



University of Dundee Carbon Management Plan



Version number: V4.1

Owner: Trudy Cunningham

Date: May 2010

Approval status: Approved by carbon management board



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FOREWORD FROM PRINCIPAL

Soon after taking office I committed the University to working with the Carbon Trust to reduce our carbon emissions and in doing so to both achieve budget savings and enhance our reputation as an energy-efficient institution. We have an excellent track record in generating our own heat and power, being the first Scottish university to install a Combined Heat and Power plant in 1996; an approach that reduces our annual footprint by around 4000 tonnes of CO₂. Much has also been done to raise awareness of environmental issues in the University.

However, I am mindful of the internal and external drivers for enhancing our performance in this important area, and of the financial and reputational benefits, further improvements could bring. The University has therefore set a target to reduce its carbon emissions by 20% over the next 5 years. To do so we will need to:

- *Change our attitude to carbon emissions, and energy management*
- *Set targets for carbon reduction in Colleges and Directorates*
- *Change our attitudes to the use of space*

We have a duty to act in a socially responsible way and I have little doubt that our reputation will increasingly be linked to progress in this area. To achieve such progress will require good management, clear objectives for reductions and - perhaps especially - personal commitment from students and staff to make the relatively minor shifts in their individual behaviour that collectively will make a significant difference.

I am therefore seeking the commitment of all staff and students to support our Carbon Management Plan, which will make a vital contribution to our future sustainability.

Professor Pete Downes

Principal & Vice Chancellor



FOREWORD FROM THE CARBON TRUST

Cutting carbon emissions as part of the fight against climate change should be a key priority for Higher Education - it is all about getting your own house in order and leading by example. The UK government has identified the public sector as key to delivering carbon reduction across the UK inline with its Kyoto commitments and the 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.

The University of Dundee was selected in 2008, amidst strong competition, to take part in this ambitious programme. The University of Dundee partnered with the Carbon Trust on this programme in order to realise vast carbon and cost savings. This Carbon Management Plan commits the organisation to a target of reducing CO₂ by 20% by the academic year 2015/16 and underpins potential financial savings to the organisation of around £3 million.

There are those that can and those that do. Public sector organisations can contribute significantly to reducing CO₂ emissions. The Carbon Trust is very proud to support the University of Dundee in their ongoing implementation of carbon management.

A handwritten signature in black ink, appearing to read 'Richard Rugg'.

Richard Rugg
Head of Public Sector, Carbon Trust



Management Summary

1. OVERVIEW & INTRODUCTION

Climate change is one of the most serious threats facing our world.

Evidence shows that the Earth is warming and that human activity is making a significant contribution to this, climate change is a real threat to society, as we know it. All Universities are becoming more and more aware of their environmental credentials and position within 'Green' league tables. Students are now more aware of environmental issues than ever before and when choosing a university this is one of their deciding factors.

Within the public sector, an organization's carbon footprint has become an increasingly high priority. Growing awareness of the existence and scale of manmade climate change means that the University's reputation and ability to attract funding depend on taking action to reduce its impact. Moreover, with fuel prices rising, the University cannot afford to be wasteful with its energy use. Higher education needs to play its part in meeting national targets for carbon reduction. Scotland is already feeling the effects as increasing global temperatures bring changes in weather patterns, rising sea levels and more frequent and severe storms.

The Scottish Government recognises that climate change will have far-reaching effects on Scotland's economy, its people and its environment and is determined to play its part in rising to this challenge. The [Climate Change \(Scotland\) Act](#) has set ambitious targets. The Climate Change (Scotland) Bill commits Scotland to reduce its emissions by at least 80% from 1990 levels by 2050 and meeting 50% of Scotland's electricity demand from renewable sources by 2020; with an interim emissions reduction target of at least 42% by 2020.

This will drive new thinking, new solutions, and new technologies putting Scotland at the forefront of building a sustainable low carbon economy. The Scottish Climate Change Bill proposes to set some of the most stringent emissions targets in the world.

