Report No. ES09102	**London Borough of Bromley**	Agenda Item No.

PART 1 - PUBLIC

Decision Maker:	**Improvement & Efficiency Sub-committee**
Date:	**19 January 2011**
Decision Type:	Non-Urgent Non-Executive Non-Key
Title:	**CARBON MANAGEMENT FUND: PROGRESS REPORT 2010**
Contact Officer:	Alastair Baillie, Environmental Development Manager Tel: 020 8313 4915 E-mail: alastair.baillie@bromley.gov.uk
Chief Officer:	Paul Dale: Deputy Chief Executive and Director Resources Nigel Davies: Director Environmental Services
Ward:	All

1. Reason for report

1.1. In October 2008, the Executive agreed to establish a ring-fenced Carbon Management Fund (ED08067 Minute 69) to invest in energy efficiency, with the aim reducing Council carbon emissions by 25% over five years and avoiding unnecessary costs.

1.2. The Executive requested that Improvement, Efficiency & Effectiveness Sub-committee (IE&E) receive annual reports on the Fund's operation (also see ES08185, December 2008 and ES09102, December 2009).

1.3. This report details the progress made on the first two tranches of Carbon Management Funded projects and identifies possible third tranche projects for 2010/11 and beyond.

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2. RECOMMENDATIONS

That IE&E sub-committee:

2.1 Notes the work conducted on the first and second tranche Carbon Management Funded projects and comments on the proposed third tranche projects.

2.2 Receives a further annual report in December 2011, detailing progress on all current Carbon Management Funded projects and proposed fourth tranche projects for 2011/12 and beyond.

Corporate Policy

1. Policy Status: Existing policy.
2. BBB Priority: Excellent Council.

Financial

1. Cost of proposal: Estimated cost £363k
2. Ongoing costs: Recurring cost. Estimated avoided spend per annum: 2011/12 - £40k; 2012/13 - £89k; 2013/14 - £145; 2014/15 - £180k; 2015/16 - £193k
3. Budget head/performance centre: Carbon Management Programme within Capital Programme
4. Total current budget for this head: £285k current uncommitted balance (plus £62.5k due from Salix)
5. Source of funding: Capital Programme (£250k) and Carbon Trust / Salix (£250k)

Staff

1. Number of staff (current and additional): 0.4 FTE current
2. If from existing staff resources, number of staff hours:

Legal

1. Legal Requirement: No statutory requirement or Government guidance.
2. Call-in: Call-in is applicable

Customer Impact

1. Estimated number of users/beneficiaries (current and projected): N/A

Ward Councillor Views

1. Have Ward Councillors been asked for comments? N/A.
2. Summary of Ward Councillors comments: N/A

3. COMMENTARY

Background

3.1 In 2008, the Council established a ring-fenced Carbon Management Fund (Fund). This £500k Fund (£250k LB Bromley / £250k Salix) is used to provide internal loans to fund the installation of proven energy saving technologies across the Council estate and street lighting assets.

3.2 Each loan is repaid into the Fund from an agreed adjustment to an energy budget, reflecting reduced consumption and cost. Consequently the Fund is continually replenished and can be re-invested in new energy efficiency projects. Once an individual project has fully paid back, the avoided spend will then permanently benefit the Council.

3.3 The term 'avoided spend' has been used in this report rather than 'savings'. This is because the financial benefit of energy efficiency activity will manifest itself in one of two ways:

- If overall energy costs have risen due to increased site activity or service provision, longer opening hours, increased energy prices or cold weather, then energy efficiency measures will mitigate these factors and avoid costs that would otherwise have been incurred.

- If the reduction in consumption from energy efficiency measures outweighs the above negative factors, then a true saving will be made.

Clearly which of these two scenarios will happen cannot be determined in advance but that should not prevent action being taken to avoid carbon emissions and unnecessary spending.

3.4 To be considered for funding, projects should payback in less than five years and have a long-lasting effect. This ensures that LB Bromley receives good value for money from such works.

3.5 This report focuses on the progress of the existing first and second tranche Carbon Management Funded projects and proposes third tranche projects, to be implemented in 2010/11 and 2011/12.

3.6 In this report, the term 'carbon' may be used, for brevity, to describe 'carbon dioxide' and is generally abbreviated to CO_2 and expressed in tonnes.

First Tranche Projects

3.7 Table 1 shows the first tranche projects including when the projects were 'Commissioned' (when energy savings and consequently fund repayments commenced), the investment cost, annual avoided spend, carbon savings, and the agreed payback period (the time taken to fully repay the investment cost).

