

Committee: Corporate Asset Sub-Committee (CASC)	Dated: 5 th September 2018
Subject: CDP Targets and investment requirement 2018 onwards	Public
Report of: The City Surveyor	For Information
Report author: James Rooke, Corporate Energy Manager	

SUMMARY

This report provides a recommendation for continuation of the existing Carbon Descent Plan (CDP) reduction targets and requests the approval of a Capital Energy Fund and associated resource to ensure that these targets are achieved.

The CDP, expired in March 2018 and therefore requires a new target to be set for the next seven years.

This report recommends that the Corporation maintains the existing longer-term target of 40% absolute reduction by 2025 relative to a 2008 base year and provides an update on delivery plan for the first phase. Specifically, a bottom up analysis of potential energy reduction initiatives from the first two-year phase.

This approach is endorsed by the Energy Board.

RECOMMENDATIONS

- Re-affirm the Corporations existing commitment to a 40% reduction by 2025, representing an updated 29% reduction target from present absolute performance.
- Members review the list of potential energy reduction schemes set out in Appendix A and agree that these should be progressed
- Agree the City Surveyor should progress those energy savings schemes set out in Appendix A that don't require any capital expenditure
- Note that any additional staffing cost (such as a fixed term energy project manager) will initially be met from the City Surveyor's local risk budget but recovered from the savings achieved.
- Agree that those schemes requiring investment be progresses by the City Surveyor as 'spend to save' schemes through the gateway process at the earliest opportunity.
- The City Surveyor to report back on progress in six months' time

MAIN REPORT

Background

The Carbon Descent Plan is comprised of shorter and longer term reduction targets. The target set for March 2018 was to have reduced the Corporation's energy use by 25% compared to a 2008 base year. A 15% absolute reduction was achieved during this time period, leaving a 10% shortfall. This indicates that a greater investment in capital and resource is required to return to target.

To achieve these ambitious targets, upfront investment for new projects will be required, supported by sufficient human resources, in order to make longer-term carbon and financial savings.

In order to comply with the original 40% target will require a new shorter-term target of 29% energy reduction compared to a 2017/18 baseline. This will require significant Capital expenditure.

Benefits of maintaining the 40% target, rather than readjusting to a less ambitious target, include offsetting the increased cost of energy as a commodity, long-term financial savings and maintaining the Corporation's reputation in terms of environmental performance, especially in the context of the Corporation's strengthened commitment to responsible business practices.

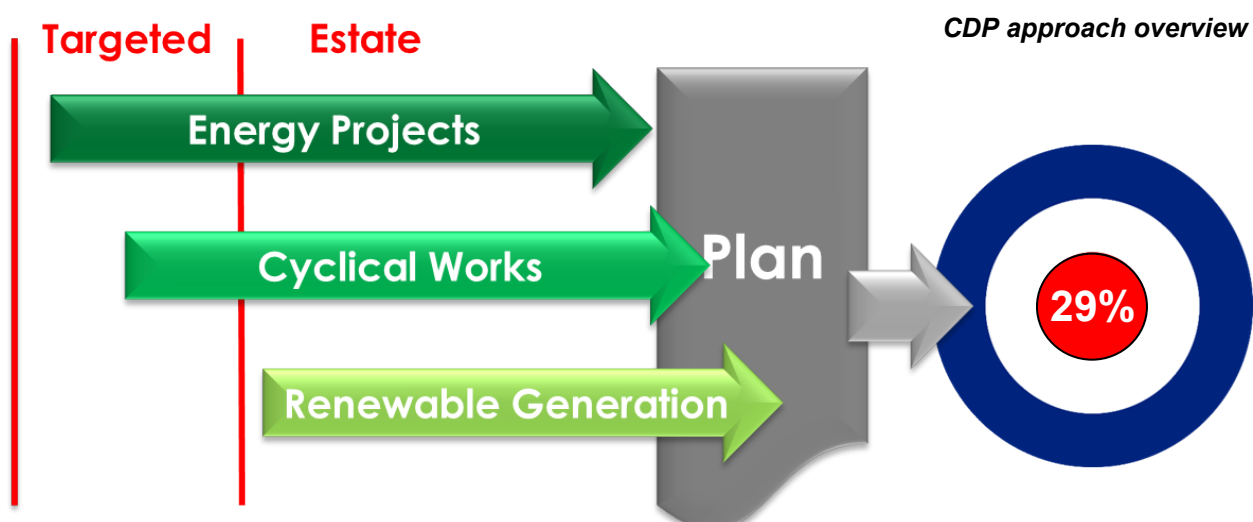
Approach

The proposed 29% reduction target will be met through three main routes, delivered as part of two phases:

