

Committee:	Dated:
Corporate Asset Sub-Committee (CASC)	5 th October 2017
Subject: 2017/18 Q1 Energy Performance Update	Public
Report of: The City Surveyor	For Information
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SUMMARY

This report provides the results of the Q1 2017/18 energy consumption for CoL operational sites, an update on the annual trend to meet the energy reduction targets set out in the Corporation's Carbon Descent Plan 2015 (CDP-15), and an update on the energy projects for sub-metering, benchmarking and Temperature Policy.

The Q1 results show an overall decrease of 2.7% (absolute energy consumption) compared to the same period in 2016/17. Most departments reduced their consumption below the annual target level, especially the Guildhall Complex which saw a 13.8% reduction.

The 12 months performance up to 2017/18 Q1 compared to the 2008/09 baseline indicates a reduction of 17.7% in absolute consumption and 15.8% reduction when weather corrected. This indicates the CDP-15 target of 25% by the end of 2017/18 is very unlikely to be met.

MAIN REPORT

1. Performance update

- 1.1 The absolute energy consumption for April 2017 to June 2017 was 2.7% lower than the consumption over April 2016 to June 2016, as presented in Table 1 below.
- 1.2 The weather over 2017/18 Q1 was milder than 2016/17. This has lowered heating consumption for many sites, but increased cooling consumption for a few. The overall net impact is a lower consumption than would be expected under typical weather conditions¹ (based on published degree days).
- 1.3 Most departments reduced their energy consumption. A 13.8% reduction at the Guildhall Complex provided the majority of the reduction, mainly due to improved operational management of the steam generators which has been on-going since July 2016. It should be noted the reduction seen in Q1 will not continue at the same level into the rest of the year as the year-on-year reduction diminishes over time. Further savings were provided through the management of ventilation time schedules within the North Wing and decanting of computer equipment (UPS) from the Justice Rooms.

¹ "a typical weather year is considered against the 20-year average based on degree days, a measure of the severity and duration of external temperatures"

1.4 The reductions at Guildhall Complex were partly offset by a 5.6% increase at the Courts, mainly due to a significant increase in the oil consumption at the Central Criminal Court for the old boilers. More detailed departmental commentary is provided in Appendix A.

1.5 Consumption was also higher at Smithfields and New Spitalfields markets due to the warmer weather increasing cooling demand. Appendix B presents the breakdown between tenant and landlord electricity for the markets and shows although landlord services reduced consumption by 6.8% there was a 4.5% increase in tenant consumption.

1.6 Chart 1 below represents the overall performance from the 2008/09 baseline. Annual results are presented for both absolute and weather corrected energy consumption. The chart also presents two set of performance figures, 'Reported' and 'Revised'. The reported figures were presented in past committee reports, and these have been revised due to ongoing improvements in data quality (meter reads etc.) to improve the accuracy of the results.

