Appendix 1

Cherwell District Council

Carbon Management Plan 2009 – 2015 Review

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Executive Summary

In 2011 Cherwell District Council adopted a Carbon Management Plan with two key targets, to reduce the council's carbon footprint by 22% (1195 tonnes of CO_2) by 2015 against a 2009 baseline and to realise savings of up to £1,070,000. The council services and activities included in the scope of the plan are corporate buildings, leisure centres, fleet and business mileage.

While good progress has been made on reducing the carbon footprint, the council has fallen short of meeting the target; achieving a direct reduction of 11.1%. This is due partly to some factors beyond the council's control. Part of the reason for not achieving the target was due to how the electricity across the UK is generated and the carbon factors used to calculate the carbon footprint in the final year (2014/15). If this had not changed then the council would have achieved a reduction of 15.2%. In addition to this, the original Carbon Management Plan did not account for the districts increasing population, placing ever more demand on services.

During the course of the five years of the plan further projects were identified to help meet the target and while these made a contribution they were unfortunately not enough to meet it. The Bicester Biomass boiler was one of the projects identified after the target was set and if there were no problems this would have allowed the council to meet the target. Unfortunately there were delays to the building of the boiler and teething problems associated with the integration with existing leisure centre systems, which meant the savings and income are being realised later than planned. Additionally there have been a number of notable successes; the solar PV installations across the council are generating more electricity than expected and are continuing to save and generate an income of £89,000 per year. Some of the councils sites have dramatically reduced its consumption of electricity and gas; one in particular showing reductions of 52% and 38% respectively. Ultimately the improvements in infrastructure and efficiencies will continue to save the council both financially and environmentally in the future.

With regards to financial savings, income and cost avoidance this has totalled £1,100,000; more than was originally thought achievable due to the greater than expected fluctuations in energy prices. Ultimately therefore the Carbon Management Plan has been partly successful in achieving a reduction in the carbon footprint and financially a success.

1.0 Introduction

CDC is continually striving to be amongst the best performing councils in the country and recognises that its activities have an impact on climate change. Recognising and reducing the carbon footprint is a long standing aim of the council and the need to monitor and reduce greenhouse gas emissions from all estates and activities is more paramount than ever before.

In 2006/7 Cherwell District Council set a 5 year reduction target for reducing 520 tonnes of carbon dioxide (CO_2) emissions by 2011/12 using the Department for Environment Food and Rural Affairs (DEFRA) 2005 guidance. Subsequently National Indicators were introduced, including indicators specifically for local authorities to monitor and report the reduction of emissions for their estates and activities.

The change in guidance and scope from the National Indicators meant the original target was severely limited and in order to build on this original target a carbon management plan was drawn together with the aid of the Carbon Trust.

A target was set in 2011, using a baseline of 2009/10, for a reduction in carbon emissions of 22%. Whilst noting two key objectives the plan would contribute towards:-

- Reducing Cherwell's impact on the natural environment, limiting the use of natural resources and support others in the district to do the same (Cleaner and Greener)
- Providing value for money and a financially sound organisation, minimising the impact of smaller council budgets on frontline and priority services (Value for Money)

It is undeniable that local authorities are facing an unprecedented challenge with their longer term resources and financial sustainability. The exceptional appreciations in the energy markets herald significant market increases and volatility for the future; it cannot be ignored that a reduction in the underlying causes of the emissions (the consumption of electricity, heating and vehicle petrol/ diesel based on fossil fuels) will yield significant financial savings.

The Carbon Management Plan 2009-15 identified potential savings of £1,070,000 and, if not addressed, acknowledged the costs to the council would increase by over £100,000 per year. With the associated impacts of uncontrollable climate change well recognised and the financial benefits undeniable, a review of the Carbon Management Plan 2009-15 is required as a first step to implementing a new plan and is set out in this report.

2.0 Overview of the Carbon Management Plan 2009-15

In order to properly analyse the successes and failures of the council's previous carbon management plan, understanding the situation of when the plan was set and the subsequent projections must first be understood.

The Carbon Management Plan 2009-15 divided the emissions into the following areas in order to properly identify and distribute the different work areas to council personnel:

- CDC Buildings
- Fleet
- Business mileage
- Leisure facilities

Figure 1 provides a breakdown of these emission sources from the 2011 carbon management plan document.