The University of Dundee, in supporting the government in delivering their targets of 42% reduction by 2020 and 80% reduction by 2050 is developing a comprehensive 'Carbon Management Plan' supported by the Carbon Trust. Our programme aims to realise carbon and cost savings across the University operations and includes:

- Buildings and infrastructure
- Energy (Electricity, coal, oil and gas)
- Waste management
- Transport
- Procurement



2. CARBON MANAGEMENT STRATEGY

2.1 Our low carbon vision

Setting targets is essential to identify the size of the challenge, co-ordinate efforts nationally and internationally, and demonstrate commitment to meaningful change. However, targets alone do not achieve results. They need to be supported by a strategy so that the methods by which the targets are to be achieved can be agreed and the necessary actions and investment put in place. The intention of this plan is to focus efforts in areas that offer the greatest carbon reduction return and identify issues that need further action.

2.2 Context and drivers

There is a hierarchy of international and national targets, and legal commitments reflecting the global acceptance of the threats posed by climate change and the need to address it. This hierarchy, which drives action at many levels including higher educational establishments and other public bodies, is outlined below.

United Nations Framework Convention on Climate Change¹

The Convention has been ratified by 189 countries, including the UK, and came into force on 21 March 1994. It recognised that the climate system is a shared resource whose stability can be affected by emissions of CO₂ and other greenhouse gases, and it established an overarching consensus for inter-governmental efforts to tackle climate change. Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices;
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries, and
- co-operate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol²

The Protocol shares the Convention's objective, principles and institutions, but significantly strengthens it by committing signatories to legally binding targets to limit or reduce their greenhouse gas emissions (GHGs)³. 168 countries have ratified the Protocol to date, including the UK on 31 May 2002, where it came into force on 16 February 2005.

¹ Source: http://unfccc.int/essential_background/convention/items/2627.php

² Source: http://unfccc.int/kyoto_protocol/items/2830.php

³ The six main GHGs are carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF₆). The latter 5 GHGs are often expressed as carbon equivalents and have atmospheric and temporal effects far greater than CO₂ itself. This is known as 'Global Warming Potential'. The Council is focusing on its CO₂ emissions, but it should be aware of the importance (and any inadvertent procurement, use or disposal) of these other substances. Further information can be found at: http://unfccc.int/ghg_emissions_data/information_on_data_sources/global_warming_potentials/items/3825.php



35 of these countries, and the EEC (including the UK), are required to further reduce GHG emissions below levels specified for each of them in the treaty. All reductions add up to a total cut in GHG emissions of at least 5% from 1990 levels in the commitment period 2008-2012. The UK's Kyoto commitment is a 12.5% cut in CO₂ emissions from 1990 levels by 2010, which the UK's Climate Change Programme is designed to deliver.

European Union, United Kingdom and Scottish Climate Change Programmes

There are Climate Change Programmes at the EU⁴, UK⁵ and Scottish⁶ levels, which both fully accept and support the need for action on climate change⁷. All three programmes have resulted in the following commitments and initiatives that affect Scotland:

- Introduction of the Climate Change Levy, UK and then EU Emissions Trading Schemes, Renewable Energy and CHP initiatives
- Climate Change (Scotland) Act 2009
- Establishment of the Carbon Trust
- Establishment of the UK Climate Impacts Programme (significant focus on adaptation to climate change).
- Carbon Reduction Commitment (CRC) energy efficiency scheme

⁴ <http://ec.europa.eu/environment/climat/eccpii.htm>

⁵ <http://www.defra.gov.uk/ENVIRONMENT/climatechange/uk/ukccp/index.htm>

⁶ <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/ScottishBill>

⁷ On 5 February 2007, Scotland's First Minister reiterated that the central issue for government is climate change, and he urged everyone to take personal responsibility. The full speech can be viewed on: <http://www.scotland.gov.uk/News/News-Extras/env-challenge>



