UNIVERSITY OF ST ANDREWS
CARBON MANAGEMENT PLAN

CMP 2011 - 2016

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Owner: Roddy Yarr

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Revision v0.2	Feb 2012 Typographical updates
Revision v0.3	Nov 2012 Clarification of utilities management target

Foreword from Principal

This Plan for carbon management over the next 5 years represents a commitment from the University to make improvements across a range of key areas. The plan is aligned to the University's Strategic Plan and supports the existing Sustainable Development Policy and Strategy which recognises the need to reduce carbon emissions in order to become more sustainable.

Since the University started to understand its 'carbon footprint', there has been a significant increase in the awareness of staff and students. By working together, the analysis and identification of ways by which this 'footprint' can and will be reduced will enable the University to continue to provide exceptional teaching and research in ever more sustainable ways.

Changing the way we do things won't happen overnight. To achieve these changes will take time, and effective communication and engagement is key. As an institution that is renowned worldwide for excellence in teaching and research, the University also aims to be at the forefront in demonstrating working practices that integrate environmental, social and economic issues. Achieving sustainable development rests with us all. Each of us has a contribution to make, and the consequence will be a cleaner, healthier and more sustainable environment for everyone in St Andrews. I commend this plan and its aims and objectives to you and encourage you to become involved in this exciting endeavour.

Louise Richardson

Principal of the University of St Andrews

Foreword from the Carbon Trust in Scotland

Cutting carbon emissions as part of the fight against climate change should be a key priority for all public bodies - it's all about getting your own house in order and leading by example. The Scottish and UK governments have identified the public sector as key to delivering carbon reduction across Scotland and the UK, in line with Kyoto commitments and the world-leading Scottish and UK Climate Change legislation.

The Carbon Trust's Public Sector Carbon Management programme is designed in response to this. It assists organisations in saving money on energy and putting it to good use in other areas, whilst making a positive contribution to the environment by lowering their carbon emissions.

University of St Andrews was selected to take part in this ambitious programme. University of St Andrews partnered with the Carbon Trust in order to realise substantial carbon and cost savings. This Carbon Management Plan commits the organisation to a target of reducing CO_{2e} by achieving carbon neutrality in energy consumption by the end of 2015/16 and underpins potential financial savings to the organisation of around £20 million.

There are those that can and those that do. Public bodies can contribute significantly to reducing CO_{2e} emissions. The Carbon Trust is proud to support University of St Andrews in the on-going implementation of its carbon management.

Paul Wedgwood

Manager, Carbon Trust in Scotland

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EXECUTIVE SUMMARY

This Carbon Management Plan (CMP) for the University of St Andrews sets out a five-year plan for the reduction of carbon emissions across the University's own activities. It has been produced in conjunction with the Carbon Trust in Scotland using the support of accredited consultants.

This CMP is aligned with the University's Strategic Plan and supports the existing Sustainable Development Policy and Strategy 2012-2022. Overall responsibility for delivery of the CMP will lie with the Environment and Energy Manager. He will be supported on a day-to-day basis by the Energy Officer and, more widely, by the Carbon Management Group, which includes representatives from across all departments. Progress towards the CMP's aims and objectives will be reviewed annually by the Sustainability Policy Group and more regularly by the Carbon Management Group.

Structure of the Plan

The Carbon Management Plan is split into three separate sections:

- **Background and Context:** This section sets out the aims and objectives of the CMP, the drivers behind the CMP, the University's governance structure in relation to carbon management, the original baseline carbon footprint for University of St Andrews and reduction targets.
- **Progress Review:** This section provides an ongoing review of actual progress towards target carbon emissions.
- **Implementation Plan**: This section provides a list of planned carbon reduction projects, with details of project ownership, estimated reductions and progress.

Overall Target

University of St Andrews's overall target for carbon reduction is to become **carbon neutral** in energy consumption by the end of financial year **2015/16** (based on a baseline year of 2006/7). This equates to a reduction of around **21,000 tonnes CO_{2e}**, and a cost saving of around **£20 million**, over the next 5 years.

The University aims to become carbon neutral for energy consumption and to understand the carbon impact and reduce this carbon footprint in the key areas of resource use, waste, travel and transport and ultimately procurement.

1. BACKGROUND AND CONTEXT

1.1 Our Low Carbon Vision

The Carbon Management Plan vision is that:

The University is committed to delivering sustainable development, reducing resource use and supporting a shift towards a low carbon economy. The Strategic Plan states that:

"the University accepts the challenge of taking an integrated approach to sustainable development that includes use of renewable energy sources, energy efficiencies, attention to the environmental impact of its activities and development of distinctive programmes of teaching, research and knowledge transfer in sustainable development that are recognised as of international excellence."

The University's Sustainability Policy commits it to:

1. Environment Management and Compliance

   To prevent pollution and ensure full compliance with relevant environment legislation now and in the future.

2. Resource Use

   To ensure prudent use of natural resources. Specifically to reduce water consumption by 30% by 2020 based on 2009 baseline.

   To participate in the Flexible Framework for Procurement and to achieve Level 5 by 2015. (Flexible Framework is a tool to help introduce sustainable procurement practices in a phased manner).

   To challenge our procurement practices so that we aim to procure goods and services locally and regionally where possible.

3. Utilities Management

   - To become carbon neutral for our energy use by 2016
   - To reduce consumption of energy by 20% by 2015 (and 42% by 2020)

4. Waste Management

   To achieve zero waste to landfill by 2020.

5. Travel and Transport

   To develop solutions that reduce travel and transport impacts generated by the University. Specifically to reduce single occupancy car use to 40% by 2015.

6. Engaging Staff and Students and Achieving Behaviour Change

   To develop initiatives that engage staff and students in understanding how they can reduce their consumption of resources and cut carbon emissions.

7. Research and Teaching

   To minimise the environmental impact of our teaching and research activities by developing sustainable development practices, engaging with Schools and promoting awareness of the need to reduce resource use.

1.2 Context and Drivers

Many policies driving the sustainable development and climate change agendas come from international agreements and national strategies, reflecting the cross-border and global nature of the issues. This section outlines the main directives and plans which drive climate change activity in the University and will be key for implementing emissions reductions.