- I. **Energy Projects** – An opportunity driven programme outside of cyclical works
- II. **Cyclical Works** – Actively managed enhancement to cyclical works, for example ensuring that the planned GHC chiller system replacement employs best available energy technology
- III. **Renewable Generation** – New procurement models for sourcing renewable and low carbon energy.

Phase 1) - Targeted: focuses on the Barbican (BAC) and Guildhall Complex (GHC), rolling out energy efficiency projects that will deliver the greatest energy reduction impact and make the most financial savings relative to upfront costs.

Phase 2) - Estate: Using the learning from the targeted phase to support department plans across the wider operational estate.



Progress Update

i. Energy projects

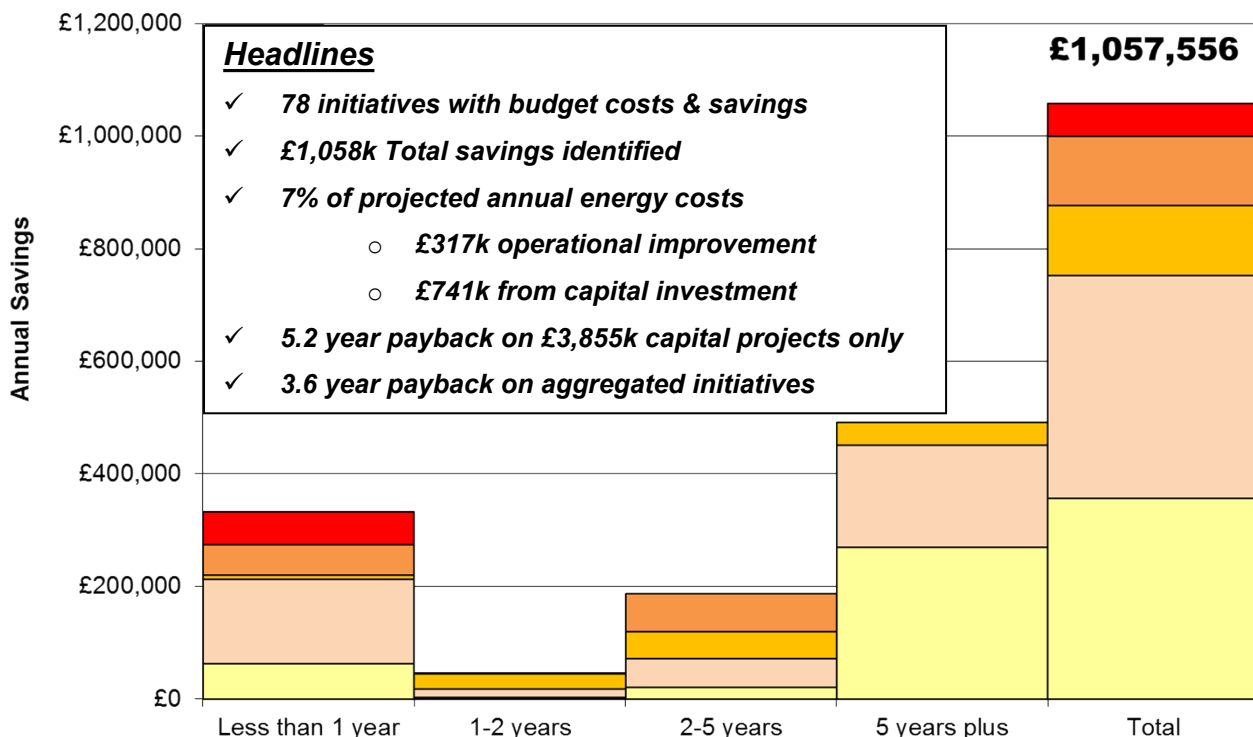
Phase 1 - Targeted

To mobilise this process, initial energy survey scoping work has been undertaken at BAC and GHC using the internal energy team resource and external energy

engineering specialists. This initial phase has identified £1,058k of savings. Investment to achieve this saving has been summarised as below:

- £317k can be achieved using resource only and local budgets (including some schemes that only require staff input).
- £741k can be achieved with a capital investment of £3,855k giving a payback of 5.2 years.

Energy projects by payback



A more detailed summary of these projects is appended for reference.

Phase 2 (Estate)

External consultants are being commissioned to survey six of the largest sites to provide a project business case for the next phase of the plan.

ii. Cyclical Works

The Energy team is working with the CSD Projects team to create synergies between the cyclical works / Forward maintenance programmes and the energy programme. For example, a detailed feasibility was recently commissioned for upgrade of the GHC cooling system. Initial analysis has identified potential £180k saving through energy and reduction of cyclical maintenance.

iii. Renewable Generation

Following approval of a 100% renewable electricity policy, the potential for a renewable energy Power Purchase Agreement (PPA) is now being investigated. If a suitable PPA is identified, it would provide the Corporation with the potential to demonstrate strong environmental credentials in parallel with a commercial benefit as this arrangement

would de-couple commodity energy prices from volatile energy markets and link instead to a more stable inflationary metric such as the Consumer Price Index. Importantly, this will provide protection from future commodity energy price rises above inflation.

Investment requirement

This paper requests approval for strategy of progressing the energy projects requiring capital investment and sets out the outline business case.

Option 1 (recommended): Corporation Investment: Phased Investment for capital energy projects provided by the Corporation to directly fund an accelerated reduction programme. Schemes progressed through the gateway process as spend to save schemes. Larger projects being progressed individually whilst small initiatives as a programme of works.

Advantage: Lowest delivery cost, greatest level of control, integration into existing supply chain and operation.

Disadvantage: Mobilisation time and need for Capital

Option 2: Business as usual: Energy Team continues to manage operational improvement with limited investment.

Advantage: Low cost, short payback priority, No additional capital requirement. Already mobilised

Disadvantage: Limited impact on energy reduction. Reduction targets not met.

Option 3: External Investment: Funds borrowed from third party in Energy Performance Contract model.

Advantage: Rapid mobilisation, No requirement for capital funding, shared risk.

Disadvantage: Limited control, Increased costs for delivery margins and cost of finance.

This paper recommends the adoption of Option 1, Corporation Investment as the optimum choice for control, cost and return. The requirements for which are set out below:

Option 1 – Corporation Investment

1.Revenue requirement

To continue the identification and development of projects into year three, a resource stream is required:

- I. *Project delivery:* The creation of an additional energy projects officer, on a fixed term contract (which could be renewed if appropriate), to manage and deliver projects in years 1-3. Cost circa £70k/year would need to be viewed as a component of the energy capital programme cost. Initially sourced from the CSD local risk budget with costs recovered from savings and project costs as appropriate.
- II. *Control savings generation & retention:* Many of the opportunities identified are generated by improved building control management. This is a specialist area

and we recommend the sourcing of a specialist controls engineer to identify and deliver these initiatives. Energy Team (ET) estimates an annual savings figure above £200k. An AECOM energy savings report identifies an annual savings figure above £600k via improved control. The ET are applying for a transformation fund sum of £80k to cover a 12-month fixed term contract.

2.Capital Requirement

To facilitate the delivery of capital projects we propose the adoption of:

- I. .Indicative figures suggest an investment of £3,855k will deliver a reduction in energy costs of £1,058k. Schemes to be progressed through the gateway process as 'spend to save' schemes This will deliver the first two years of the CDP plan in combination with the measures above.
- II. A small grant fund of £50k to be administered by the energy team directly where small projects with paybacks below two years can be identified. This would require the agreement of Finance Committee.