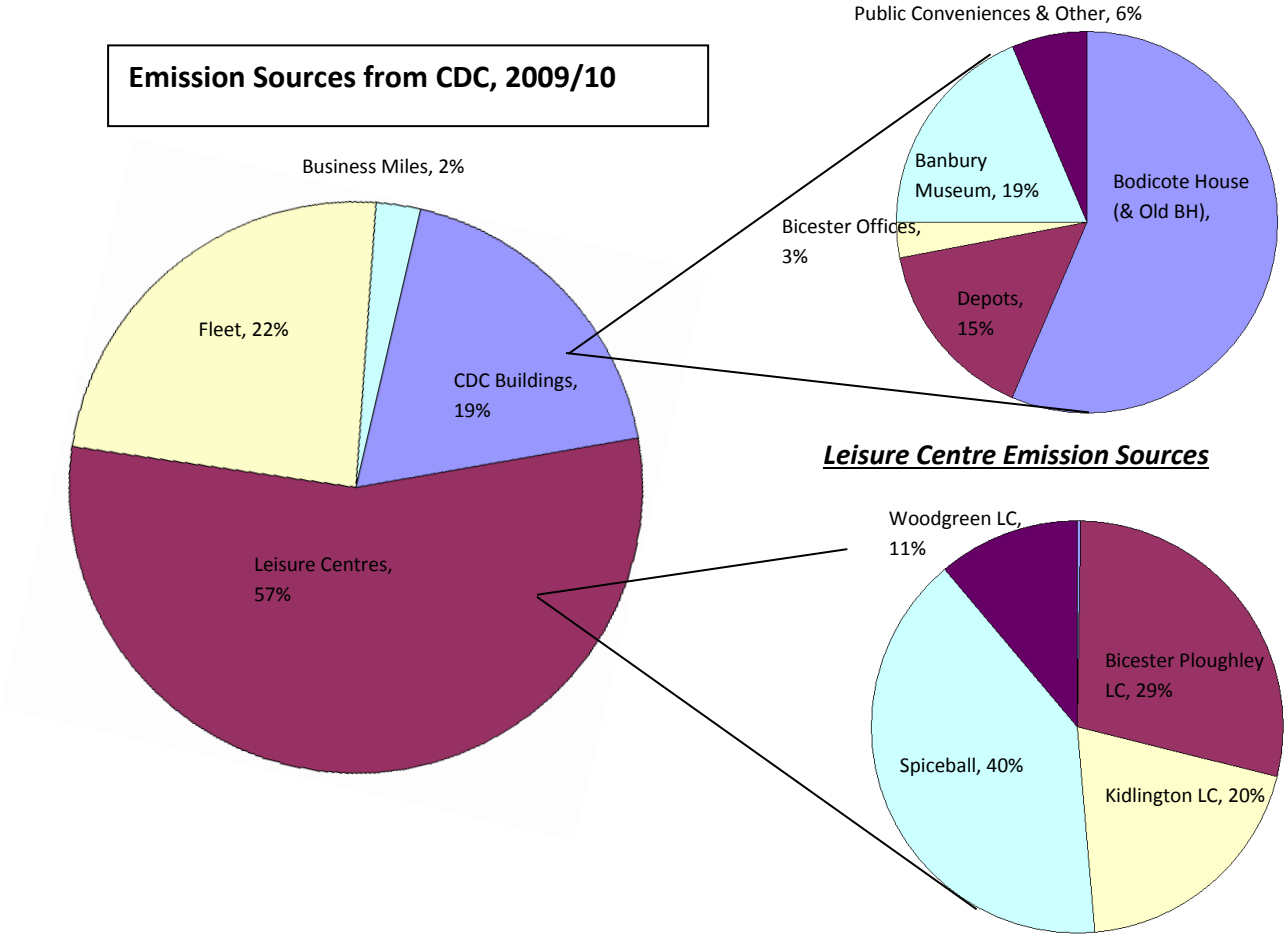

Figure 1: Cherwell District Council emission source from baseline

The leisure centres account for the largest proportion of energy use across the council and are therefore the largest source of emissions. This is followed by the fleet operations; which cover refuse and recycling collections, the street cleaning service and landscaping services. The council buildings cover not only the main offices at Bodicote House but also the two depots, Banbury museum and a portfolio of other smaller properties. Business mileage is travel incurred by officers in the course of their duties utilising their own vehicles.

It has been recalculated that the expenditure on energy totalled £1,390,000 for the financial year 2009/10. It should be noted that the leisure provider Parkwood Leisure are liable for a significant element of the costs detailed within the electricity and gas margin.

2.1 Projections and Plans from the Carbon Management Plan 2009-15

In 2009 it was identified that an approach where no modifications or action was taken by the council would be known as business as usual (BAU). This approach based on a rise in costs of 1.7% per year for all fuels and 0.7% rise in consumption for business and fleet mileage only (no increase in consumption for gas and electricity).

The BAU approach determined that the increase in emissions would be approximately 1% in total over 5 years with an increase in costs to £1,507,990 this is highlighted in Figure 2.