- Climate Change (Scotland) Act (2009) - The Climate Change (Scotland) Act 2009 outlines national GHG emissions reduction targets; specifically at least an 80% reduction in GHG emissions (relative to 1990 levels) by 2050 with an interim milestone target of at least 42% by 2020. The Scottish Government produced a Climate Change Delivery Plan in June 2009 to guide the national effort to meet the climate change targets and this will influence the University's policy priorities in this area.
- EU Energy Performance of Buildings Directive (2002, revised 2009) – The University is required to produce Energy Performance Certificates with respect to certain buildings following implementation of EU Directive 2002/91/EC through the Building (Scotland) Act 2003.
- Carbon Reduction Commitment Energy Efficiency Scheme (CRC EES) (2010) – The University is mandated to participate in this scheme, introduced in April 2010. Under the present terms of the scheme annual energy consumption from stationary fixed sources must be monitored and reported on with the purchase of carbon allowances to match annual emissions each year. While these allowances are presently purchased at a fixed price subsequent years of the scheme will involve a bid auction process thereby increasing the potential financial liability to the University.
- Sustainable Development Strategy – The University's Sustainable Development Policy (2012 to 2022) notes that *'The University of St Andrews has a responsibility to manage its positive and negative impacts on society and the environment through its operations, products or services and through its interaction with key stakeholders such as employees, students, unions, funders, research partners, communities and suppliers.'* Key commitments directly linked to the CMP are:
  - Promote the highest standards of scientific, scholarly and professional integrity and to give due consideration to the ethical, social and environmental issues arising from its activities; and
  - Undertake activities that are environmentally sustainable, conform to high standards of environmental consideration and prevent pollution

- Universities and Colleges Climate Commitment for Scotland (UCCCfS) – University of St Andrews is a signatory to this commitment on behalf of Scotland's Universities and Colleges to address the challenges of climate change and reduce their carbon footprints. Signatories are committed to producing and publishing a five-year Climate Change Action Plan (CCAP) which will include measurable targets and timescales to achieve a significant reduction in emissions from all business operations and activities.

1.3 Revised Carbon Management Plan

With the assistance of the Carbon Trust in Scotland, the University has undertaken a review of progress to date against the targets set out in the original CMP of 2008. This has included a review of ongoing efforts to reduce carbon emissions across University activities and development of a revised CMP.

1.4 Aims and Objectives

Specific carbon management objectives and targets are outlined below. These will be integrated into the governance process that exists for the Sustainable Development Strategy and its commitments.

Description	Objective	Target
Management Process	To integrate carbon management into the processes of the University to help ensure effective carbon management and reporting	
Utilities	To become carbon neutral for energy consumption by 2016	To achieve 4,200 tonnes of carbon savings via the Carbon Trust's SALIX fund
Procurement of Goods and Services	To ensure the prudent use of natural resources	The impact of procurement on certain items such as food and the University's ability to use local suppliers will be the subject of specific targets that will be integrated into the University's SD target setting process
Waste	To achieve and maintain zero total waste to landfill growth from 2010 onwards	Target 1 – To compost 100% food waste at all Halls of Residence by 2009 (achieved) Target 2 – To achieve a recycling rate of 90% by 2010 (this includes construction waste)
Travel	To reduce single occupancy car use to less than 45% by 2010	
Vehicle Fuel Use	To develop solutions that reduce travel and transport impacts generated by the University	To introduce a green vehicle fleet for the University by end July 2008 (achieved)
Construction and Refurbishment	To ensure that all new build and refurbishment projects achieve a level of sustainability performance that is equivalent to a BREEAM Excellent standard.	Achieved

1.5 Carbon Management Governance and Reporting

Carbon Management is integrated within the existing governance structure for Sustainable Development. The Carbon Management Group reports to the Sustainability Policy Group where the strategic approach and delivery is approved and monitored. The Sustainability Policy Group reports progress to the Planning and Resources Committee at least annually and ultimately to the University Court.

Table 1 Stakeholder Group Mapping

Stakeholder Group	Role within Programme	Method of Communication
Principal and Senior Management	• Leadership and support to drive forward CMP • Understanding of net benefits of CMP in relation to wider sustainable development targets	• Briefings from Sustainability Policy Group
Finance Director	• Support in making business case for ongoing actions within CMP	• Briefings from Project Leader
Staff	• Meet student expectations • External and internal reputation	• Regular updates via in-house communication routes
Academic Staff	• Meet student expectations • Sustainable development considerations to impinge on ongoing work	• Regular updates via in-house communication routes
Students	• Understand University's commitments to sustainable development and specific actions outlined in CMP • Maintain awareness of potential impact of individual actions in terms of ongoing targets	• Regular communication via in-house channels • Promotion of carbon management issues during Student Week
Communication Team	• Assist understanding among all stakeholders • External and internal reputation	• Development of news articles for dissemination via media channels
Wider public and stakeholders	• Reputation	• Development of news articles for dissemination via media channels

The key individuals involved in the delivery of the CMP are outlined in Table 2.

Table 2 Carbon Management Plan Delivery Team

Role in Carbon Management Programme	Name	Position
Principal's Office Representative	Neville Richardson	Master, Chair of Sustainability Policy Group
Project Sponsor	John Maguire	Director of Estates
Project Leader	Roddy Yarr	Environment and Energy Manager
Project Support	David Stutchfield	Energy Officer

1.6 Monitoring and Reporting

In order to gauge the success of the CMP it is essential that the University's performance is monitored effectively. The University will continue to gather relevant data on an annual basis in order to monitor how carbon emissions are progressing.

Data management is central to monitoring progress towards targets and identifying any areas of concern. Updates will be carried out by the Energy Officer, supported by the wider Carbon Management Group as required.

The progress of the CMP will be reported annually to the Sustainability Policy Group and to the Planning and Resources Committee. Reporting will cover emissions identified within the scope of the baseline and financial information. It will also address whether or not emissions reductions are on target and the effectiveness of less quantifiable activity such as staff training and awareness raising.

The CMP itself will also be reviewed annually and details of projects and progress to date updated accordingly.

1.7 Emissions Baseline and Projections

This section provides details of the University's carbon emissions baseline and projections through to 2015/16. There are two scenarios used in the projections:

- **Business as Usual (BAU).** This scenario assumes no additional actions are taken to reduce carbon emissions and shows the amount of carbon emitted by the University through to 2015/16;
- **Reduced Emissions Scenario (RES).** This scenario assumes that all actions outlined in this CMP are carried out to reduce carbon emissions.

1.8 Scope

The scope of the baseline estimates was established as being the following areas:

- Energy – metered energy consumption for which the University is responsible, spanning all Schools, Units and Halls of Residence;
- Waste – waste collected from within the University and landfilled;
- Fuel Use – recorded fuel used by University vehicles;
- Water – metered consumption across all Schools, Units and Halls of Residence;
- Business mileage – this is an estimated figure accounting for all University business travel (field trips, conferences etc.);
- Procurement – this is an estimated figure accounting for the impact of the University's procurement strategy for goods/services.

The emissions categories outlined here are those which the University can both influence and positively change.

Staff commuting and student travel are specifically excluded from the baseline on these grounds.

Staff travel to and from work is recognised as an issue within the University Travel Plan and an objective exists to reduce single occupancy car use. The University will continue to work with staff and transport stakeholders to encourage uptake of alternative forms of transport.