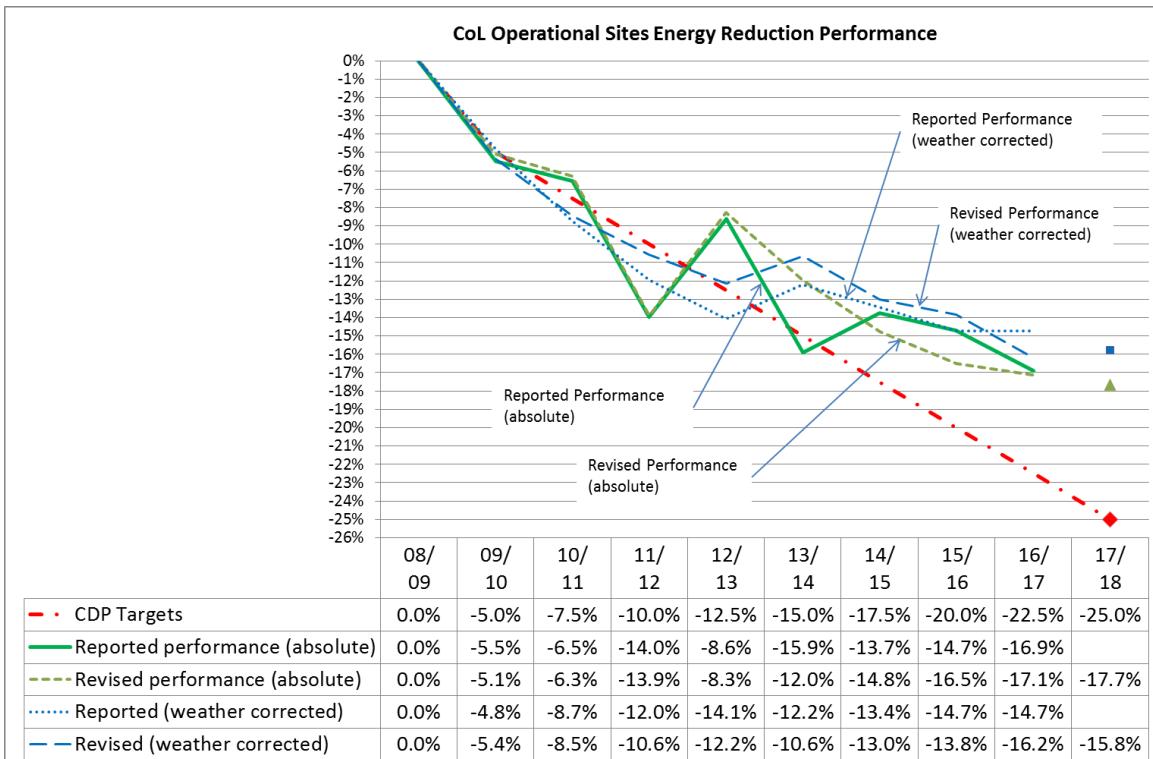
1.7 The 12 months performance to Q1 of 2017/18 indicates a 17.7% reduction in absolute consumption from the baseline, and a 15.8% reduction when corrected for the weather (based on degree days and in accordance with the previously agreed methodology).

Table 1. Performance comparison: 2017/18 Q1 with 2016/17 Q1

Dept.	16/17 Q1 (kWh)	17/18 Q1(kWh)	Diff. kWh	Diff. %	
Guildhall Complex	5,393,524	4,651,379	-742,145	-13.8%	Achieved above annual target
Culture, Heritage & Libraries	755,767	673,084	-82,683	-10.9%	
Walbrook Wharf	395,486	354,221	-41,265	-10.4%	
Open Spaces	1,384,612	1,243,335	-141,277	-10.2%	
CoL Boys'	725,541	652,699	-72,842	-10.0%	
CoL Freemen's	691,741	641,704	-50,037	-7.2%	
CoL Police	1,431,319	1,356,117	-75,202	-5.3%	
GSMD	1,759,828	1,696,000	-63,828	-3.6%	
Mansion House	407,685	397,650	-10,035	-2.5%	
Built Environment	1,515,339	1,504,241	-11,098	-0.7%	Achieved below target
CoL Girls'	448,290	447,054	-1,236	-0.3%	
Barbican Arts Centre	4,047,859	4,190,864	143,005	3.5%	
Markets & C.P.*	6,925,033	7,222,336	297,303	4.3%	
Courts	1,754,897	1,852,704	97,807	5.6%	
Total	27,636,921	26,883,388	-753,533	-2.7%	
GHC & Walbrook Wharf	5,789,010	5,005,600	-783,410	-13.5%	

*includes tenants consumption, see Appendix B for Tenant/Landlord breakdown.

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



2 Benchmarking

- 2.1 The Energy Team have carried out an assessment of the energy consumption for the office areas of the Guildhall Complex and Walbrook Wharf. Tables 2 and 3 below presents the initial results. It should be noted that due to insufficient sub-metering a significant proportion of the results are based on estimations, rather than actual data. The tables are annotated to provide an indication of the confidence which should be given to the results at this stage. The sub-metering study (currently underway) described in section 3, will provide guidance on how the data can be improved going forward.
- 2.2 The results for table 2 are benchmarked against CIBSE Guide F good and typical practice. It should be noted that CIBSE benchmarks were developed in the 1990's and may not reflect modern office standards and operation, but are however the best source of such benchmarks currently available.