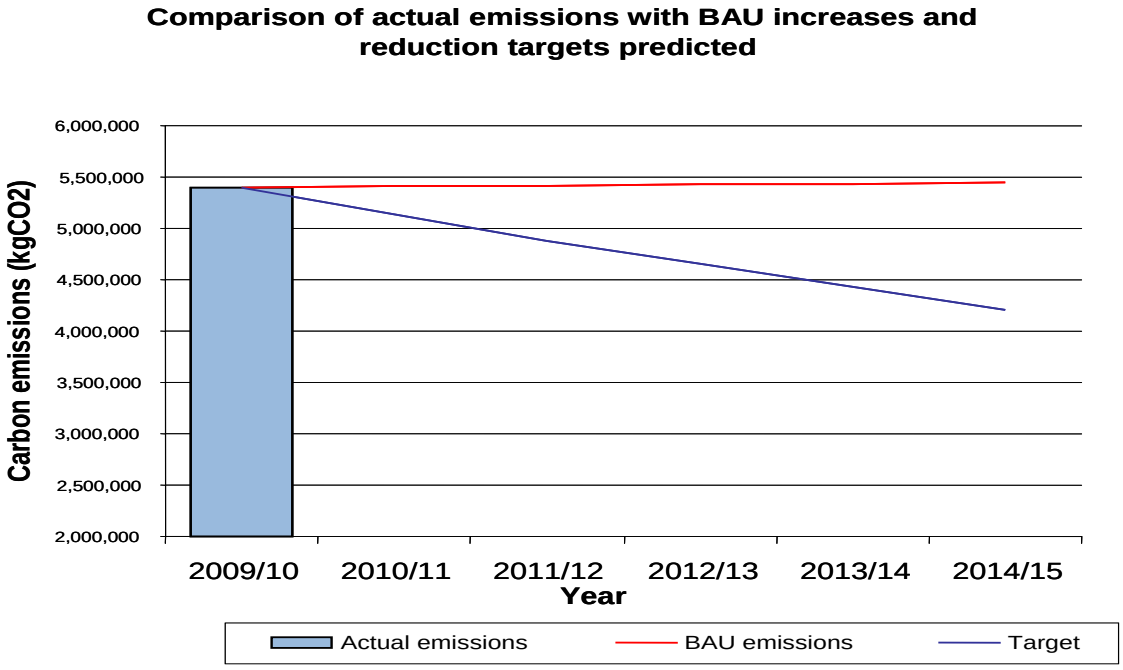

Figure 2: Comparison of actual emissions with BAU increases and target

The plan itself was drawn together from a number of highlighted projects across different council departments, some of which were drawn from energy audits conducted by the Carbon Trust in 2011. A full list of these projects can be found within Annex 1.

These projects were identified to contribute towards meeting the target of a 22% reduction in the carbon footprint. It should also be noted that even if all the projects identified in the list were implemented they would still not be able to meet the 22% reduction target. A gap of approximately 2.5% was expected (such that 19.5% of the target had identifiable projects planned for).

This target was implemented in consultation with the Carbon Trust and council officers with the knowledge of the gap. As it was fully anticipated to be a challenging and ambitious target, it was predicted further projects would be identified within the intervening years in order to meet the target.

If the carbon reduction target was met by the anticipated reduction in consumption of fossil fuel derived heating, electricity and petrol/diesel, there would be significant financial savings available. The anticipated difference between the council's energy costs in 2009, from a business as usual approach (i.e. no change), and the implementation of the plan would be significant; over the five years totalling a potential saving of £1,070,000.

3.0 Performance of the Carbon Management Plan 2009 – 15

An overview of the performance is highlighted in Figure 3.

Of the 22% target, an overall 11.1% reduction in carbon dioxide was achieved.

Total Tonnes of CO_2	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	% variance from 09/10
Buildings	1,035.6	899.3	705.6	744.0	760.9	778.5	-24.8%
Fleet Emissions	1,199.4	1,117.6	1,075.2	1,149.5	1,154.7	1144.5	-4.6%
Business Mileage	124.7	130.0	121.0	119.4	109.2	100.6	-19.3%
Leisure Centres	3,029.5	3,082.6	2,903.3	2,776.4	2,775.6	2765.6	-8.7%
Total	**5,389.1**	**5,229.5**	**4,805.0**	**4,789.3**	**4,800.4**	**4,789.3**	**-11.1%**

Figure 3: Performance of carbon management plan 2009-15

It should be noted there was a significant alteration in the guidance between 2011 and 2014/15 relating to how the carbon footprint is calculated. Specifically the carbon factors set in the most recent year are provisional and often have to be altered to account for corrections in later years.

A good example of this is the electricity grid. Approximately 6% of the UK's electricity in 2014 was imported from France, in order to calculate the UK's electricity carbon factor France's electricity carbon factor needs to be calculated first. As a result the carbon factor for each year regularly changes and any progress can be masked in the headline figures. A more detailed review of the service areas are undertaken in the following sub-sections.

One significant impact upon the calculations was the grid electricity carbon factor during the final year of 2014/15. In autumn 2014 a potential fault was discovered and investigated in a number of the UK's nuclear reactors, at the same time several nuclear reactors were turned off for scheduled maintenance. In order to meet the UK's demand for electricity the deficit was covered by increased production from a number of gas power stations and by bringing a number of mothballed fossil fuel power stations back into productivity. The result was that the carbon factor for using grid electricity in 2014/15 was higher than it was in 2009/10. This was ultimately masking the progress which was achieved in reducing the council's underlying energy consumption. If the carbon factor for the previous year (2013/14), was taken into consideration the council would have saved the equivalent of 15.2% against the target. This highlights the reliance of the council upon outside factors in determining its carbon footprint.

The Cherwell district between 2009 – 2015, has experienced significant amounts of growth; as a result the council has been responsible for achieving ever more. A good example is the population growth; the population is estimated to have increased by approximately 3,000 between 2011 and 2014 to 144,500, equivalent to 2%. This increase in population results in a bigger demand on services such as waste and recycling collections. This in turn raises the council's fuel consumption due to increased collections.