Table 1: First Tranche Carbon Management Fund Projects

Project Description	Commission Date	Investment Cost (£)	Annual Avoided Spend (£/pa)	Annual Savings (tCO_2)	Payback (years)
Street-signage conversion from 24hr to dusk-to-dawn switching	October 2009	43,482	26,862	99	1.62
Voltage Optimisation (Civic Centre)	February 2009	89,827	30,703*	114*	2.93
Total		**133,309**	**57,565**	**213**	N/A

** In practice, meter readings have shown an 11.5% reduction in electricity consumption rather then the 8.8% reduction originally projected, which may lead to improved carbon and financial savings.*

Second Tranche Projects

3.8 Table 2 shows the second tranche projects including their investment cost, annual avoided spend, carbon savings and payback period.

Table 2: Second Tranche Carbon Management Fund Projects

Project Description	Commission Date	Investment Cost (£)	Annual Avoided Spend (£/pa)	Annual Savings (t/CO_2)	Payback (years)
Phase 2: Street-signage conversion from 24hr to dusk-to-dawn switching	December 2010	49,385	14,434	95	3.42
Central Island Column project	February 2011	17,920	7,197	47	2.49
Total		**67,305**	**21,631**	**142**	N/A

3.9 Fewer projects were implemented in this second tranche than planned. This was partly due to the Accommodation Review and uncertainty over the Civic Centre's future. A key condition of Fund is that projects must pay for themselves through energy savings in less than five years and this condition would not have been met had the site had been vacated (within this period).

3.10 Despite this, the Council has made steady progress in reducing its carbon emissions through a variety of activities including planned Property works and the behaviour change work done by staff Environmental Champions. For information on non-Carbon Management Funded projects, please see Executive Report ES10188 on Carbon Management Programme.

Third Tranche Projects

3.11 A number of projects are planned for 2010/11 and future years. The associated data are mainly provisional estimates and it should be noted that projects may change (due to cost variations, resource availability, priorities etc.) or be replaced by new projects, as this is an evolving plan.

3.12 Table 3 shows potential third tranche projects. These projects, which won't all necessarily start in 2010/11 and will be progressed as resources allow, are projected to save a 783t of carbon and avoid £141k of cost each year (based on current prices and consumption levels).

Table 3: Potential New Carbon Management Fund Projects

Project Description	Estimated Costs (£)	Estimated CO_2 Savings (t/pa)	Estimated Avoided Spend (£/pa)	Estimated Payback (years)
Voltage Optimisation: Walnuts Offices	4,468	5	1,180	3.79
Voltage Optimisation: EDC Princes Plain	4,468	5	1,217	3.67
Voltage Optimisation: Anerley Town Hall	4,468	5	1,084	4.12
Overhaul of Civic Centre heating system	90,000	300	46,500	1.94
Oil-gas conversion: Beckenham Library	45,000	10	9,000	5
Electric-gas hot water conversion: Beck. Lib.	30,000	10	10,000	3
Server room evaporative cooling	23,000	172	25,229	0.9
Heat recovery to Great Hall ventilation	11,000	27	3,332	3.3
VSD controls North block burners/ pumps	17,000	44	6,432	2.6
Lowering return temp. to Boilers North Block	1,300	9	1,180	1.1
Reducing North Block heat pump flow rates	4,800	27	4,044	1.2
CCTV Area: replace electric heating with gas	6,900	27	4,440	1.55
Civic Centre lighting upgrades	44,500	71	10,400	4.3
'Nightwatchman' smart IT software	tbc	tbc	tbc	tbc
Fit electronic gear to MI26 Lanterns	76,169	71	16,943	4.5
Totals	**363,073**	**783**	**140,981**	N/A

3.13 These proposed third tranche projects have been identified on the basis of their feasibility, payback period, and long-term savings potential.

Three voltage optimisation projects have been initially quantified by assessing site size and electricity consumption. More detailed surveys and data-logging must be conducted to finalise feasibility, costs and savings. As with the successful Civic Centre voltage optimisation project, these projects will deliver measurable energy savings. The installations will be undetectable in the day-to-day site operations and will also protect and prolong the life of electrical equipment, thus reducing maintenance costs.

Beckenham Library still relies on an old-fashioned oil-fired system for its space heating and an electrical system for water-heating. Projects to convert both systems to a less carbon-intensive and more cost-effective gas system are under investigation.

The following projects were identified by consultants as a result of a detailed site survey at the Civic Centre (part of our continuing partnership working relationship with the Carbon Trust).

CCTV accommodation heating project: This would involve replacing the current electric heating and extending the Low Temperature Hot Water system and adding ten radiators with thermostatic radiator valves. There is an underutilised high efficiency condensing boiler with more than adequate capacity and this will save energy costs and carbon emissions as gas is cheaper and is less carbon intensive (per kWh) than electricity.