2.3 University Strategic themes

- ***To reduce the University of Dundee's CO2 emissions by 20% by 2015/16, using the financial year 2008/09 as a baseline. Thereafter, reduce the University's CO2 emissions year on year in line with national legislation; particularly to achieve a 2% reduction in energy consumption in University buildings year on year from 2010/11. To achieve this we will:***
- ***reduce the energy usage of the University by 10% by 2015/16***
- ***encourage workforce involvement in the identification of opportunities and the implementation of action***
- ***lead by example and encourage our staff, students and the wider University community to make changes to reduce carbon emissions***
- ***raise the environmental profile of the University both locally and nationally***
- ***bring together existing and future Carbon Management projects into a consistently managed and coherent programme by 2010, with management oversight from the University's Carbon Management Board***
- ***identify, review and update policies to incorporate carbon management and reduction targets***



2.4 Targets and objectives

The University of Dundee will reduce the CO₂ emissions from its activities by 20% from 2008/09 baseline, by August 2016.

Table 1- Carbon emission targets

Year (1 st Aug-31 st July)	Base Year	Start	1	2	3	4	5
Academic Year	2008-9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Target annual % CO ₂ reduction			4%	8%	12%	16%	20%
Annual CO ₂ targets (Tonnes)		25,980	24,941	23,944	22,987	22,068	21,186
Cumulative annual CO ₂ saving targets(T)			1,039	2,036	2,993	3,912	4,794

This Carbon Management Plan sets a target of a 20% reduction in manageable CO₂ emissions against a baseline year of 2008/09, which is equivalent to reducing CO₂ emissions to 21,186 tCO₂ by 2015/16 by saving 4,794Tonnes against a business as usual projection, as detailed in table 1.

The 20% target applies to the university's overall management emissions. Reductions will be made in energy use in buildings, business travel, water use and waste sent to landfill.



3 EMISSIONS BASELINE AND PROJECTIONS

3.1 Scope

The scope of the University's baseline emission calculations includes the CO₂ produced from five broad areas.

- Energy use in buildings
- Water consumption
- Waste
- Business Travel (Staff)
- Procurement

Manageable emissions

This includes energy use in buildings, waste, water, staff and student business travel. The University, through changes to business practice, can directly control these emissions. Carbon emissions are calculated for the main University campus only as Ninewells and Kirkcaldy campuses have already produced a carbon management plan in conjunction with NHS Tayside and Fife. Changes to the travel forms from August 2010 will enable better data capture of business travel.

Also included in the baseline is the assessed carbon emissions associated with the purchase and delivery of office products and services at the University. Other goods and services are not yet directly measurable, as it requires the supplier to provide detailed information however, the university is actively engaging with companies to advance the quality of data for future use.

Influence emissions

A Travel Plan exists to influence behavioural change amongst students and staff within the university and significantly as part of this plan, a comprehensive commuter travel analysis was undertaken during 2008. A comprehensive staff and student survey will be undertaken every two years, together with the information recorded on home and term time addresses this will enable this important dimension to the Carbon Management Plan to be monitored. It must be noted that whilst local commuting may be influenced by initiatives such as restricted car parking, lift share, bike pool and cycle to work scheme, international travel, which is significant in terms of Carbon, will be very difficult to influence. A new 5-year travel plan has just been completed⁸.