In the year 2014/15 the total fuel bill of the council was £1,286,000. Of the estimated £1,070,000 savings over the 5 years that were anticipated with the business as usual approach, a total of £436,500 was saved. However the business as usual approach was ultimately incorrect as it failed in the assumption on two accounts – the volatile and ever increasing prices of energy and that the council would not increase its consumption through natural growth to cover the increasing demands placed upon it by a growing district.

The BAU approach anticipated electricity prices would rise a total of 8.79% over the course of the Carbon Management Plan, in actual terms they rose 33% (significantly less than the domestic market due to how the council and its contractor's energy is procured). When the prices of energy are taken into consideration the overall savings, improvements and avoided costs accounted for £950,000. However there is a further income stream related to the Feed-in-Tariff (government rebate for renewable electricity production) and the Renewable Heat Incentive (government rebate for renewable heat production), which total £150,000 across the 6 solar and 1 biomass projects. Therefore total savings, cost avoidance and related income over the 5 years are £1,100,000.

3.1 Building Performance

The council's buildings carbon footprint encompassed a number of different work streams (outlined in appendix 1); specifically technology, cultural change and property which was encompassed by the target. The total reduction target was 6.38% of the 22% target, or 343 tonnes of carbon dioxide.

The total carbon dioxide saved was 257 tonnes, however as mentioned in the previous section the electricity factor for 2014/15 was unforeseeably abnormal. Once this is taken into consideration the saving was 312 tonnes.

The technology workstream identified a 1.35% reduction target made of three projects: the roll out of Wyse thin client computers, the introduction of more efficient projectors and the reorganisation of the computer server room.

The Wyse thin clients were trialled in 2010 and were found not to be able to deliver the performance required. As a result the full council roll-out was altered to an upgrade in the hard drives, which increased the performance compared to the previous equipment but was not capable of delivering the electricity savings anticipated. The final completion of this roll out was in 2014.

The overhead projectors in the meeting rooms was rolled out in 2013 delivering the anticipated savings, albeit minor in comparison to the other projects.

The reorganisation of the server room and the air conditioning units was implemented in 2014; the council in the intervening years has been joining its IT systems to two other councils – Stratford District Council and South Northants Council. As a result the initial savings calculated did not take into consideration the future needs of the joint IT systems. Subsequently, the potential savings achieved were smaller than was originally calculated.

The cultural change workstream identified a reduction of 0.75% or 40 tonnes of CO_2 via staff engagement to reduce the carbon footprint. Due to staff changes and natural progression in order to meet this target a high level of engagement was required. As resources were scaled back this workstream was strategically reworked and refocused. An example of this would be instead of engaging with staff to switch off lights when required, automatic sensors to switch the lights off were installed. As a result, although some aspects of this target were achieved it should and has been treated in conjunction with the wider overall building performance target.

The property workstream consisted of a number of projects highlighted in appendix 1. There have been a number of notable successes; these include the lighting upgrades, the HVAC replacement (Heating, Ventilation and Air Conditioning) and the solar PV in particular. The installation of Solar PV across Thorpe Lane Depot, Bodicote House and the leisure centres is producing an annual saving of 164 tonnes of CO_2 and financial savings/generation of £89,000 per year. This is more than was originally expected and is highlighted in Figure 4. Additionally some sites have seen a total refurbishment such as Thorpe Lane Depot; which has seen a drop in gas consumption by 38% and electricity consumption by 52%.

	Total kWp production for 2014	System size kWp	Total Cost over lifetime	Total income per year	Lifetime income	ROI	Carbon Savings (Tonnes of carbon dioxide)
Bod House	42,264	50	£154,000	£9,500	£192,000	6.25%	21
TLD stores	67,175	81	£187,000	£19,500	£391,000	10.49%	33
TLD workshop	12,132	14	£60,000	£5,500	£106,000	8.85%	6
Bicester	12,374	12	£60,000	£3,500	£64,000	5.32%	6
Kidlington	89,987	100	£260,000	£21,500	£428,000	8.21%	44
Spiceball	31,882	30	£113,000	£7,500	£147,000	6.55%	16
Woodgreen	109,488	132	£307,00	£22,500	£447,000	7.27%	54
Total	365,301	419	£1,140,000	£89,000	£1,776,000	7.79%	181

Figure 4: Solar PV production for council sites for the year 2014 (based on original cost and electricity cost of 2014/15)

However a number of identified projects were ultimately not implemented. These included:-

- Voltage optimisation - expected to save the council 46.5 tonnes.
  Upon further investigation was found not to be able to achieve the savings initially identified. The technology works in correcting the inefficiencies of three phase power usually delivered at a voltage of 242V to 230V, unfortunately upon investigation it was found the inefficiencies were minimal and the savings could not be achieved to justify the cost of installation.
- Installation of smart meters - capable of delivering savings of 51 tonnes of CO2 at a cost of £15,000. Following discussion with neighbouring councils regarding teething problems and

meters with limited lifetimes, the project was delayed. Figure 5 shows a gas smart meter consumption recording for two consecutive days for the same site, the top shows an inefficient heating cycle and the other an efficient heating cycle; smart meters enable identification of these losses which can subsequently be corrected. The council's current electricity supplier subsequently began to automatically upgrade the meters in 2015, as a result due to value for money and the limited resources available this project was postponed