Table 2. Benchmarking results for Guildhall Complex and Walbrook Wharf office areas based on floor area

	Benchmark practice (kWh/m ² TFA/year)		Energy consumption by floor area (kWh/m ² TFA/year)			
	Best	Typical	North Wing	West Wing	East Wing	Walbrook Wharf
Building energy services						
Heating and hot water	97	178	67 ^[M]	108 ^[L]	204 ^[L]	98 ^[H]
Cooling	14	31	24 ^[L]	27 ^[L]	82 ^[L]	
Fans, pumps, controls	30	60	26 ^[M]	93 ^[L]	117 ^[L]	
Lighting, small power, computer rooms, catering, other	79-85	115-122	97 ^[H]	127 ^[L]	182 ^[M]	168 ^[H]
Total	220-226	384-391	214	355	585	266

Table 3. Benchmarking results for Guildhall Complex and Walbrook Wharf office areas based on workstations

Building energy services	Workstation (kWh/workstation/year)			
	North Wing	West Wing	East Wing	Walbrook Wharf
Heating and hot water	593 ^[M]	1,310 ^[L]	1,704 ^[L]	1,461 ^[H]
Cooling	209 ^[L]	326 ^[L]	685 ^[L]	
Fans, pumps, controls	227 ^[M]	1,123 ^[L]	978 ^[L]	
Lighting, small power, computer rooms, catering, other	863 ^[H]	1,779 ^[L]	1,789 ^[M]	
Total	1,893	4,538	5,157	3,956

Annotation:

- [H] High confidence: data is mostly based on working sub-meters which relate to the service
- [M] Medium confidence: some sub-metering, but also some level of estimation/apportionment
- [L] Low confidence: no sub-metering, figures based on significant rough estimation

- 2.3 Currently there is insufficient good quality data to draw definitive conclusions on the performance, however there is an indication that: North Wing is the more efficient office, space heating and cooling may be particularly high in the East Wing, ventilation and distribution pump efficiency could be an issue for the West and East Wings, and lighting and small power could be a concern within the East Wing.
- 2.4 The Energy Team are working to produce a similar assessment for the other non-office areas of the Guildhall Complex.
- 2.5 For other non-office sites, other indicators will be more appropriate for monitoring energy performance and table 4 presents an initial assessment of the Barbican Arts Centre (BAC) gross expenditure (informed by Chamberlains) by the total energy consumption and carbon emissions.

Table 4. Benchmarking results for BAC based on annual income generated

Year	CRC emissions (tCO2)	BAC gross income (£k)	Energy consumption per income (kWh/£k income)
2014-15	4825	22,693	411
2015-16	4519	25,798	363
2016-17	3853	25,451	346

3. Sub-metering study

- 3.1 A contractor has been commissioned to deliver a sub-metering study for the Guildhall Complex and Walbrook Wharf.
- 3.2 The study will provide a condition assessment with costed recommendations for repairing, or installing new, sub-metering. The study will also review and opportunities for enhanced monitoring of plant equipment, and improving the communication and analysis of data.
- 3.3 The outcomes will facilitate an appraisal of the options for enhancing the sub-metering to enable monitoring and reporting on energy consumption by functional building areas, and by different building services and systems. This will enable the development of more accurate performance benchmarking and ongoing monitoring of energy end-uses to identify efficiency opportunities.

3.4 An update with the draft findings will be provided at the next CASC meeting.

4 Temperature policy consultation

4.1 Over August 2017 all CoL staff were consulted on a new draft corporate wide policy on 'Temperatures'. This policy aims to maintain thermal comfort in an energy efficient approach. The policy, if adopted, will apply to all properties or demises occupied and managed by City of London. A draft of the policy can be accessed via the Colnet web page:

<http://colnet/Pages/News/Temperature-Policy-Consultation.aspx>

4.2 Over 100 individual responses have been received, including from departmental Energy Representatives, Unions and health and wellbeing representatives.

4.3 The original timeline was for the final policy to be drafted in September 2017 for approval at in October CASC. However, due to the quantity of responses the Energy Team plans to come back in November CASC for a final approval with a formal launch in January 2018.

5. Conclusion

5.1 The Q1 results show an overall decrease of 2.7% (absolute energy consumption) compared to the same period in 2016/17.

5.2 The 12 months performance up to 2017/18 Q1 indicates a reduction of 17.7% in absolute consumption and 15.8% reduction when weather corrected. This indicates the CDP-15 target of 25% by the end of 2017/18 is very unlikely to be met.

5.3 Initial results on assessing energy intensity indicators for the Guildhall Complex, Walbrook Wharf and Barbican Arts Centre have been presented. However additional sub-metering information will be required to provide a more accurate and in-depth assessment. A sub-metering study currently underway is due to conclude in October 2017 which will inform on the works and costs for providing this additional data.

5.4 The Temperature Policy consultation has concluded and received a significant response. A revised timeline for adopting and launching the policy is proposed.