The University recognises that there is an emissions impact that results from student travel to and from the University. The emissions associated with travel to and from the institution is one area that the University sees as necessary in order to sustain the benefits to society brought about by excellence in teaching and research. By bringing students and researchers together in one place, with all of the engagement, facilities and infrastructure located in a single, compact location, there are considerable sustainability benefits attached to this experience. For this reason, the University has decided not to focus further on this particular carbon management

aspect at this stage. In 2012, the University will be changing the timing and duration of University semester periods to reduce the number of journeys that students have to make when attending the University.

1.9 Baseline Footprint

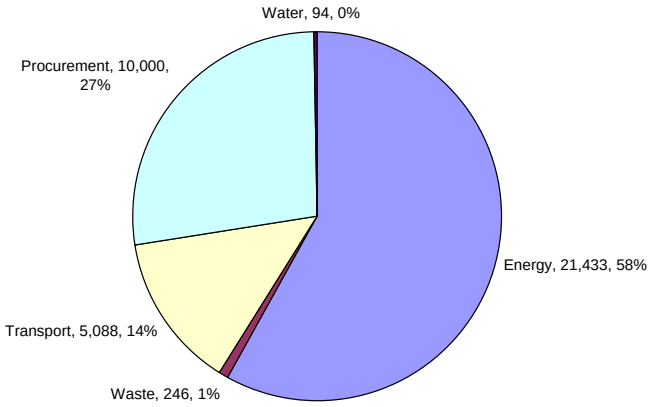
The baseline year is 2006/07. Total carbon emissions amount to 36,861 tCO_{2e}.

A breakdown of these emissions by category is provided here.

Table 3 Carbon Baseline 2006/07 by Emission Category

Category	Total Carbon Emissions (tCO_{2e})	% Contribution to Total
Energy *of which:*	**21,433**	**58%**
Electricity	*12,188*	*(33%)*
Fossil Fuel	*9,245*	*(25%)*
Transport *of which:*	**5,088**	**14%**
Fleet Fuel	*88*	*(0%)*
Business Travel	*5,000*	*(14%)*
Waste – Landfilled	**246**	**1%**
Water	**94**	**0%**
Procurement	**10,000**	**27%**
TOTAL	**36,681**	**100%**

Figure 1 Carbon Baseline 2006/07 (All figures in tCO_{2e})



Emissions Data Notes

1. The figures for both business travel and procurement are estimated values. It is intended to capture the impact of these activities more accurately via enhanced data capture and reporting in the future.

1.10 Projected Emissions and Value at Stake

Projected CO_{2e} emissions for the Business as Usual (BAU) scenario have been calculated. The BAU scenario assumes that the University does nothing to reduce increasing trends in energy use (nor the impact of planned development works) and incorporates only existing measures already underway i.e. no additional actions carried out. Conversely the Reduced Emissions Scenario (RES) assumes that all actions identified in this CMP are carried out. The Value at Stake (VAS) is the difference between the two scenarios.

Emissions of carbon are predicted in the BAU scenario to rise from 40,836 tCO_{2e} in 2010/11 to 42,273 tCO_{2e} in 2015/16. Implementing the actions in this CMP through the RES over the same period will reduce the emissions of carbon to around 15,000 tCO_{2e}. The accumulated carbon savings of the CMP are shown in Table 4. By implementing the CMP the University will save an aggregate total of almost 39,500 tCO_{2e} through to the end of 2015/16.

Table 4 Projected Carbon Value at Stake

	UOM	***2010/11***	***2011/12***	***2012/13***	***2013/14***	***2014/15***	***2015/16***
BAU Emissions	tCO_{2e}	40,836	41,119	41,405	41,692	41,982	42,273
Reduced Emissions Scenario	tCO_{2e}	40,836	38,801	37,978	37,936	38,209	16,058
Value at Stake	tCO_{2e}	0	2,319	3,427	3,756	3,773	26,215
Cumulative Value at Stake	tCO_{2e}	0	2,319	5,746	9,502	13,275	39,491

Notes for Table 4

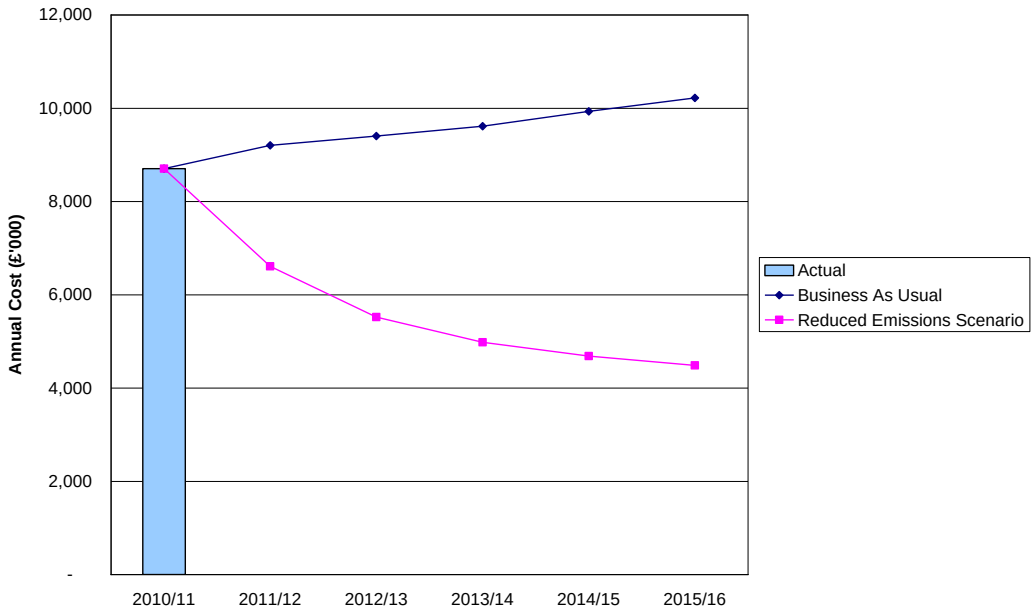
1. In the BAU Scenario an annual growth in emissions of 0.7% per annum is assumed in the case of buildings, transport and procurement emissions
2. In the BAU Scenario a net zero change in waste and water emissions is assumed
3. 2010/11 emissions are aligned with reported 2009/10 figures

In addition to the carbon savings, there are also associated financial savings. These financial savings (shown by the gap between the BAU and RES scenarios) are made up of a number of sources, specifically:

- Energy Consumption – Reduced utility costs (including reduced exposure to price inflation), reduced liability under the terms of the CRC EES and reduced climate change levy
- Transport – Reduced fuel costs (including reduced exposure to price inflation)
- Waste – Reduced costs of landfill (landfill tax and gate fees)

Figure 3 shows the two scenarios – the BAU and the RES – in terms of the financial costs to the University and is discussed in more detail in Section 3. As in the case of the carbon value at stake calculations above, it is assumed in the RES that the carbon neutrality in energy consumption target is achieved by 2015/16 (relative to the baseline year of 2006/07).