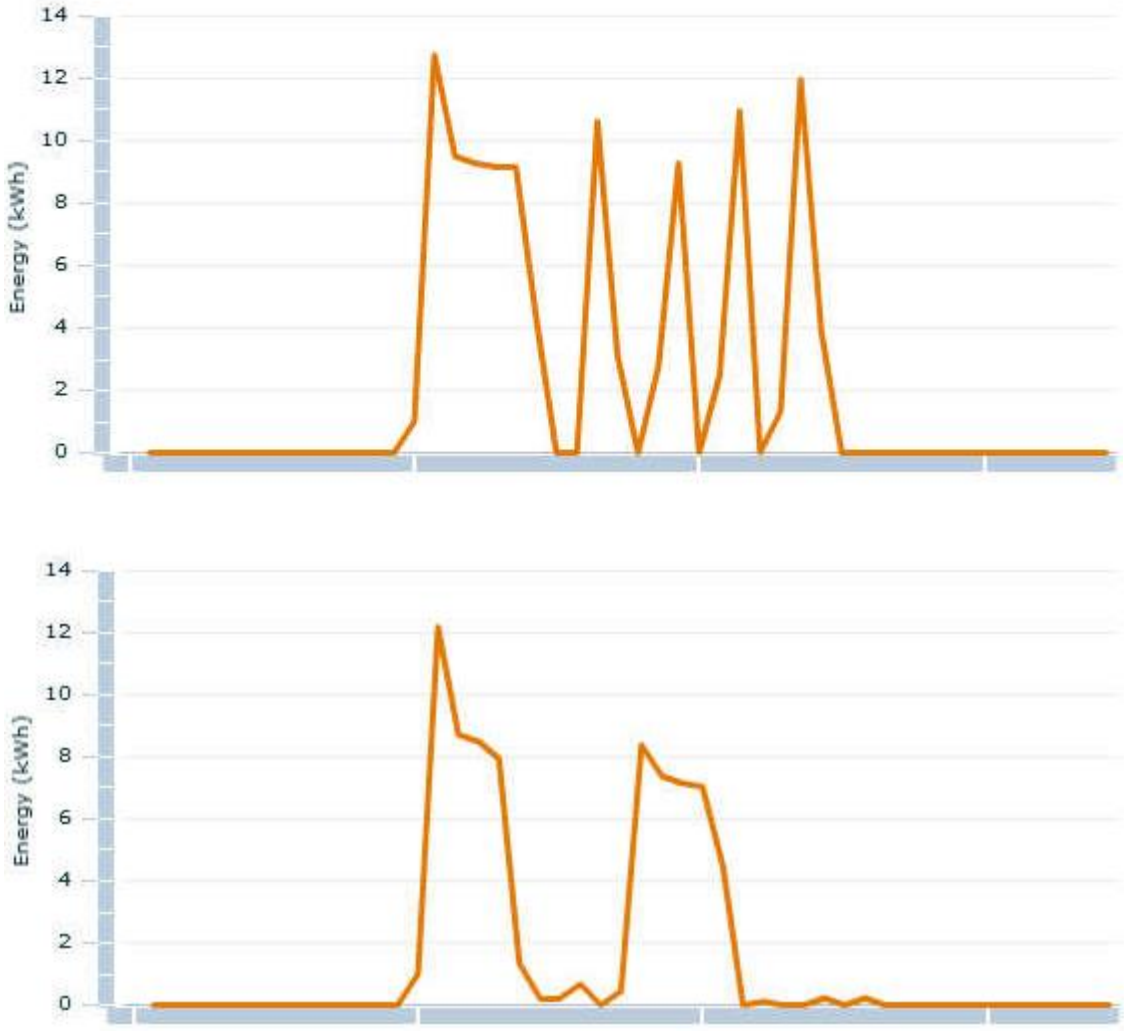

Figure 5: Smart meter consumption recording tool, top graph showing an inefficient heating cycle and the bottom an efficient cycle

Several additional projects were identified after the original list; these included lighting projects, the HVAC replacement and loft insulation top up. However these projects did not overcome the shortfall in the projects which did not go ahead.

It should also be noted that overall significant savings have been achieved in these services as highlighted in Figure 6.

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	% variation from 2009/10

Total Electricity	783.62	647.90	531.96	541.10	559.54	609.70	-22%
Total Gas	252.0	251.4	173.6	202.9	201.4	168.8	-33%

Figure 6: CO2 Emissions from Buildings

3.2 Fleet Emissions

Fleet emissions accounted for 24% of the council's carbon footprint in 2014/15. The fleet emissions sub target equated to 2.36% of the overall target and a reduction of 127 tonnes of CO_2.