There is no provision for these initiatives within the City's current approved budgets and the submission of a business case paper to the appropriate committees will be required.

Next steps

Following CASC approval, City Surveyor will prepare gateway 1/2 reports in the Autumn for submission to the appropriate committee on the projects requiring capital investment. These will include the business case for the projects.

For those schemes not requiring capital investment Members should note the Surveyor will draw up a programme of works and commence implementation of these schemes recruiting if necessary the required staff resource on a fixed term contract. The cost of staff resource to be met initially from the City Surveyor's local risk budget but ultimately recovered from the energy savings achieved.

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Appendix A – Summary of energy projects

Site	Description	Annual Savings		Est. Cost (£)	Payback Period (yrs)
		Annual Savings (£)	Annual Savings Energy (kWh)		
Guildhall Complex	Replace Guildhall chillers with more efficient system	£ 180,000	-	£1,000,000	5.6
BAC	Reduced Elec. kVA import to meet needs	£ 6,992	-	£0	-
BAC	Reduced Elec. kVA import to meet needs	£ 5,580	-	£0	-
BAC	Reduced Elec. kVA import to meet needs	£ 2,375	-	£0	-
Barbican Hsg Estate	Increase Elec. kVA import to meet needs	£ 23,075	-	£0	-
Billingsgate Market	LED lighting update opportunities, number of areas	£ 26,967	189,950	£48,572	1.8
CoL Boys	Demand control for LTHW pumps	£ 1,172	8,298	£1,200	1.0
CoL Boys	Optimised time schedules for space pre-htg.	£ 1,851	82,306	£300	0.2
CoL Freeman's	Swimming pool cover for new pool	£ 14,228	319,262	£30,701	2.2
CoL Girls	Increase Elec. kVA import to meet needs	£ 1,231	-	£0	-
CoL Girls	Pool ventilation improvement/replacement	£ 22,634	223,612	£118,800	5.2
CoL Girls	Reduce pool heating times during the day period	£ 2,765	19,463	£0	-
Guildhall Complex	Reduced Elec. kVA import to meet needs	£ 24,754	-	£0	-
Guildhall Complex	Reduced Elec. kVA import to meet needs	£ 2,788	-	£0	-
Guildhall Complex	Reduced Elec. kVA import to meet needs	£ 2,119	-	£0	-
Guildhall Complex	Increase Elec. kVA import to meet needs	£ 377	-	£0	-
Guildhall Complex	Reduce elec. loads during Triad warnings	£ 10,059	-	£0	-
Guildhall Complex	Reduce elec. loads during Triad warnings	£ 7,956	-	£0	-
Guildhall Complex	Replace office downlights with LED	£ 16,529	105,448	£62,371	3.8
Guildhall Complex	Sub-metering to enhance energy management	£ 32,684	393,477	£149,902	4.6
Guildhall Complex	Installation of a Variable Speed Drive (VSD)	£ 16,869	113,568	£15,000	0.9
Guildhall Complex	Upgrade 11 AHUs with new fans and motors	£ 37,445	300,170	£116,751	3.1
Guildhall Complex	Reduction/eliminate non-essential humidification	£ 15,742	748,017	£1,800	0.1
Guildhall Complex	Speed control for office/toilet AHU fans	£ 9,116	81,120	£3,520	0.4
Guildhall Complex	Demand control via CO monitoring	£ 9,069	64,865	£0	-
Guildhall Complex	Set-back of HVAC during bank holidays	£ 3,000	20,966	£0	-
Guildhall Complex	Correct chiller sequence programming	£ 1,092	8,256	£0	-
Guildhall Complex	Replace/redesign for LED lighting with controls	£ 11,346	42,719	£30,000	2.6
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 381	2,698	£0	-
Guildhall Complex	WW CHWS Pumps operating at different loads	£ 488	3,740	£300	0.6
Guildhall Complex	Reduced heating times	£ 663	5,269	£0	-
Guildhall Complex	Create a schedule for the HWS not to run 24/7	£ 222	1,778	£0	-