Figure 3 Projected Financial Value at Stake



2. PROGRESS REVIEW

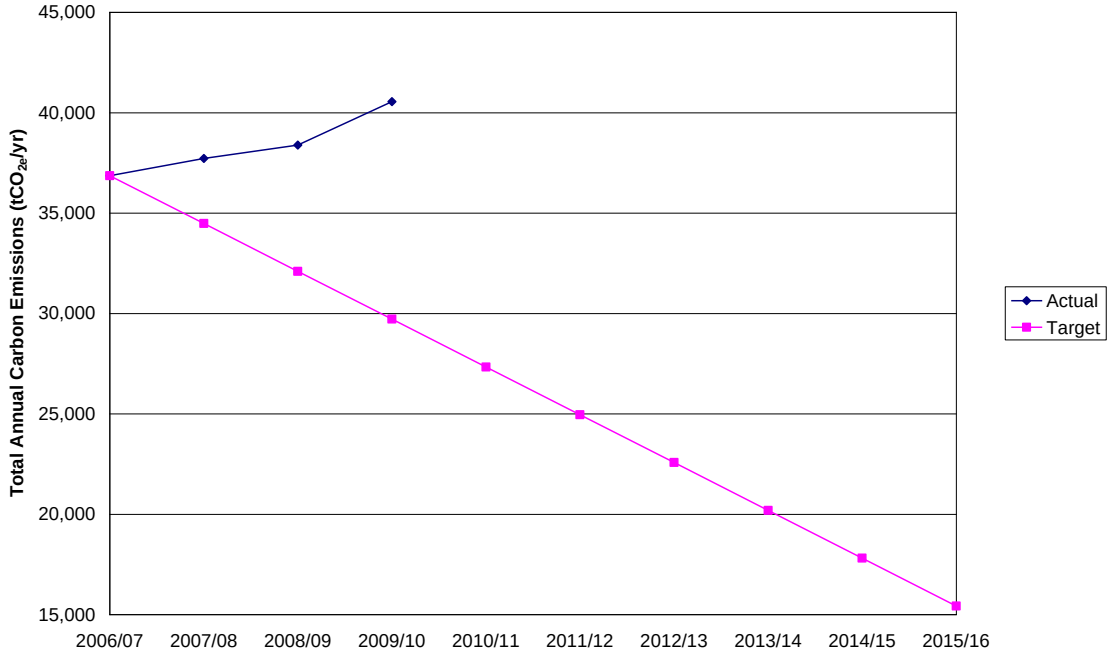
This progress report includes information on actual CO_{2e} emissions for the University of St Andrews through to end March 2010.

Table 5: University of St Andrews Reported Carbon Emissions (all figures in tCO2e)

Category	*Financial Year*										
	2006/07	*2007/08*	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	
Energy	21,433	22,265	22,990	25,141							
Waste (Landfilled)	246	239	230	234							
Transport	5,088	5,076	5,082	5,080							
Procurement	10,000	10,000	10,000	10,000							
Water	94	135	80	100							
TOTAL	**36,861**	**37,715**	**38,382**	**40,554**							
Target Emissions	36,861	34,480	32,098	29,717	27,336	24,954	22,573	20,191	17,810	15,428	
Variance	**0**	**3,236**	**6,284**	**10,833**							
% Change from baseline	0	2.3	4.1	10.0							
% Annual Change	0	2.3	1.8	5.7							
% Annual Change (by category)											
Energy	0	3.9	3.3	9.4							
Waste (Landfilled)	0	-3.1	-3.7	1.9							
Transport	0	-0.2	0.1	0.0							
Procurement	0	0.0	0.0	0.0							
Water	0	44.1	-40.8	24.8							

Notes: Carbon neutral in energy consumption target translates as a reduction of 21,433 tCO_{2e} against baseline (i.e. removal of energy related emissions)

Figure 2: University of St Andrews Carbon Emissions



Commentary

Energy **-** Excluding new buildings occupied during the year, the consumption of energy has remained static compared to the previous year, allowing for a 4% colder winter. Residential Business Services has reduced their electricity usage by 4%, while gas use increased by 5% in absolute terms, which is only 1% if corrected for temperature (degree days). Non-residential gas increased by 3% in absolute terms and fell by 1% if corrected for temperature (degree days), but electricity rose by 7%. If new buildings (Medical Science Building, Library Store, Butts Wynd Data Centre, Old Burgh School, and Fife Park/DRA developments) are added in, then the overall consumption of gas and electricity is 9% higher.

Strategically, the University has an ambition to become carbon neutral for its energy supply as a way of mitigating the relatively energy intensive consumption that is attached to research as well as mitigating the risks attached to rising fossil fuel costs and future issues of supply continuity.

To help deliver this ambition, the University has applied for planning permission for a 12MW community wind farm on land that it owns at Kenly by Boarhills.

The University has also developed a low carbon energy generation scheme to create hot water and electricity from a system of gas and wood-burning boilers. This Energy Centre is being planned for installation at the former Guardbridge Paper Mill site. The scheme would combust gas as well as wood sourced from sustainable sources and distribute the hot water and electricity generated to the North Haugh area in the first instance.

Solar Thermal panels providing hot water have been installed at New Hall, the new Medical Building and at the new blocks at David Russell Apartments (DRA) during the period. These panels complement the existing solar installation at Scott Block (DRA) and the solar photovoltaic panels and ground source heat pump at the Museum of St Andrews.

The new Medical Sciences Building benefits from a gas fuelled Combined Heat and Power (CHP) plant that will generate heat and hot water. In the summer, excess heat will be used to

provide cooling using an absorption chilling unit.

Waste – The amount of waste recycled has reached a high of 65%. Despite a higher proportion of waste being recycled, the overall volume of waste has risen, though this is partly attributable to the inclusion of waste arising from non-University student accommodation, especially at the end of the term. Greater emphasis continues to be placed on re-use of waste on site and composting, particularly with regard to food waste arising from the halls of residence. For construction waste, each new build and major refurbishment project also adopts a minimum recycling rate of 75% of site arisings.

Transport – Continued monitoring of fleet fuel use has meant a static consumption profile. Staff travel emissions remain an estimated figure; the development of a more robust means of assessing such emissions remains a priority for the year ahead. Better data for staff business travel has been secured.

Water - Water consumption has reduced by 26% compared to 2008, equating to a cost saving of £211K. This was largely due to the repair of a major leak at the North Haugh and also by the fitting of water controls on facilities such as urinals. Measurement of performance remains hampered by water meter failures.

Date of next progress report: November 2012

3. IMPLEMENTATION PLAN

3.1 Existing Projects

These projects have been either fully or part-implemented.

