands, likely in part due to the return of Art Gallery AHU to operation, but also some potential control issues with the Theatre and Foyers ventilation plant which FM should investigate. The Energy Team are working up a proposal for LED lighting within the car park driveways and will be providing the site with support for BEMS control improvements.

- 1.6 **Central Criminal Court (CCC)**: following advice from the Energy Team, since May the efficiency of the oil boilers has increased through reinstating a smaller oil boiler to improve load matching and reduce system losses. Oil consumption also reduced, and gas consumption increased, as the new gas boilers contribute an increasing proportion of the heating services. Electricity consumption remained static, however, there was a significant increase in the supply associated with the chillers probably due to the heat wave. This was countered by a decrease in other supplies, probably due to the improved efficiency of the new ventilation plant. As the phased refurbishment continues, energy should reduce, but significant reductions will only come once older heating and cooling plant is decommissioned at the end of the programme. The Energy Team are also pursuing funding for LED lighting upgrades.
- 1.7 **GSMD Milton Ct.** electricity consumption reduced by ~10% in the month of June compared to last year, due to lower daytime loads compared to May. This is likely due to recent improvements undertaken by FM to ventilation controls. Heat consumption was higher in Apr-May but significantly lower in June compared to the previous year. The recent reduction likely relates to improvements to the ventilation controls. Cooling consumption has been on a lower trend since Nov-18 and Q1 was ~80% lower than the previous year. This is likely due to control improvements to prevent cooling during times of lower outside air temperature and recent improvements to limit over ventilation. The Energy Team are looking to secure funding to upgrade the lighting in some areas and support FM with further control improvements.
- 1.8 **CoL Police**: this commentary summarises the performance changes across all police buildings as they are in the process of significant accommodation moves. Overall energy consumption reduced by 2.8% across all buildings when corrected for the weather. In-line with reducing occupancy there were continued reductions at Snowhill and Wood Street. Bishopsgate consumption remained about the same, but New Street reduced significantly. The data indicates potential heating system control issues at Snowhill and Bishopsgate which the Energy Team will investigate further with FM.
- 1.9 **Tower Bridge**: electricity consumption for the main supplies reduced significantly over the last heating season due to the replacement of electric heating with the new gas boiler system. Electricity consumption for the South side (including offices) remained static compared to the previous year. Gas consumption is significantly higher compared to the previous year and historical averages. This likely relates to the new gas boilers providing increased capacity and displacing the electric heating, however the Energy Team and FM should review the control settings to ensure efficient operation is being achieved.

Conclusion

While the long-term energy performance remains below target the results for Q1 are a significant improvement which if sustained indicate the end of year target should be met. Continuation of this trajectory would also indicate that the City is on track to achieve the long term 40% reduction target, however this will undoubtedly require continued and additional investment in both capital and resources.

2. Energy Projects update

A bid for capital funding has been submitted as part of the fundamental review for funding as follows:

- Phase 1: £1.9m – for immediate deployment
- Phase 2: £1.4m – for future deployment

In parallel to this a gateway 1-5 paper will be submitted to RASC and Project sub for the October committee cycle.

SALIX funding is also be sought to cover 50% (£950k) for phase 1 under an invest to save scheme.

Proposed Phase 1 Projects are listed in the appendix (project scope and price have been updated since last submission and so have been revised downward to £1.8m).

3. Power Purchase Agreement update

The Power Purchase Agreement tender is now at SQ stage – A procurement timetable is supplied in the appendix.

4. Citigen update

Three working groups have been established to address the Cities goals of cost, environment and compliance:

Technical group: To agree carbon measurement, property, air quality and planning issues

Tariff group: To agree a simpler tariff structure which reflects the costs of infrastructure and energy costs with appropriate indexation.

Commercial group: To confirm legal and contract structure informed by the findings of the technical and tariff groups.

WS Atkins have been appointed as the technical advisor.

Sharpe Pritchard have been appointed as the legal advisor.

Next steps:

- Produce draft Heads of Terms for Dec 2019
- Produce a draft contract with term sheet by April 2020

5. Carbon measurement update

The energy team have undertaken an analysis of gas and electricity for the City covering the last ten years and this is detailed in the appendix.