North Block boiler / heat pump project: This combined scheme had to be quantified as separate components to satisfy Salix technical rules. The project is to set the boiler control strategy so operation is based upon achieving a return temperature of 60^{o}C and subsequently reduce the flow rate of the pumps. As the flow temperature is lowered, so system distribution heat loss is also reduced. The boilers respond to changes in demand, reducing standing losses. The energy saving is both from reducing heating mains losses and reduced pumping power; the effect being to half the pumping flow rate, which reduces pump electrical consumption.

Server room evaporative cooling project: Server room cooling is operational throughout the year and is currently cooled by air conditioning units which use significant amounts of electricity. Evaporative coolers are a more passive system and use the latent cooling of water to reduce the cooling load imposed on the air conditioning system (by the computer servers). They also offer free cooling during night periods (outside air is cooler). Existing air conditioning units would be retained as a back-up system.

Great Hall heat ventilation system recovery project: This aims to reduce the requirement for heating fresh air coming into the air handling unit. As the existing plant is more than 30 years old, the most practical approach would be to replace the existing unit with a new one incorporating a thermal wheel. Thermal wheels can recover about 85% of heat from ventilation air, transferring it to incoming fresh air which then needs minimal additional heating to reach the required temperature.

Variable Speed Drive (VSD) controls for North Block pumps: VSD controls will be applied to North Block heat pumps. These will vary pump speed depending on heating demand. They also respond to increases in system pressure produced by thermostatic radiator valve operation. The VSD units can also provide metering data for the pumps to assist performance monitoring. Reducing flow rates by 20% can offer energy savings of 50%. On average it is expected that the fan flow rate will be reduced by at least 20% offering significant savings throughout the year.

Civic Centre Lighting: The Civic Centre survey also outlined an opportunity from lighting upgrades. The replacement of old lighting stock would provide a number of benefits including reduced energy consumption, improved light quality, improved lifecycle replacement schedule, reduced maintenance and aesthetic improvements.

Smart IT software, such as 'Nightwatchman', intelligently manages computer power across a network. This significantly lowers energy consumption without ever impacting user productivity.

The Highways project to fit electronic gear to MI26 Lanterns is planned to start early in 2011. The project involves the replacement inefficient mechanical gear on 1,341 MI26 type lanterns with electronic gear, generating good energy savings via a very established method.

Before these projects commence, further analysis will be undertaken to identify all key risks and assumptions will be tested against a series of 'what if' scenarios to ensure savings are realistic.

3.14 Members should be aware that other non-Carbon Management Funded projects are also being progressed (for a variety of purposes) and are met from existing or external budgets. These too contribute to reduced carbon emissions and energy cost avoidance (see January 2011 Executive Report ES10188 on the 2009/10 Carbon Management Programme).

4. POLICY IMPLICATIONS

4.1 The Quality Environment section of the Council's Building a Better Bromley 2020 Vision states that 'we are also determined to work together in reducing energy consumption' and 'reducing energy use' is also identified as an issue to be tackled and how we will judge success.

4.2 Undertaking energy efficiency activity will place the Council in an improved position with regard to complying with, and reducing liabilities under, the statutory Carbon Reduction Commitment (also see Executive Reports ES09101 December 2009, and ES10189 January 2011).

5. FINANCIAL IMPLICATIONS

First and Second Tranche Projects

5.1 Table 4 shows when the first and second tranche projects will pay back into the Fund.

Table 4: First and Second Tranche CMF Projects: Repayment Schedule

PROJECTS	2008/09 £	2009/10 £	2010/11 £	2011/12 £	2012/13 £	2013/14 £	2014/15
1st Tranche							
Convert street-signage from 24hrs to dusk-to-dawn switching	0	13,431	26,862	3,189	0	0	0
Voltage optimisation (Civic Centre)	4,133	30,703	30,703	24,288	0	0	0
2nd Tranche							
Convert street-signage from 24hrs to dusk-to-dawn switching Phase 2	0	0	4,811	14,434	14,434	14,434	1,272
Convert central island columns / bollards to dusk-to-dawn switching	0	0	1,200	7,197	7,197	2,327	0
Annual payback amount	**4,133**	**44,134**	**63,576**	**49,108**	**21,631**	**16,761**	**1,272**
Cumulative payback 1st and 2nd tranche combined	**4,133**	**48,267**	**111,843**	**160,951**	**182,582**	**199,343**	**200,614**

5.2 Table 5 shows the projected avoided spend against revenue budgets (based on consumption and prices at project start date) once the project has fully paid back into the Fund.