⁸ <http://www.dundee.ac.uk/estates/energy&environment/documents/travelplan.pdf>

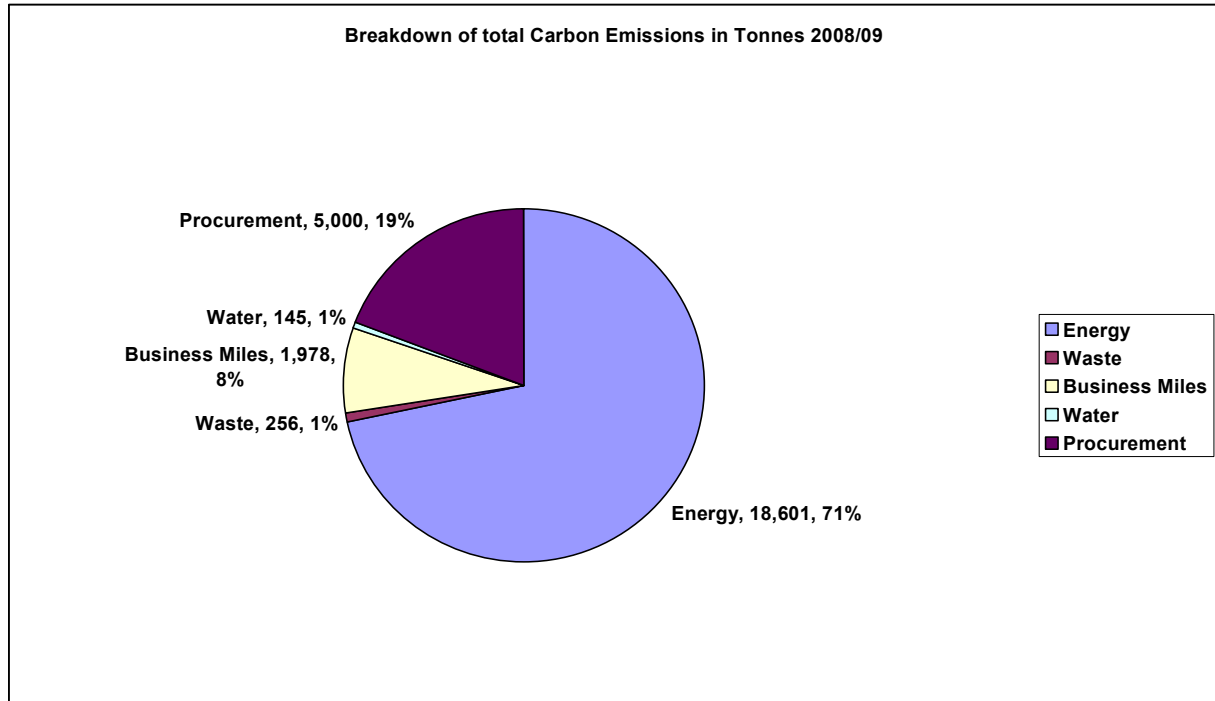


It is recognised that the University can influence these emissions but cannot directly manage them. We shall promote the use of video/telephone conferencing when suitable and provide training where necessary. Similarly, the University can only influence staff practices at work i.e. using recycling facilities and using less energy by switching things off. Hopefully the awareness gained at work will extend beyond the boundaries of the campuses and back into people's everyday lives. Our Halls of Residence are managed by Sanctuary (an external provider/company). Whilst they are outwith our direct control as we are not responsible for their energy or waste, we have a duty of care to educate our students and shall be running an awareness campaign, as well as end of semester recycling initiatives and an interhouse competition for all our Halls of Residence.

Baseline

Figure 1 shows the 2008/2009 academic year (1st August-31st July) carbon emissions by aspect and it is in these areas where carbon management will focus. Procurement is the only estimated figure, but it was felt necessary to include it as our procurement office are developing a number of policies e.g. printer rationalisation, purchasing locally sourced goods and other sustainable practices, which will influence our carbon emissions. The university's carbon emissions were calculated at approx 25,980 tonnes of Carbon Dioxide for the baseline year of 2008/09

CARBON FOOTPRINT OF UNIVERSITY



CO2Source	Tonnes Co2
Energy	18,601
Waste	256
Water	145
Staff Business Miles	1,978
Procurement	5,000
Total	25,980

3.2 CO² Emissions Factors

DEFRA (Department for the Environment & Rural Affairs) emission factors (2008) were used to calculate the appropriate CO₂ emissions factor for each fuel type and source of emission. These factors are available on DEFRA website –“Environmental Reporting Guidelines for Company reporting on greenhouse gas Emissions.”⁹