Table 6: University of St Andrews Existing Projects

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P001	Boiler replacement - New Hall Ph 1	Buildings	Estates Manager	66.5	£8,878	£41,250		4.65	31/07/2008
CUNI01P002	Boiler replacement - New Hall Ph 2	Buildings	Estates Manager	26.5	£3,535	£17,500		4.95	31/07/2008
CUNI01P003	Boiler Replacement - Castlecliffe	Buildings	Estates Manager	51.5	£6,869	£34,000		4.95	31/07/2008
CUNI01P004	Boiler replacement - St Marys	Buildings	Estates Manager	39.9	£5,325	£26,250		4.93	31/07/2008
CUNI01P005	Valve Covers - various	Buildings	Estates Manager	18.3	£2,439	£10,000		4.10	31/07/2008
CUNI01P006	Boiler Replacement - 113 N Street	Buildings	Estates Manager	1.7	£206	£1,000		4.84	31/07/2008
CUNI01P007	Bute pipe insulation	Buildings	Estates Manager	35.9	£4,442	£19,970		4.50	31/01/2007
CUNI01P008	Gatty Upgrade May 2007	Buildings	Estates Manager	3.7	£455	£1,987		4.37	31/07/2007
CUNI01P009	Angus & Stanley House Boiler Replacement	Buildings	Estates Manager	10.7	£1,254	£6,100		4.87	30/03/2007
CUNI01P010	Loft Insulation	Buildings	Estates Manager	4.5	£1,691	£6,909		4.09	31/07/2007
CUNI01P011	Quattroseal at McIntosh Hall	Buildings	Estates Manager	35.1	£4,342	£17,803		4.10	31/07/2007
CUNI01P012	Quattroseal at St Regulus Hall	Buildings	Estates Manager	26.4	£3,260	£12,028		3.69	31/07/2007
CUNI01P013	Savawatt @ Gatty	Buildings	Estates Manager	15.7	£2,682	£6,602		2.46	31/07/2007
CUNI01P014	Savawatt - location BMS	Buildings	Estates Manager	27.0	£4,611	£10,759		2.33	31/07/2007
CUNI01P015	Savawatt -location Purdie	Buildings	Estates Manager	7.5	£1,281	£2,769		2.16	31/07/2007

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P016	Savawatt - location Bute	Buildings	Estates Manager	9.6	£1,642	£3,638		2.22	31/07/2007
CUNI01P017	Savawatt - location St Salvators Hall	Buildings	Estates Manager	3.1	£535	£1,331		2.49	31/07/2007
CUNI01P018	Double glazing upgrade - location Gatty	Buildings	Estates Manager	8.5	£1,045	£5,123		4.90	31/07/2007
CUNI01P019	VSD Ventilation - location LTIF4	Buildings	Estates Manager	9.5	£1,620	£11,030		6.81	31/07/2007
CUNI01P019	VSD Ventilation - location LTIF4	Buildings	Estates Manager	10.7	£1,318	£11,030		8.37	31/07/2007
CUNI01P020	Seocndary double glazing - location Careers	Buildings	Estates Manager	3.8	£465	£2,276		4.89	31/07/2007
CUNI01P021	Secondary door - location Purdie	Buildings	Estates Manager	4.3	£530	£2,509		4.73	31/07/2007
CUNI01P022	BEMS - location Psychology	Buildings	Estates Manager	20.4	£2,520	£7,070		2.81	31/07/2007
CUNI01P023	BEMS - location Buchanon	Buildings	Estates Manager	9.7	£1,200	£3,319		2.77	31/07/2007
CUNI01P024	Savawatt - location John Burnet Hall	Buildings	Estates Manager	4.5	£774	£1,582		2.04	31/07/2007
CUNI01P025	Quattroseal - location Art History	Buildings	Estates Manager	10.8	£1,329	£5,584		4.20	31/01/2007
CUNI01P026	Quattroseal - location Castle House	Buildings	Estates Manager	6.9	£853	£3,496		4.10	31/01/2007
CUNI01P027	Quattroseal - location Castlecliffe	Buildings	Estates Manager	8.2	£1,010	£4,289		4.25	31/01/2008
CUNI01P028	Quattroseal - location Deans	Buildings	Estates Manager	5.8	£719	£2,947		4.10	31/07/2007
CUNI01P029	Quattroseal - location John Burnet Hall	Buildings	Estates Manager	22.6	£2,797	£10,071		3.60	31/07/2007
CUNI01P030	Loft Insulation - Gatty	Buildings	Estates Manager	2.1	£257	£1,156		4.50	31/07/2007
CUNI01P031	Roof Insulation - location Gatty	Buildings	Estates Manager	0.4	£54	£200		3.70	31/07/2007
CUNI01P032	TRVs - location Gatty	Buildings	Estates Manager	1.3	£159	£350		2.20	31/07/2007
CUNI01P033	Boiler Replacement - Kennedy Hall	Buildings	Estates Manager	5.2	£645	£3,200		4.96	31/01/2008
CUNI01P034	BMS Boiler controls	Buildings	Estates Manager	37.2	£4,600	£5,778		1.26	31/01/2008

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P035	New Hall Boiler Controls	Buildings	Estates Manager	45.4	£5,615	£7,399		1.32	31/01/2008
CUNI01P036	Sports Centre HF Lights	Buildings	Estates Manager	12.9	£2,200	£5,868		2.67	31/07/2007
CUNI01P037	Uni Hall Lumsden Pipe Insulation	Buildings	Estates Manager	3.2	£401	£1,980		4.94	31/01/2008
CUNI01P038	Uni Hall Lumsden HF Lights	Buildings	Estates Manager	13.2	£2,250	£6,171		2.74	31/01/2008
CUNI01P039	Quattroseal - Kennedy Hall	Buildings	Estates Manager	5.9	£723	£3,037		4.20	31/07/2007
CUNI01P040	Boiler Replacement - Bute	Buildings	Estates Manager	59.3	£8,586	£42,500		4.95	31/07/2008
CUNI01P041	Quattroseal - location Uni Hall	Buildings	Estates Manager	29.8	£4,860	£13,074		2.69	31/07/2008
CUNI01P042	Savawatt - North Haught	Buildings	Estates Manager	50.3	£8,654	£17,307		2.00	31/01/2008
CUNI01P044	LED lighting - Gatty & Gateway	Buildings	Estates Manager	3.7	£644	£1,740		2.70	31/01/2008
CUNI01P045	Pipe insulation - Various sites	Buildings	Estates Manager	6.5	£950	£4,680		4.93	31/07/2008
CUNI01P046	Loft Insulation - various sites	Buildings	Estates Manager	28.7	£4,175	£25,810		6.18	31/07/2008
CUNI01P049	Boiler Replacement - Bute DHW	Buildings	Estates Manager	15.8	£3,258	£12,133		3.72	28/07/2008
CUNI01P050	Quattroseal - St Katharines Lodge	Buildings	Estates Manager	9.7	£1,993	£4,700		2.36	28/07/2008
CUNI01P051	Quattroseal - Roundal	Buildings	Estates Manager	2.5	£579	£1,703		2.94	01/07/2008
CUNI01P052	Quattroseal - St Marys	Buildings	Estates Manager	7.3	£1,507	£4,190		2.78	28/07/2008
CUNI01P053	Quattroseal - 3&5 South Str	Buildings	Estates Manager	2.9	£667	£2,077		3.11	01/08/2008
CUNI01P054	Boiler replacement - grounds	Buildings	Estates Manager	18.1	£4,148	£12,748		3.07	01/07/2008
CUNI01P055	Quattroseal - 79 N Street	Buildings	Estates Manager	8.8	£2,019	£7,299		3.62	28/07/2008
CUNI01P056	Quattroseal Hebs Block	Buildings	Estates Manager	1.9	£438	£1,055		2.41	01/08/2008
CUNI01P057	Quattroseal - Irvine	Buildings	Estates Manager	6.7	£1,539	£5,479		3.56	01/08/2008