Initial analysis shows a 47% reduction in carbon dioxide emissions compared to a corresponding 18% reduction in kWh energy, which can largely be attributed to the decarbonisation of grid electricity since 2015.

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Appendix 1. Commentary on other top 30 sites

- 1.1 **New Spitalfields Market:** when adjusted for the weather the electricity consumption has remained static over Q1. The HHD shows overnight loads are slightly lower than the previous year, which may be due to the external temperature differences and their impact on tenant refrigeration. Due to a lack of sub-metering data it is impossible to provide further analysis.
- 1.2 **Billingsgate Market:** electricity consumption has increased significantly since May-19 since an area has been leased out to a new tenant who is operating significant electrical loads. This will have a growing impact on the site energy performance for 2019/20. This consumption is however recharged to the tenant.
- 1.3 **Freemen's:** overall energy consumption was lower mainly related to the communal heating system, swimming pool electricity and Boarding/Music block gas. Site-wide communal heating system gas consumption reduced significantly over May-June. The Energy Team will investigate this and the potential positive impact of the site development plans and pending new CHP energy centre. Swimming pool electricity consumption has been significantly lower since Apr-19, the Energy Team will investigate this with site. Gas for heating the Boarding/Music block has been lower since Nov-18. Maintenance issues persist with the system, which site are addressing. Alongside this there are opportunities to improve the heating control which the Energy Team will investigate. The Energy Team are also looking to secure funding for LED lighting in a few areas.
- 1.4 **Col Girls:** overall energy consumption was about the same, with areas of increases balancing areas of reduction. Swimming pool water heating decreased, probably due to improved control, but was countered by increases in the pool hall air heating. Electricity consumption for small power and lighting has been lower over Q1 compared to the previous year. Lower daytime and overnight loads probably relate to local actions to ensure lighting and appliances are not left on unnecessarily. Electricity consumption for general heating was higher, especially over Q1 due to morning pre-heating even in June. The heating control settings show be reviewed to ensure they are appropriate. The Energy Team are looking to secure funding for the replacement of the very inefficient swimming pool plant and cover.
- 1.5 **CoL Boys:** electricity and gas consumption remain unchanged when corrected for the weather. There continues to be a very high electricity demand even during unoccupied hours. This should be investigated by the site to ensure appliances, lighting and plant are not left operating unnecessarily. The Energy Team are looking to secure funding towards LED lighting and ventilation motor controls.
- 1.6 **GSMD Silk St.** electricity consumption increased in Apr-May but since June it has decreased, and into July it is 20% lower month-on-month than the previous year. This recent trend relates to lower daytime loads and may relate to the site and FM ensuring building services are not operating unnecessarily during the summer holiday period. Due to a faulty meter, which Citigen are looking to repair, it is not possible to analyse the heat consumption data. The Energy Team are looking to secure funding for upgrading the lighting to LED throughout and support FM with further control improvements.
- 1.7 **GSMD Sundial Ct.** electricity consumption was higher over Apr-Jun 2019, especially April which was 19% higher mainly due to higher day-time loads. Heat consumption has varied over the year, but there was a significant increase in June, probably due to a heating control issue. This has since returned to normal levels.