⁹ <http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>

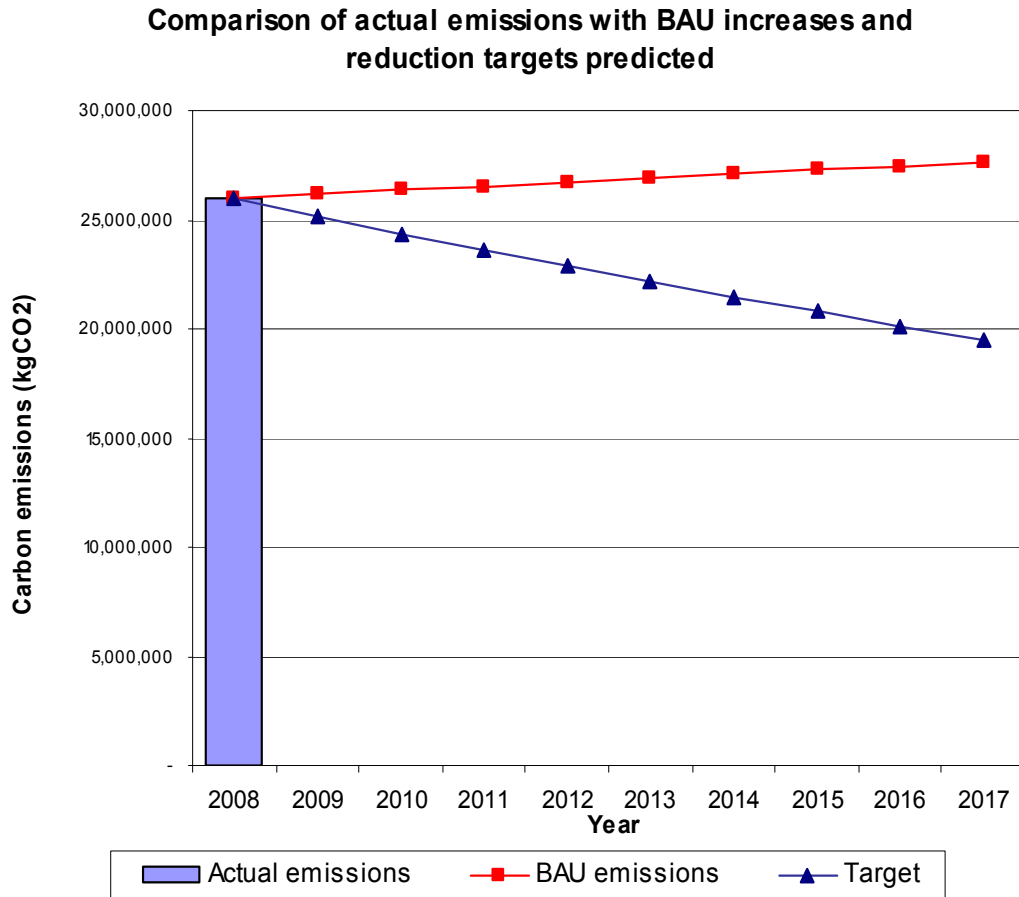
Table 2 Conversion factors used

Electricity (grid)	0.537kg/kWh
Natural gas	0.185kg/kWh
Car (unknown fuel)	0.20 kg/kWh
Train (National)	0.06kg/kWh
Air	0.12kg/kWh
Waste	447 kg/tonne
Water	0.404 kg/m ³

The purpose of the greenhouse gas (GHG) conversion factors is to help businesses convert existing data sources (e.g. utility bills, car mileage, refrigeration and fuel consumption) into CO₂ equivalent emissions by applying relevant conversion factors e.g. the above conversion factors mean that for every Kilowatt hour of electricity used, as supplied by the National grid, 0.537 kg of carbon emissions are produced.