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P058	Quattroseal - 71 N Street	Buildings	Estates Manager	2.1	£485	£1,449		2.99	01/09/2008
CUNI01P059	Quattroseal - St Katharines West	Buildings	Estates Manager	6.5	£1,505	£4,550		3.02	01/09/2008
CUNI01P060	Quattroseal - Buchanon	Buildings	Estates Manager	10.4	£2,380	£8,961		3.77	01/09/2008
CUNI01P061	Quattroseal - Bute	Buildings	Estates Manager	13.8	£3,166	£11,511		3.64	25/09/2008
CUNI01P062	Boiler replacement - Parliament Hall	Buildings	Estates Manager	13.9	£3,188	£11,800		3.70	01/07/2008
CUNI01P063	Maths / Purdie VSD on Fans	Buildings	Estates Manager	2.6	£644	£1,631		2.53	31/07/2008
CUNI01P064	Maths / Purdie duct insulation	Buildings	Estates Manager	26.0	£5,971	£22,255		3.73	31/07/2008
CUNI01P065	Students Association VSD	Buildings	Estates Manager	5.7	£1,391	£6,000		4.31	31/07/2008
CUNI01P065	Students Association VSD	Buildings	Estates Manager	4.2	£978	£6,000		6.14	31/07/2008
CUNI01P066	Students Association BEMS upgrade	Buildings	Estates Manager	27.5	£6,354	£9,000		1.42	31/07/2008
CUNI01P067	Purdie Heat Recovery	Buildings	Estates Manager	9.3	£2,146	£8,040		3.75	31/07/2008
CUNI01P068	Maths / Purdie / Parli Hall Air Quality Control	Buildings	Estates Manager	3.6	£834	£2,414		2.89	31/07/2008
CUNI01P069	Maths / Purdie / Parli Hall TRVs	Buildings	Estates Manager	1.2	£285	£306		1.07	30/09/2008
CUNI01P070	Maths / Purdie / Parli Hall Pipe Insul	Buildings	Estates Manager	3.6	£833	£3,170		3.81	30/09/2008
CUNI01P071	Lighting - AMH Bedroom	Buildings	Estates Manager	7.1	£1,518	£7,463		4.92	11/12/2008
CUNI01P072	LED Flood at Gateway	Buildings	Estates Manager	6.2	£1,528	£8,484		5.55	11/12/2008
CUNI01P074	Various sites - loft insulation	Buildings	Estates Manager	8.3	£1,913	£8,348		4.36	15/03/2009
CUNI01P075	Andrew Melvile staircase - lighting upgrade	Buildings	Estates Manager	1.0	£219	£698		3.19	15/03/2009
CUNI01P076	Gateway - LED	Buildings	Estates Manager	5.8	£1,433	£8,304		5.80	15/03/2009
CUNI01P078	Gateway - boiler controls	Buildings	Estates Manager	12.7	£2,911	£5,175		1.78	15/03/2009

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P079	Gateway / Purdie - solar film	Buildings	Estates Manager	10.1	£2,451	£11,852		4.84	31/03/2009
CUNI01P080	Various sites Phase 2 - draught proofing	Buildings	Estates Manager	12.7	£2,933	£9,418		3.21	15/03/2009
CUNI01P081	Various site residences - draught proofing	Buildings	Estates Manager	14.6	£2,584	£11,026		4.27	15/04/2009
CUNI01P082	Physics A/B LED Lights	Buildings	Estates Manager	4.6	£1,126	£6,000		5.33	01/04/2009
CUNI01P083	Physics A/B Lecture Theatre Lights	Buildings	Estates Manager	32.1	£7,818	£36,000		4.61	01/04/2009
CUNI01P084	Physics A/B AHU VSD Controls	Buildings	Estates Manager	30.5	£7,420	£27,000		3.64	01/04/2009
CUNI01P086	Albany Park - loft insulation	Buildings	Estates Manager	3.6	£683	£4,727		6.93	01/03/2009
CUNI01P087	Physics - insulation	Buildings	Estates Manager	22.5	£5,206	£26,000		4.99	01/04/2009
CUNI01P088	Physics - TRVs	Buildings	Estates Manager	8.1	£1,870	£6,000		3.21	01/04/2009
CUNI01P089	Physics Library - lighting upgrade	Buildings	Estates Manager	13.3	£3,246	£15,000		4.62	01/04/2009
CUNI01P090	St Marys - VSD	Buildings	Estates Manager	4.2	£1,034	£3,250		3.14	01/08/2008
CUNI01P091	Bute 2 - VSD	Buildings	Estates Manager	8.3	£2,054	£6,500		3.16	01/08/2008
CUNI01P092	New Hall - VSD	Buildings	Estates Manager	8.3	£1,771	£6,288		3.55	01/08/2008
CUNI01P093	New Hall - Insulation	Buildings	Estates Manager	3.1	£578	£2,560		4.43	01/08/2008
CUNI01P094	New Hall - BEMS	Buildings	Estates Manager	45.4	£8,593	£39,474		4.59	01/09/2008
CUNI01P095	New Hall Ph 3 - Boilers	Buildings	Estates Manager	31.4	£5,933	£26,128		4.40	01/09/2008
CUNI01P096	AMH - VSD	Buildings	Estates Manager	9.0	£1,908	£7,500		3.93	01/07/2009
CUNI01P097	AMH - Controls	Buildings	Estates Manager	5.7	£1,111	£5,000		4.50	01/07/2009
CUNI01P098	9 North Street Boiler Replacement	Buildings	Estates Manager	3.0	£575	£2,816		4.90	01/07/2009
CUNI01P099	Bute pipe insulation - rooms	Buildings	Estates Manager	9.7	£2,222	£7,993		3.60	01/07/2009