- 1.8 **Mansion House**: electricity consumption has reduced over Q1, up to 11% lower in June which shows lower daytime and overnight loads. Gas consumption for heating has been lower since Feb-19 probably due to resolved maintenance issues with the heating plant.
- 1.9 **Walbrook Wharf**: electricity consumption for the environmental cleansing area (phase 1) decreased significantly since May. This is assumed to be due to the ending of the heating season and cessation of the temporary electric heating to the workshop areas which has been operating while the gas heaters are out of operation. As a result, gas consumption for this area continues to be significantly lower. These trends will reverse once the gas heaters are replaced. Electricity consumption for the office (Phase 2) continues to be lower due to a reduction in occupancy, and significant increases can be expected when areas are tenanted again. Electricity consumption is likely to increase substantially due to the pending increases in electric vehicle charging.
- 1.10 **CoL Cem. & Crem.** gas consumption for the cremators increased over Q1 compared to last year. This likely to be entirely due to demand for their services. Electricity consumption for the New Cremation building was down significantly over the last year and continued to reduce in Apr-May. This is likely due to the replacement of electric heating with the LTHW heat-recover system.
- 1.11 **London Metropolitan Archive (LMA)**: electricity has been significantly lower over Q1 compared to the previous year, but in-line with historical averages. This may be partly related to lower cooling demands over May-June 2019 as the weather was not as warm as the previous year over this period. However, there is also a significant reduction in weekend consumption indicating some change to the HVAC control strategy. Gas consumption increased over Apr-May, partly due to the weather but the control settings should be investigated to ensure efficient operation. The Energy Team are looking to secure funding towards works for improved demand and zoned control of the ventilation to the archive building.
- 1.12 **Streetlighting**: a slight reduction in the electricity consumption likely due to minor changes to the lamp schedule.
- 1.13 **Animal Reception Centre**: electricity consumption continues to be on a significantly lower trend since Dec-18. The data shows overnight loads are lower, indicating some improvement to the control of the plant. Gas consumption has increased slightly due to higher continuous loads, even in the summer. The Energy Team will investigate this to ensure heating control settings are appropriate.
- 1.14 **Open Spaces Hampstead Heath Leisure**: overall energy consumption reduced for Hampstead Heath increased. Electricity consumption for the Lido has increased slightly over Q1 compared to the previous year. This mainly related to an increase in overnight loads which the Energy Team will investigate with site. Gas consumption for the Lido remained static.
- 1.15 **Open Spaces Epping Forest**: overall energy consumption reduced for Epping Forest. Gas for the Warren Office increased likely due to higher hot water demands. Electricity consumption for the Warren office was lower over Mar-Apr but higher over May-Jun. The data shows occasional significantly higher daytime loads which may relate to a specific source. Gas consumption for the View has been significantly higher since April and the Energy Team will investigate further.
- 1.16 **Open Spaces Golders Hill & Extension**: overall energy consumption was similar to the previous year when corrected for the weather. Gas consumption for West Ham Avenue was

significantly higher over May-June and the data shows potential heating control issues which the Energy Team will investigate with FM. Gas consumption for the Extension has been significantly lower since May-18.

- 1.17 **Open Spaces Parliament Hill:** gas consumption increased for the Nassington Rooms and track, due to higher hot water demands. The Energy Team will investigate control settings as there is some unusual consumption in the early hours each Sunday.
- 1.18 **Upper Thames Street Tunnel:** lighting consumption continues to be lower since resolving a maintenance issue in Mar-19 and is now returning to previous levels. Ventilation consumption was lower due to a return to normal levels following a period in 2018 when it was operating higher than usual.
- 1.19 **Tower Hill Coach & Car Park:** electricity consumption is slightly higher, mostly due to an increase in overnight electricity loads. The Energy Team are looking to secure funding for upgrading the lighting and improvements to the ventilation control.
- 1.20 **Minorities Car Park:** electricity consumption has been lower since May-19, the reason is to be confirmed.