6. Recommendation(s)

6.1 It is recommended Members note the contents of this report.

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Appendix A. Departmental commentary

Dept.	16/17 Q1	17/18 Q1	Diff. kWh	Diff. %	Summary
Barbican Arts Centre	4,047,859	4,190,864	143,005	3.5%	Significant increase in Citigen cooling was probably related to the warmer weather and an exhibition in the art gallery. This was partly offset by reduced heating demands. Reductions in electricity were observed across a number of supplies, which may be related to efficiency activities.
Built Environment	1,515,339	1,504,241	-11,098	-0.7%	Small overall reduction. Only significant change is the continued reduction of electricity at Upper Thames Street Tunnel due to lighting upgrades and reduced ventilation requirements.
CoL Boys'	725,541	652,699	-72,842	-10.0%	Reduction mainly related to the gas consumption and likely related to reduced heating demands due to the milder weather compared to the previous year.
CoL Freemen's	691,741	641,704	-50,037	-7.2%	Gas consumption was lower, likely related to lower Easter holiday occupancy and milder weather.
CoL Girls'	448,290	447,054	-1,236	-0.3%	No significant changes.
Courts	1,754,897	1,852,704	97,807	5.6%	Central Criminal Court oil boilers are being replaced by gas boilers. However over the quarter the oil boilers increased, rather than reduced their consumption. This is being investigated with the site.
Culture, Heritage & Libraries	755,767	673,084	-82,683	-10.9%	A significant reduction in gas and electricity at LMA due to resolution of HVAC control issues and milder weather. However, possibly due to warmer than average weather, the consumption has increased significantly in July and therefore Q2 results may not be as good. Tower Bridge gas consumption was lower, reason TBC. Shoe Lane Library gas consumption was significantly higher due to a large "catch-up" invoice following a period of no meter readings.
GSMD	1,759,828	1,696,000	-63,828	-3.6%	Citizen heat and electricity consumption for the main school is significantly reduced, believed to be related to heating control improvements. This was partly offset by increased electricity at Milton Court, believed to be related to comfort cooling and the site are currently investigating.
Guildhall Complex	5,393,524	4,651,379	-742,145	-13.8%	The majority of the reduction in overall energy was related to the improved operation of the steam generators. It should be noted this was implemented in July-16, and therefore after this quarter the year-on-year comparative impact will be reduced. Electricity continues to reduce for the Justice Rooms as equipment is decanted. Due to the milder weather there was a reduction in heat demand, which was partly offset by an increase in cooling demand (electric chillers and pumps). There was a 12% reduction in electricity for the North Wing ventilation plant due to efficiency adjustments to the time schedule.
Mansion House	407,685	397,650	-10,035	-2.5%	Reduced gas for catering, assumed to be related to reduced functions/occupancy. Reductions also in electricity and gas for heating/hot water, assumed to be related to occupancy and milder weather.
Markets & C.P.	6,925,033	7,222,336	297,303	4.3%	Small reductions in energy due to milder weather were offset by increased energy for cooling.
Open Spaces	395,486	354,221	-41,265	-10.4%	A reduction in gas consumption at the Crematorium (assumed to be due to lower demands), and a reduction at West Ham Park Nursery (due to its closure).
CoL Police	1,431,319	1,356,117	-75,202	-5.3%	Reductions in energy at Bishopsgate Police Station. Electricity is lower due to an unusually high consumption over the same period the previous year. Gas is lower, possibly due to milder weather.
Walbrook Wharf	395,486	381,495	-13,991	-3.5%	Gas and electricity within the Amy areas reduced. This may be related to the milder weather.

Appendix B. Markets energy consumption breakdown

Over 75% of the total energy consumption for the Markets and Consumer Protection department relates to electricity consumption within the three markets. Of this about 70% relates to tenant supplies and 30% to landlord services. Table B1 below compares the Q1 consumption and shows the landlord consumption reduced by 6.8% but the tenant consumption increased by 4.5%, resulting in a total increase of 1.3%.

Table B1. Electricity split between tenants/landlord

	16/17 Q1 kWh	17/18 Q1 kWh	Diff. kWh	Diff. %
M&CP Landlord	1,551,087	1,446,153	-104,934	-6.8%
M&CP Tenants	3,922,702	4,100,740	178,038	4.5%
Total	5,473,789	5,546,893	73,104	1.3%