Guildhall Complex	Reduced the operating times, currently 24/7	£ 473	4,004	£0	-
Guildhall Complex	Reduction to time schedules	£ 709	5,054	£0	-
Guildhall Complex	Reduction to time schedules to meet occupancy	£ 685	5,739	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 1,815	18,960	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 2,585	19,137	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 1,177	9,360	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 3,406	25,220	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 1,229	9,100	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 14,479	117,896	£0	-
Guildhall Complex	Setup a new timeschedule, currently operating 24/7	£ 1,722	13,785	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 818	6,367	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 543	3,666	£0	-
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 180	1,560	£0	-
Guildhall Complex	Replace Manuscript Store AHU with EC fan/motor	£ 5,648	40,767	£12,000	2.1
Guildhall Complex	Replace SUFs in Denco units in EW Geni Rm.	£ 8,011	63,295	£13,200	1.6
Guildhall Complex	Plant/System options for GHC cooling	£ 19,014	141,977	£77,600	4.1
Guildhall Complex	Reduced time schedule to meet occupancy needs	£ 2,964	24,115	£0	-
Guildhall Complex	Return to automatic and timed control	£ 9,961	74,581	£0	-
Milton Court	Reduced Elec. kVA import to meet needs	£ 14,871	-	£0	-
Parliament Fields Lido	Variable speed control for filtration pumps	£ 6,406	87,061	£10,034	1.6
Smithfields	Reduced Elec. kVA import to meet needs	£ 2,382	-	£0	-
Smithfields	Upgrade to LED with occupancy control	£ 15,484	107,639	£33,080	2.1
Smithfields	Set system for control via CO levels only	£ 38,241	296,779	£1,800	0.0
Sundial Court	Reduced Elec. kVA import to meet needs	£ 1,711	-	£0	-
The Warren Office	Reduced Elec. kVA import to meet needs	£ 2,207	-	£0	-
Upper Thames Street Tunnel	Reduced Elec. kVA import to meet needs	£ 1,014	-	£0	-
Walbrook Wharf	Reduced Elec. kVA import to meet needs	£ 2,634	-	£0	-
Walbrook Wharf	Solar PV on main roof	£ 18,616	115,377	£141,220	7.6
Guildhall Complex	CHWS Pumps operating 24/7	£ 417	2,828	£0	-
Tower Hill Car Park	Demand control of Vent. System	£ 21,120	138,909	£87,998	4.2
Guildhall Complex	Improve BEMS strategy for West Wing chillers	£ 8,346	63,840	£3,067	0.4
Guildhall Complex	NW CHWS operate on actual demands	£ 7,599	71,784	£3,067	0.4
CoL Girls	Alternative to direct electric heating (e.g. heat pump)	£ 14,202	115,919	£31,600	2.2
BAC	Reduce elec. loads during Triad warnings	£ 2,577	-	£0	-
Central Criminal Court	Reduce elec. loads during Triad warnings	£ 8,226	-	£0	-
City of London School for Boys	Reduce elec. loads during Triad warnings	£ 3,619	-	£0	-
CoL Freeman's	Reduce elec. loads during Triad warnings	£ 2,194	-	£0	-
CoL Girls	Pool pump demand control	£ 527	4,958	£6,000	11.4
CoL Girls	Reduce elec. loads during Triad warnings	£ 3,619	-	£0	-
GSMD Main	Reduce elec. loads during Triad warnings	£ 2,303	-	£0	-
Guildhall Complex	Use of battery for demand response	£ 249,996	-	£1,726,000	6.9
Milton Court	Reduce elec. loads during Triad warnings	£ 1,865	-	£0	-
Walbrook Wharf	Reduce elec. loads during Triad warnings	£ 1,185	-	£0	-
Walbrook Wharf	VSD for LTHW CT pumps	£ 3,190	24,090	£5,000	1.6
Central Criminal Court	Reduce oil boiler operation within the summer	£ 36,330	700,181	£9,900	0.3
Tower Hill Car Park	Upgrade to LED with controls	£ 19,687	133,828	£114,839	5.8