Table 5: First and Second Tranche CMF Projects: Projected Avoided Spend

PROJECTS	2010/11 £	2011/12 £	2012/13 £	2013/14 £	2014/15 £	2015/16 £	2016/17 £
1st Tranche							
Convert street-signage from 24hrs to dusk-to-dawn switching	0	23,673	26,862	26,862	26,862	26,862	26,862
Voltage optimisation (Civic Centre)	0	15,835	40,123	40,123	40,123	40,123	40,123
2nd Tranche							
Convert street-signage from 24hrs to dusk-to-dawn switching Phase 2	0	0	0	0	13,162	14,434	14,434
Convert central island columns / bollards to dusk-to-dawn switching	0	0	0	4,871	7,197	7,197	7,197
First & Second tranche project avoided spend	**0**	**39,508**	**66,985**	**71,856**	**87,344**	**88,616**	**88,616**
Cumulative first & second tranche project avoided spend	**0**	**39,508**	**106,493**	**178,349**	**265,693**	**354,309**	**442,925**

Third Tranche Projects

5.3 Table 6 summarises Appendix 1, which shows when the proposed third tranche projects are provisionally estimated to pay back into the Fund (based on internal loan agreements).

Table 6: Third Tranche CMF Projects: Provisional Repayment Schedule*

PROJECTS	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
	£	£	£	£	£	£	£
Annual payback amount	0	58,742	126,939	84,323	50,061	36,420	6,587
Cumulative payback amount	**0**	**58,742**	**185,681**	**270,004**	**320,065**	**356,485**	**363,072**

* *Assumes that all projects are implemented by 1 November 2011*

5.4 Table 7 summarises Appendix 2, which shows the potential third tranche projects including provisional avoided spend (once the project has been fully repaid into the ring-fenced fund). Not all of these projects are fully quantified and so the figures are indicative only (actual payback dates will reflect project start dates).

Table 7: Third Tranche CMF Projects: Projected Avoided Spend

PROJECTS	2011/12 £	2012/13 £	2013/14 £	2014/15 £	2015/16 £	2016/17 £	2017/18 £
Total avoided spend pa	0	14,042	56,658	90,920	104,561	134,394	140,981
Cumulative 3rd tranche project avoided spend	**0**	**14,042**	**70,700**	**161,620**	**266,181**	**400,575**	**541,556**

5.5 Table 8 summarises the overall financial benefit to the Council of current and proposed Carbon Management Funded projects (once fully the Fund has been fully paid back).

Table 8: CMF Projects: Projected Avoided Spend (Tranches 1, 2 and 3)

PROJECTS	2010/11 £	2011/12 £	2012/13 £	2013/14 £	2014/15 £	2015/16 £	2016/17
First tranche projects	0	39,508	66,985	66,985	66,985	66,985	66,985
Second tranche projects	0	0	0	4,871	20,359	21,631	21,631
Third tranche proposed projects	0	0	14,042	56,658	90,920	104,561	134,394
Total avoided spend per annum	**0**	**39,508**	**81,027**	**128,514**	**178,264**	**193,177**	**223,010**
Cumulative avoided spend	**0**	**39,508**	**120,535**	**249,049**	**427,313**	**620,490**	**843,500**

5.6 Carbon Management Fund projects represent a win-win financial situation for the Council, regardless of whether future energy prices rise or fall. Price-sensitivity analysis demonstrates that:

- a fall in energy prices means that although project savings will be slightly reduced, there will be an overall financial benefit to the Council as energy bills will be significantly lower (far outweighing the reduced project savings);

- an increase in energy prices means that projects will save even more than originally projected, thus helping to mitigate the financial impact of any future energy price increases.

5.7 The Carbon Reduction Commitment (CRC), see Executive Reports ES09101 (December 2009) and ES10189 (January 2011), places a significant additional financial liability on avoidable carbon, reinforcing the need for a continued focus on the energy demand management measures set out in this report.

5.8 Carbon Management Fund projects must pay for themselves before they provide any avoided spend benefit. However, they will provide an immediate and additional financial benefit because fewer CRC carbon allowances will have to be purchased. For instance, the 355t of carbon emissions saved annually from Tranche 1 and 2 projects will result in the Council avoiding £4,260 of CRC allowance costs in 2011/12. This benefit will increase as the price of CRC allowances increases and further projects are implemented.

5.9 The Carbon Management Fund as reported to Salix at the end of 2009/10 is shown in Table 9.

Table 9: Carbon Management Fund as at 31.03.10

Carbon Management Fund	**£'000**
Funding Received as at 31.03.2010	
LBB Capital Programme	250
First three instalments received from Salix	188
Total funding received to date	438
Less expenditure to date	-200
Add back loan repayments to date	48
Fund balance as at 31.03.2010	285
Final instalment from Salix: due July 2010	63

Non-Applicable Sections:	Legal Implications Personnel Implications
Background Documents: (Access via Contact Officer)	IE&E Report ES08185: Carbon Management Programme: First Tranche Projects IE&E Report ES09102: Carbon Management Fund: Progress Report 2009 Executive Report ES10188: Carbon Management Programme Progress Report 2009/10 Executive Report ES10189: Carbon Reduction Commitment Scheme 2010 Annual Report