The carbon saving achieved was 4.6% or 55 tonnes, but this is misleading as explained below. Figure 7 highlights the progress made by the council and its contractors.

Total year Tonnes CO2	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	% variation from 2009/10
CDC Fleet	1095.11	1073.67	1035.36	1031.59	1040.27	1030.50	-6%
Contractors fleet	104.25	43.93	39.82	117.93	114.42	114.04	9%
Total	**1199.35**	**1117.60**	**1075.18**	**1149.52**	**1154.69**	**1144.54**	**-4.6%**

Figure 7: Fleet Emissions CO2 split

Specifically the projects were designed to impact upon the council's vehicle fleet by a waste and recycling rounds review, the introduction of an electric vehicle and the increase in efficiency of the vehicles. It should be noted the majority of the fleet footprint is in relation to the waste/recycling collection vehicles.

The more efficient vehicles are all based upon diesel. At the start of the Carbon Management Plan, there was anticipation of a variety of different fuel based technologies coming forward such as: liquid petroleum gas (LPG), light natural gas (LNG), compressed natural gas (CNG), hydrogen based fuels, electric vehicles etc. Unfortunately none of these have become mainstream in the UK, for a variety of reasons. As a result the opportunities to fundamentally reduce the carbon footprint of the waste and recycling fleet have been severely limited.

No progress was made by the contractor's fleet (responsible for landscaping) in reducing their carbon footprint.

The successes can be highlighted in the first few years in Figure 7. Although higher efficiency vehicles were purchased throughout the course of the carbon management plan, this had to contend with the increased number of properties and people within the district. The increase in the number of properties between 2009 - 2015 totalled approximately 1,900, the equivalent to a 3% increase.

3.3 Business Mileage

The business mileage aspect of the council's carbon footprint was identified as one of the smallest parts, but financially represented a significant outlay. Accordingly in the 2009-15 Carbon

Management Plan there was not a specific target set but an agreement to put a plan in place to facilitate the carbon reduction.

Two staff travel plans adopted by the council (2011-2014, and a joint Cherwell and South Northants plan 2015-2019) have introduced a range of measures to promote alternative methods of travel. A number of examples of these are:

- Introduction of bike mileage rates and pool bikes
- Promotion of car sharing
- Homeworking policy

In terms of the business mileage the carbon footprint has dropped by 19.3%. This is a combination of both a significant drop in the number of miles being conducted (approximately 45%), an increase in the fuel efficiency of vehicles and a change in the driving habits of staff. Specifically these driving habits refer to choice of vehicles – smaller vehicles are generally more fuel efficient. In 2009/10 almost 70,000 miles were conducted in large vehicles compared to 26,000 in 2014/15. This is despite the council joining several of its services with South Northamptonshire Council and Stratford District Council creating an increase in business mileage between the council offices.

Consequently the financial cost has changed from £386,000 to £212,000 and significant savings are continuing to be made each year.

3.4 Leisure Centres

The leisure centres account for the largest proportion of emissions within the scope of the council operations, the target set for the leisure centres was 10.39% of the target or equivalent to 559 tonnes of CO_2. The achieved emissions reduction was 263 tonnes, as detailed in Figure 8. As noted previously, the electricity carbon factor in the year 2014/15 was abnormally high due to problems with the UK nuclear reactors and relates to a difference of approximately 55 tonnes of carbon dioxide when compared to 2013/14 for the leisure centres. In addition the number of residents in the district has increased and subsequently the demand on the council services has had an impact upon the energy consumption of the council as more services are on offer at the leisure centres.

Total		**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**% variation from 2009/10**
Bicester Ploughey	Electricity	475.21	518	468.41	456.90	411.52	509.77	7.3%
	Gas	380.86	458.35	448.57	430.66	391.11	321.97	-15.5%
Kidlington Leisure	Electricity	363.94	356.52	346.88	319.17	301.81	295.38	-18.8%
	Gas	232.69	240.59	232.45	228.74	243.12	192.55	-17.3%

Spiceball	Electricity	695.19	843.38	734.72	740.30	691.32	754.08	8.5%
	Gas	511.20	295.59	326	361.69	368.73	338.81	-33.7%
Woodgreen Leisure	Electricity	130.81	147.91	134.06	73.57	132.34	144.99	10.8%
	Gas	203.02	186.37	185.68	136.17	210.27	178.64	-12.0%
Drayton Pavilion	Electricity	25.20	24.88	17.46	17.28	15.83	16.93	-32.8%
	Gas	11.39	10.85	9.34	11.96	9.49	12.54	10.1%
Total		**3029.50**	**3082.64**	**2903.32**	**2776.45**	**2775.56**	**2765.64**	**-8.7%**

Figure 8: Carbon Dioxide Emissions Leisure

Of the initial solar calculations completed for the Carbon Management Plan, there was a significant alteration, specifically surrounding the solar PV at Spiceball leisure centre. Unfortunately this project had to be scaled back to approximately half of what was originally intended, due to the weight restrictions upon the building's roof.