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P100	Irvine pipe insulation - room	Buildings	Estates Manager	10.0	£2,321	£8,352		3.60	01/07/2009
CUNI01P101	Savawatt - various buildings	Buildings	Estates Manager	22.8	£4,888	£17,550		3.59	01/07/2009
CUNI01P103	Solar Film - Purdie / Gateway	Buildings	Estates Manager	14.0	£2,990	£16,138		5.40	01/07/2009
CUNI01P104	Pipe insulation - St Regs Hall	Buildings	Estates Manager	21.2	£4,025	£14,816		3.68	01/08/2009
CUNI01P106	Albany Park - 96 Hepburn - Cavity wall	Buildings	Estates Manager	18.8	£3,570	£20,048		5.62	01/08/2009
CUNI01P107	Butts Wynd Free Cooling	Buildings	Estates Manager	185.7	£28,402	£46,383		1.63	01/02/2010
CUNI01P109	Verdiem Software	Buildings	Estates Manager	143.4	£21,937	£12,293		0.56	01/02/2010
CUNI01P111	Wardlaw - High efficiency boiler replacement	Buildings	Estates Manager	30.2	£5,424	£25,681		4.73	01/08/2009
CUNI01P112	Radiator foil - AMH	Buildings	Estates Manager	14.4	£2,350	£458		0.20	01/08/2009
CUNI01P113	Boiler replacement - College Gate	Buildings	Estates Manager	48.0	£8,665	£41,464		4.79	01/08/2009
CUNI01P114	Butts Wynd High Eff UPS	Buildings	Estates Manager	183.4	£28,055	£32,452		1.16	01/02/2010
CUNI01P115	St Salvators Hall BEMS	Buildings	Estates Manager	11.3	£1,880	£7,709		4.10	31/07/2010
CUNI01P116	DHW Boiler replacement - Andrew Melville Hall	Buildings	Estates Manager	31.4	£5,721	£28,532		4.99	31/01/2011
CUNI01P117	Savawatt at MSB	Buildings	Estates Manager	14.1	£2,593	£8,641		3.33	31/01/2011
CUNI01P118	Boiler replacement at Eden Court	Buildings	Estates Manager	6.8	£1,121	£3,597		3.21	31/01/2011
CUNI01P105	Physics CHP	Buildings	Estates Manager	807.7	£128,669	£585,409		4.55	Q1, FY 2011/12
ST-MSB	Solar thermal at MSB	Buildings	Estates Manager	109.5	£20,833	£250,000		12.00	2009
ST-FIFE	Solar thermal at 4 Fife Park Blocks	Buildings	Estates Manager	86.7	£16,500	£198,000		12.00	2010
ST-NH	Solar thermal at New Hall	Buildings	Estates Manager	19.7	£3,750	£45,000		12.00	2009
ST-Scott	Solar thermal at DRA Scott Block	Buildings	Estates Manager	6.6	£1,250	£15,000		12.00	2009

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	**Title**	**Area**	**Person Responsible**	**tCO_{2e}**	**Financial (£)**	**Capex (£)**	**Opex (£)**	**Yrs**	
SPV-MUSA	Solar PV at MUSA	Buildings	Estates Manager	1.1	£778	£15,000		19.28	2007
TOTAL				**4,793**	**£530,195**	**£2,800,665**			

Note: All capex figures refer to estimated cost of saving measure rather than total capex for given project.

3.2 Funded Projects

These projects are planned and funded, but have not yet been implemented. There are no such projects at present.

Table 7: University of St Andrews Funded Projects

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
TOTAL				0	0	0			

Note: All capex figures refer to estimated cost of saving measure rather than total capex for given project.

3.3 Planned Projects

These projects are planned, but funding is not yet confirmed.

Table 8: University of St Andrews Planned Projects

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
CUNI01P110	Library Lighting Floor 2 T5	Buildings	Estates Manager	41.9	£6,410	£30,710		4.79	Q2, 2012/13
P121	Andrew Melville Hall main boilers replacement	Buildings	Estates Manager	41.5	£7,579	£34,105		4.50	Q3, 2011/12
P122	Bute Building main boilers replacement	Buildings	Estates Manager	33.3	£6,078	£30,380		5.00	Q3, 2011/12
P123	3-5 South Street Boiler replacement	Buildings	Estates Manager	13.0	£2,378	£11,880		5.00	Q3, 2011/12

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	Title	Area	Person Responsible	tCO_{2e}	Financial (£)	Capex (£)	Opex (£)	Yrs	
P124	Castle House Boiler replacement	Buildings	Estates Manager	17.3	£3,155	£15,770		5.00	Q3, 2011/12
P125	Psychology secure boiler addition	Buildings	Estates Manager	22.1	£4,029	£20,145		5.00	Q3, 2011/12
P126	Fume cupboard sash closers	Buildings	Estates Manager	16.7	£3,042	£11,200		3.68	Q3, 2011/12
P127	Fume cupboard sash closers	Buildings	Estates Manager	18.5	£3,380	£44,000		13.02	Q3, 2011/12
P128	Air curtains - Gateway	Buildings	Estates Manager	13.9	£2,535	£10,000		3.94	Q3, 2011/12
P129	Air curtains - MSB	Buildings	Estates Manager	18.5	£3,380	£12,000		3.55	Q3, 2011/12
P130	Heating upgrade - Library	Buildings	Estates Manager	40.8	£7,436	£45,000		6.05	Q3, 2011/12
P131	Lighting upgrade - Library	Buildings	Estates Manager	49.1	£9,000	£45,000		5.00	Q3, 2011/12
TOTAL				327	£51,992	£279,480			

Note: All capex figures refer to estimated cost of saving measure rather than total capex for given project

3.4 Identified Projects

These projects have been identified, but savings have yet to be quantified in full and/or funding is not confirmed.