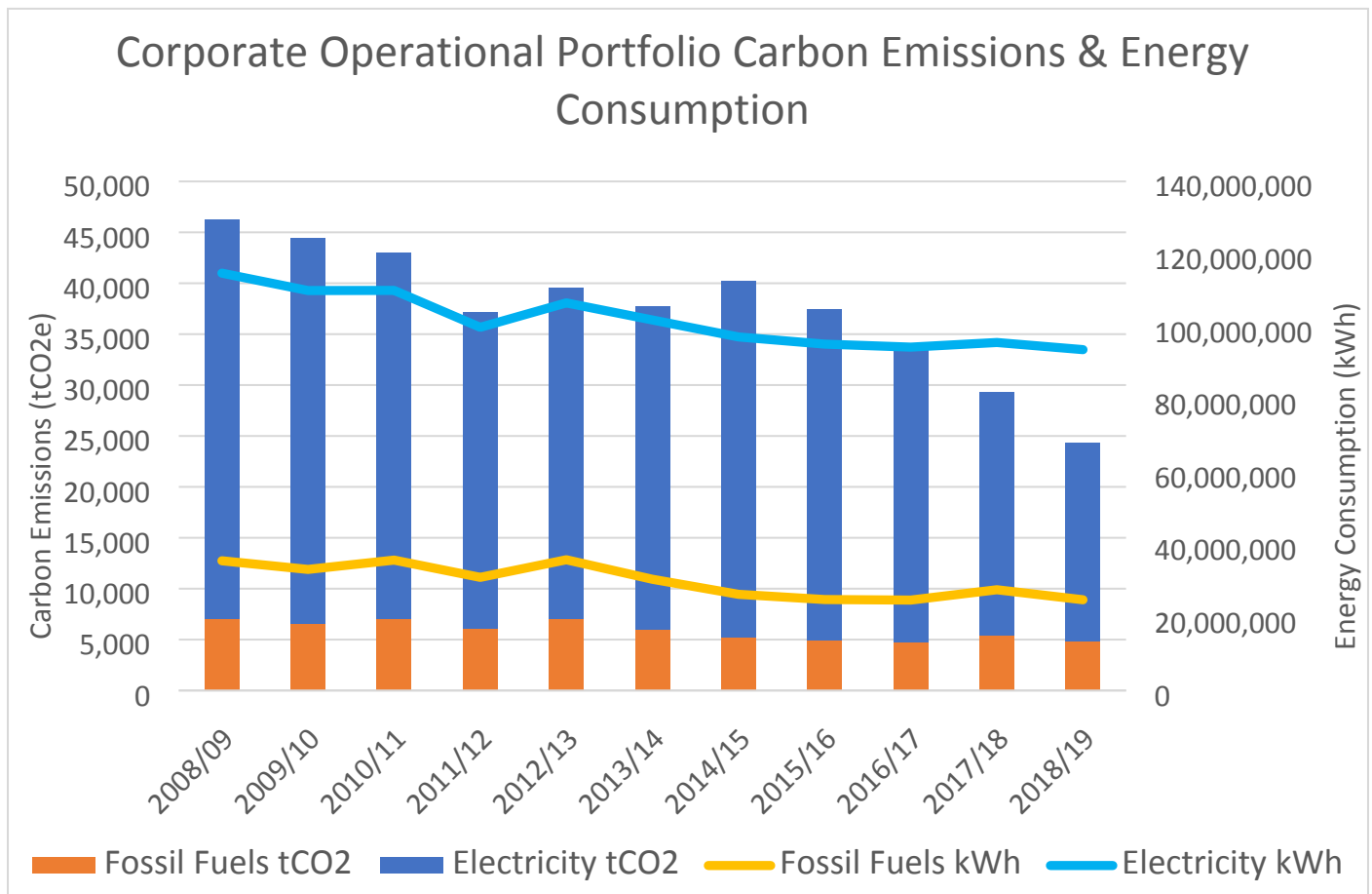
Appendix 2. Energy Project Phase 1 Summary

Title	Short description	Energy savings (kWh/year)	Cost Savings (first year £/year)	Capital Cost (£)	Simple Payback (yrs)
Tower Hill Car Park Ltg	Upgrade to LED with controls	124,741	£20,686	£113,915	5.5
LMA Zone & Demand Ctrl HVAC	Zoned control of ventilation and air conditioning	274,204	£15,832	£42,264	2.7
GSMD Milton Ct Ltg	Upgrade metal halide and CFL lighting to LED	34,321	£8,419	£53,677	6.4
GSMD Silk St LED Upgrade	Upgrade Lighting to LED with occupancy control	295,192	£50,887	£187,389	3.7
CCC LED Ltg Upgrade	Upgrade lighting to LED with controls	206,587	£49,593	£250,914	5.1
Boys LED Ltg & Controls	Upgrade Lighting to LED with occupancy control	296,276	£52,323	£265,099	5.1
Boys EC Plug Fans	Replace all belt driven fans with EC alternatives	60,826	£9,081	£54,916	6.0
Boys Calorex VSD	Install a VSD on Calorex heat recovery unit	33,541	£4,698	£27,409	5.8
Girls Pool Water Heating	Install ASHP to supply heat for pool water & cover	134,883	£17,453	£73,698	4.2
Girls Pool Hall AHU	Install AHU with heat recovery	238,991	£34,436	£183,616	5.3
Freemens Lighting Upgrades	Upgrade Ltg: Sports Hall, Science, Hayward, Art Bl.	58,893	£9,929	£88,568	8.9
Smithfields Car Park Ltg	Upgrade to LED with occupancy control	108,217	£16,781	£79,502	4.7
GHC EW AHU EC Plug		637,293	£90,032	£244,925	2.7
Sub-total		2,503,965	£ 380,148	£ 1,665,891	4.4
			Design & PM	£110,000	
			Total (excluding risk)	£1,775,891	4.7