Another significant project noted was the energy management improvement; this relates to how the leisure centre staff, within the facilities, operate the apparatus and applied to all equipment from pool heating to running machines. An arbitrary figure of a 213 tonnes of carbon dioxide reduction was attached to this project but failed to take into account the increased usage of the leisure facilities by residents over the course of the plan. As a result this figure would not have necessarily been achievable to begin with and the savings that were made would have been reduced by the increases in demands placed upon the services.

Bicester leisure centre was identified as a site with an opportunity to replace the existing gas boilers with either; combined heat and power (CHP) or a biomass boiler. This was initially identified as a saving of 40 tonnes of carbon dioxide. Following further feasibility work and investigations it was decided to install a biomass boiler capable of delivering 90% of the sites heat via renewable energy. This would provide savings equivalent to over 400 tonnes of carbon dioxide (based on the 2010/11 consumption) or approximately 8% of the 22% target. For the boiler to achieve the full reduction capable it would be required to be in operation prior to 2014/15, but following the capital bid, the project was delayed until summer 2014 whereupon it suffered from a number of teething problems. The delays and problems have been varied from the initial application for planning permission by the contractor, delivery of necessary parts to the site and integration of the boiler with existing leisure centre systems, amongst others. As a result of this delayed start and teething problems the biomass boiler was not able to achieve its full capabilities within the timeframe required but as Figure 8 shows has begun to make a significant impact and ultimately will make savings for the council within future years. To date the biomass boiler has provided 20% of the Bicester Leisure Centre heat and saved 81 tonnes of carbon dioxide.

Several additional projects were identified; including lighting upgrades to sports halls and potential insulation upgrades, which proved successful.

The performance of the leisure centres highlights a significant amount of work and success which was achieved; however the restrictions by initial projects, which were not achievable, hindered the realisation of the target. Further projects were identified, most notably the biomass boiler which

would have made a significant step towards achieving both the leisure centre target and subsequently the overall reduction target. However delays and problems resulted in this not being able to be completed within the timeframes of the original Carbon Management Plan.

3.5 Procurement of Energy

Although not originally part of the first Carbon Management Plan the procurement service covers how the council purchases its energy and has had a significant influence on reaching the financial savings in terms of the negotiation of its contracts. In 2012, Cherwell DC chose to stay with its current energy framework contractor, the savings related to this contract fall into six categories and total on average £32,000 per year. This is highlighted below in Figure 9.

Category	Saving per year
Avoided wholesale cost	£3,900
Aggregation of Multiple Portfolio's	£1,800
Lower Energy Management Fee's	£7,100
Avoided OJEU and Legal Fee's	£5,000
Non-Energy Cost Avoidance	£1,300
Market Volatility Control	£13,000

Figure 9: Table Highlighting Procurement Savings

4.0 Summary of performance

The need for Cherwell District Council to address its carbon footprint has been proved ever more urgent with the later releases of the Intergovernmental Panel on Climate Change (IPPC) reports. As such the council was proved right in setting itself an ambitious and challenging target of reducing its carbon footprint by 22% against a 2009/10 baseline. This target consisting of a number of projects identified following a Carbon Trust review of Cherwell's buildings and procedures but also included a gap of 2.5% for subsequent projects to be identified. As part of the 22% carbon reduction target financial savings of up to £1,070,000 were possible.

The carbon reduction savings reached was 11.1%. However there were a number of key oversights that were made as part of the original target; that the energy costs would rise at a stable and predictable manner, that the district would not grow such that there would be an increase in demands on the services provided and the carbon factors used to calculate the carbon footprint would be consistent. When the anomalous grid electricity carbon factor is taken into consideration the realistic carbon saving achieved was 15.2%. Equally when the wildly fluctuating energy prices are taken into consideration the savings, income and cost avoidance of the carbon management plan total £1,100,000.

Ultimately the carbon management plan had an ambitious 22% reduction target; it can be described as ambitious due to the gap in savings from the identified projects and the target. However additional projects were identified which would have seen the council surpass the target. A number of sizeable projects originally identified were not realisable upon further investigation or had to be scaled back. Although the biomass boiler, if it realised its full potential, would have overcome these

setbacks, it was delayed and suffered from early integration problems. Similarly other projects not in the original carbon management plan were identified, but these could not overcome the deficit. A number of notable successes have been achieved however:

- Lasting savings have been made in combating the business mileage,
- The council's carbon footprint for corporate buildings has seen reductions of 1/3rd for gas and 1/5th for electricity,
- Guaranteed future income from solar pv has been implemented
- Further carbon savings are possible in the future from the biomass boiler.

Even though the target was missed this does not take into account the significant efforts and successes in meeting the 15.2% reduction and therefore cannot be considered a failure. In conjunction of meeting this reduction of the original financial target set (£1,070,000) the final cost avoidance, savings and income amounted to £1,100,000 and therefore this goal was achieved.

Appendix 1: list of projects by workstream

Technology

Project Ref	Project Description	Annual Savings	Quantification Justification and Other Comments.
		tCO2	
PR 22	Bodicote House - Server Room Air Con	42.0	
PR 23	Bodicote House - Wyse Computer Roll out	33.1	
NEW9	Projector Replacement	0.5	

Cultural Change

Project Ref	Project Description	Annual Savings	Quantification Justification and Other Comments.
		tCO2	
PR 5	All Buildings - Energy Awareness - Green Champions	41.5	5% - 10% reduction opportunity advised from Carbon Trust literature. KWh savings presented shows 3% estimate.