Table 9: University of St Andrews Identified Projects

Project				Estimated Annual Savings		Costs		Payback period	Implementation Date / Status
Reference	**Title**	**Area**	**Person Responsible**	**tCO_{2e}**	**Financial (£)**	**Capex (£)**	**Opex (£)**	**Yrs**	
PO014279	North Haugh Biomass CHP	Energy	Estates Manager	18,406	4,482,450	19,143,600		4.27	Identified
P-0130493	Town Centre CHP	Energy	Estates Manager	1,311.3	£100,922	£440,000		4.36	Identified
NH Wind 01	North Haugh small scale wind	Energy	Estates Manager	11.6	£6,902	£67,000		9.71	Identified
NH Wind 02	North Haugh medium scale wind	Energy	Estates Manager	398.8	£199,000	£690,000		3.47	Identified
Upper Kenly	Upper Kenly Wind 12MW	Energy	Estates Manager	15,232.0	£2,520,000	£21,000,000		8.33	Identified
ST-DRA	Solar thermal at 14 other DRA blocks	Energy	Estates Manager	276.0	£52,500	£630,000		12.00	Identified
ST-JBH	Solar thermal at John Burnet Hall	Energy	Estates Manager	11.0	£2,083	£25,000		12.00	Identified
SPV-Library	Solar PV at Library	Energy	Estates Manager	16.2	£11,608	£236,973		20.42	Identified
SPV-Gateway	Solar PV at Gateway	Energy	Estates Manager	6.5	£4,644	£85,836		18.48	Identified
SPV-StAss	Solar PV at Students Association	Energy	Estates Manager	10.7	£7,634	£180,388		23.63	Identified
TOTAL				35,680	£7,387,743	£42,498,797			

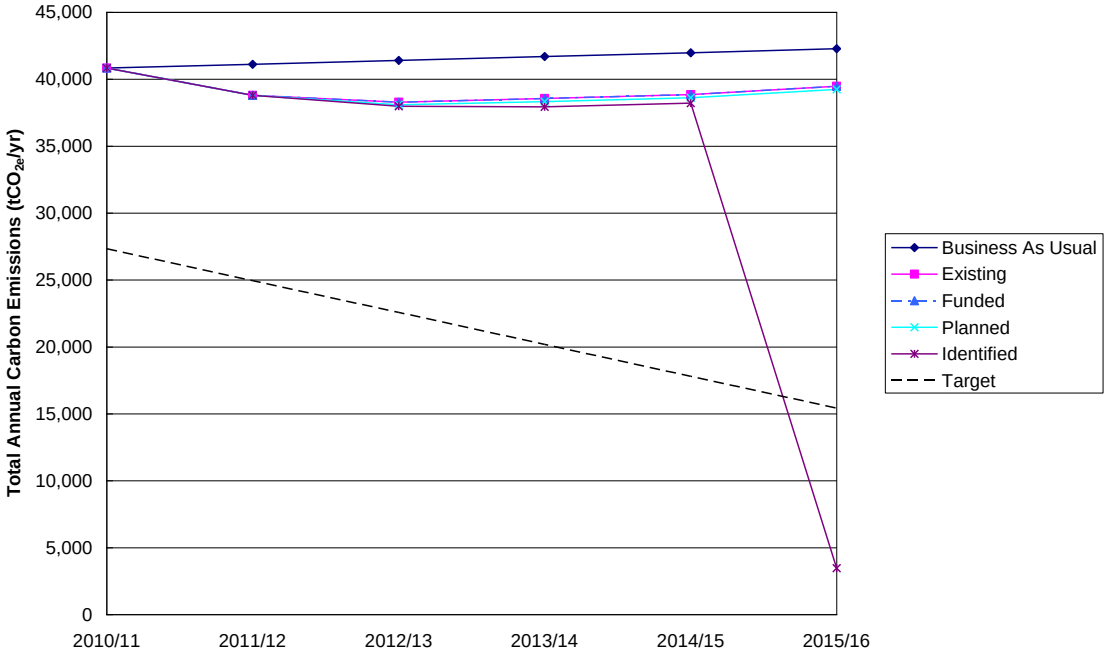
3.5 Projection of Progress Towards Target

The projected means of achieving the target reduction via different the different projects outlined above is summarised here.

Table 10: Projected Annual Carbon Savings (tCO_{2e}/yr)

Yr			1	2	3	4	5
	UOM	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Business As Usual	tCO_{2e}	40,836	41,119	41,405	41,692	41,982	42,273
Reduced Emissions Scenario	tCO_{2e}	40,836	38,801	37,978	37,936	38,209	3,467
Existing Projects	tCO_{2e}	40,836	38,801	38,279	38,566	38,856	39,474
Funded Projects	tCO_{2e}	40,836	38,801	38,279	38,566	38,856	39,474
Planned Projects	tCO_{2e}	40,836	38,801	38,084	38,329	38,619	39,237
Identified Projects	tCO_{2e}	40,836	38,801	37,978	37,936	38,209	3,467
Target Reduction	tCO_{2e}	27,336	24,954	22,573	20,191	17,810	15,428

Figure 3 Projected Annual Carbon Savings (tCO_{2e}/yr)



Achievement of the target can be seen as deliverable via all listed projects; as such both planned and identified projects need to be implemented in order to meet the reduction target.

3.6 Financing

This section details the costs and benefits associated with implementing the CMP.

Table 11 provides an assessment of costs to the University relating to building energy consumption, fleet fuel and waste disposal. These costs amount to around £7.8 million in 2010/11. The CMP aims to achieve carbon neutrality in energy consumption by 2015/16. If this target is achieved then the annual cost savings to the Council in 2015/16 are projected to be £1.8 million. Table 11 also demonstrates that the aggregated savings to the University of year on year savings is in the region of £5.3 million through to 2015/16. Clearly the financial benefits to the University from implementing the CMP are hugely significant and could be more so if energy costs continue to increase.

Table 11 University of St Andrews Projected Financial Value at Stake

	UOM	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*
BAU	£ m	8.70	9,20	9,40	9,61	9,93	10,22
Reduced Emissions	£ m	8.70	6.61	5.52	4.98	4.68	4.48
Value at Stake	£ m		2.41	3.63	4.34	4.85	5.26
Cumulative Value at Stake	£ m		2.41	6.04	10.38	15.22	20.49

There are a number of sources of funding that can be considered for funding the CMP including:

- The Salix fund: This is a source of interest free funding available to the University when seeking to invest in low carbon or energy efficient technologies.
- Capital Funding: The University has a capital fund for major asset development.

The combination of funding sources outlined here will help in providing the means of delivery of the planned carbon reductions. However, the CMP will be subject to annual assessment to ensure that sufficient funding is made available in order to maintain implemented savings.

Table 12 provides a summary of the predicted carbon reductions and the financial savings.

Table 12 Summary of Projected Cost and Carbon Savings

Total Projected Annual Cost Savings							
	UOM	***2010/11***	***2011/12***	***2012/13***	***2013/14***	***2014/15***	***2015/16***
Annual Savings	£ m	0	2.41	3.63	4.34	4.85	5.26
Total Projected Annual Carbon Savings							
Value at Stake	tCO_{2e}	0	2,319	3,427	3,756	3,773	26,215

3.6.1 Financial costs and sources of funding

The current estimated cost of delivering this CMP from 2010/11 to the end of financial year 2015/16 is summarised in Table 13.

This expenditure will be reviewed regularly to ensure that programme retains sufficient funding for delivery.

Table 13 University of St Andrews Project Funding Summary

	UOM	
Existing Projects	£ m	2.80
Funded Projects	£ m	0.00
Planned Projects	£ m	0.28
Identified Projects	£ m	42.50
TOTAL		45.58