Appendix 3. Power Purchase Agreement Timetable

Stages of Competitive Dialogue Procedure		Start Date	Completion Date	Comments
Pre-tender stage				
1	Publish PIN	21/02/2019	21/02/2019	
2	SMT	11/02/2019	26/02/2019	
3	Review SMT responses	26/02/2019	22/02/2019	
4	Scope, spec, procurement route and price: quality split	25/02/2019	05/03/2019	
5	Slides for Cat Board	04/03/2019	04/03/2019	
6	Route to market - FS Category Board	14/03/2019	14/03/2019	1 day
7	Draft stage 1 committee report	TBC	TBC	2 weeks
8	Stage 1 Report to Commercial Director	17/04/2019	17/04/2019	1 week before Chamberlain
9	Stage 1 Report to Chamberlain	24/04/2019	24/04/2019	3 weeks before Committee date
10	Submit to Committee Clerks	03/05/2019	03/05/2019	26th April for PIB - for Proc Sub & Finance 3rd May
11	Procurement-Sub Committee	15/05/2019	15/05/2019	Submit 3rd May
12	Finance Committee	21/05/2019	21/05/2019	
13	Court of Common Council (possible)	23/05/2019	23/05/2019	
14	Corporate Asset Sub-Committee (CASC)	05/06/2019	05/06/2019	For info only
15	Property Investment Board (PIB)	12/06/2019	12/06/2019	On agenda - call Christine Marsh
SQ stage (OJEU Competitive Procedure with Negotiation)				
16	Issue OJEU Notice	27/06/2019	27/06/2019	1 day
17	Issue SQ	05/07/2019	05/07/2019	approx. 3 days after sending notice to OJEU
18	SQ Period	05/07/2019	07/08/2019	30 days
19	SQ Submission deadline	07/08/2019	07/08/2019	1 day
20	SQ Evaluation	07/08/2019	30/08/2019	3 weeks
21	SQ Moderation	02/09/2019	02/09/2019	1 day
ISDS stage				
22	Issue Invitation to Tender (ITT)	09/09/2019	09/09/2019	
23	ITT Period	09/09/2019	30/09/2019	20
24	ITT Submission deadline	30/09/2019	30/09/2019	1 day
25	Tender Evaluation	01/10/2019	11/10/2019	2 weeks?
26	Tender Moderation	11/10/2019	11/10/2019	1 day
Dialogue Stage				
27	Prep for dialogue	14/10/2019	18/10/2019	1 week?
28	Issue Dialogue Pack	21/10/2019	21/10/2019	1 day
29	Dialogue sessions	04/11/2019	22/11/2019	3 weeks
30	Close dialogue	22/11/2019	22/11/2019	1 day
ISFT Stage				
31	Issue ISFT	25/11/2019	25/11/2019	
32	ISFT deadline	16/12/2019	16/12/2019	
33	ISFT evaluation	16/12/2019	03/01/2020	
34	ISFT moderation	06/01/2020	06/01/2020	
Tender award stage				
35	Contract award approval - FS Category Board	08/01/2020	08/01/2020	
36	Award Report to Commercial Director	09/01/2020	09/01/2020	1 week before Chamberlain
37	Award Report to Chamberlain	16/01/2020	16/01/2020	3 weeks before Committee date
38	Procurement-Sub Committee	06/02/2020	06/02/2020	December Committee
39	Finance Committee	18/02/2020	18/02/2020	1 day
40	Court of Common Council	05/03/2020	05/03/2020	Urgency?
Post Tender and mobilisation				
41	Standstill letters	TBC	TBC	10-days minimum, must end on weekday
42	Contract Agreement signed by parties			1 month??
43	Contract mobilisation			
44	Contract start date			

Appendix 4



The chart above shows the disconnection of carbon emissions from kWh consumption which is largely attributable to the decarbonisation of the electricity grid supply since 2015.

**note that these figures represent electricity, and fossil fuel use at City sites, but do not include Citigen attributable emissions which are still being calculated by Citigen.*