Property

Appendix 1

Project Ref	Project Description		Quantification Justification and Other Comments.
		tCO2	
PR 1	Solar PV at Thorpe Lane Depot	6.8	Part of Thorpe Lane Depot refurbishment
PR 4	Bodicote House - PIRs (lighting sensors) 1st Phase	3.1	Part of Use of Natural Resource Work stream Group
PR 6	All Buildings (ex Leisure Centre) – Automated Meter Readers/ Smart Meters	51.9	5% reduction opportunity advised from literature on AMR/ Smart Meter packages. Operating cost of approx - £10,000.00 is due to insourcing.
PR 7	Solar PV at Bodicote House	25.7	Various proposals provided from different companies. Figures shown are from Solar Century Proposal using high number of Active PV area.
PR 15	Depots - Biomass at Thorpe Lane Depot	10.1	Figures from Contractor proposals. Renewable Heat Incentive not yet incorporated.
PR 17	Depot - Lighting at Thorpe Lane Depot	5.8	Part of Thorpe Lane Depot refurbishment
PR 20	Bodicote House - Biomass (Old Bodicote House)	40.5	Figures from Contractor proposals. Renewable Heat Incentive not yet incorporated.

PR 21	Bodicote House – PIRs (lighting sensors) 2nd Phase	2.7	
PR 25	Bodicote House - PIRs (lighting sensors) 3rd Phase	2.6	
PR 26	Solar PV at Thorpe Lane Depot (Phase 2)	13.6	Reroofing of stores building allowing the placement of Solar PV
PR 28	Civic Building - Museum : Solar PV (discontinued)		
PR 29	Bodicote House - Voltage Optimisation	46.4	To be conducted in later stages of Plan
NEW3	Bodicote House Car Park Lighting	7	To be installed by 2014
NEW4	Bodicote House External Lighting	7.5	To be installed by 2014
NEW5	Heating Ventilation and Air Conditioning change at Bodicote House	35.6	To be installed by 2014
NEW6	Bodicote House roof insulation top up	10	To be installed winter 2013
NEW7	Water Boiler Timers across Bodicote House	1	
NEW8	Thorpe Lane Depot Lights Replacement	4.5	To be installed by 2014

Fleet

Project Ref	**Project Description**		**Quantification Justification and Other Comments.**

		tCO2	
PR 18	Transport: Fleet - 2.5% reduction over 5 years per year	60.5	Part of Use of Natural Resource Work stream Group. Figure of 239179kWh derives from 9750l of diesel converted to kcCO2e and reconverted multiplied over 5 years.
PR 19	Transport: Fleet - Insourcing	33.8	Part of Use of Natural Resource Work stream Group. Figure of 133470kWh derives from 27204l of diesel converted to kcCO2e and reconverted. Although insourcing, the 27000litres of fuel saved will decrease by approx 7000litres due to additional work.
PR 24	Transport - Fleet: Rounds review	37.2	Part of Use of Natural Resource Work stream Group. Figure of 147187kWh derives from 6000l of diesel converted to kcCO2e and reconverted multiplied over 5 years.

Leisure

Project Ref	**Project Description**		**Quantification Justification and Other Comments.**
		tCO2	
PR 2	Leisure Centre - Spiceball Solar PV System	31.2	Advised from Carbon Trust survey and report

PR 3	Leisure Centre - Woodgreen Solar PV System	59.2	Advised from Carbon Trust survey and report
PR 8	Leisure Centre - Woodgreen Pool temp control/circulation and review boiler controls	39.0	Advised from Carbon Trust survey and report
PR 9	Leisure Centre - Woodgreen - Energy management	3.3	Advised from Carbon Trust survey and report
PR 10	Leisure Centre - Woodgreen (PIRs (lighting sensors) and lighting)	7.2	Advised from Carbon Trust survey and report
PR 11	Leisure Centre - Spiceball, Bicester, Kidlington - Energy management improvement	213.1	Advised from Carbon Trust survey and report. Awareness assuming 7% reduction

PR 12	Leisure Centre - Spiceball, Bicester, Kidlington- review lighting	29.8	Advised from Carbon Trust survey and report. However, should be reviewed.
PR 13	Leisure Centre - Spiceball Variable Speed Drive controls	15.2	Advised from Carbon Trust survey and report
PR 14	Leisure Centre - Bicester Combined Heat and Power /Biomass	40.3	Advised from Carbon Trust survey and report
PR 16	LC Bicester – Solar PV System	20.5	advised from Carbon Trust survey and report
PR 31	Leisure Centre - Voltage Optimisation across all sites	119.8	To be conducted in Y3/4. KWh savings calculated at 7% rather than 10%. All 4 Leisure Centre Sites will need to be included to realise savings.

NEW1	Woodgreen Pool Cover	20.3	
NEW2	Bicester Sports Hall Lighting	13.3	Install before March 2013