3.3 Projections and Value at Stake

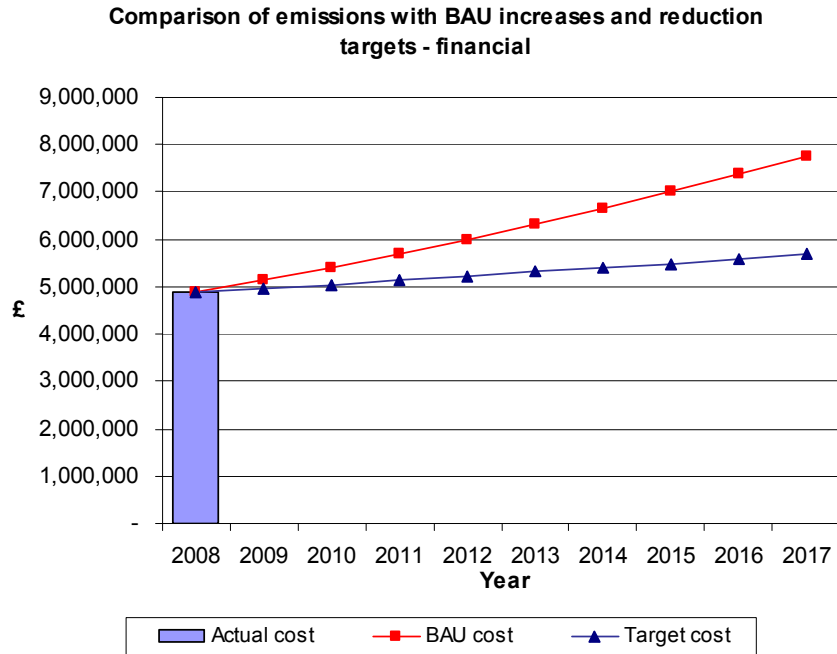
Carbon value at stake



The blue line in the above graph shows what our predicted carbon emissions will be based on our carbon reduction target.

The red line indicates the 'business as usual' scenario, which predicts our carbon emissions if we have no carbon reduction plan and continue as usual.

Financial value at stake



The blue line in the above graph shows what our predicted financial costs associated with implementing our carbon reduction plan will be based on our carbon reduction target.

The red line indicates the 'business as usual' scenario, which predicts our financial costs if we had no carbon reduction plan and continue operating as usual.

Unless carbon management policies are implemented at the University, its manageable CO² emissions are predicted to increase by 13,916 tonnes by 2017 from its baseline. This is projected to cost the University an extra £3,822,621 by 2017.

The Business As Usual (BAU) scenario assumes a growth factor of 0.7%, source DTI/DBERR EP68. However, within the Higher Education sector there has been a growth factor of 2-3%. Also within the UK, aggregate student numbers have doubled over the last 20 years.

Energy prices

Further information on predicted world energy growth and prices can be found in appendix **B**.

4 Carbon Management Projects

4.1 Existing/Planned projects subject to available funding

Ref	Project	Lead	Cost	Annual saving £'s	Annual Savings CO ₂ (T)	Payback	%of Target	Year
1	Fleet review	CG			60			2012
2	Waste- increase recycling by 5%/year	CG/TC	2,000	£2,200	12.5 (Over 5 years =50 T)			
3	Business Travel reduce by 5 %	TC			99			
4	Awareness raising-reduce overall footprint by 5% (heat, electricity)	TC	Staff time		1,268		5	2010-12
5	Printer Rationalization	TC/LA	Staff Time					
6	Reduce water use by 2%/annum	TC/DM	Staff time	£36,000	3 (Total =15)	Over 5 years		2010
7	Switch from bottled water to P.O.U.	TC/LA	40,000	15,000	65			2010-11
8	IT Projects: Power management (&optimisation)of servers, printers and monitors, energy efficient procurement	JK	10,000		500		1	2010-12
12	Offset top-up grid electricity use as part of backlog maintenance programme projects to include lighting upgrades, voltage optimisation, VSD's, Timeswitch controls, insulation	DM	500,000		900		2	2012-15
13	Swimming Pool cover	BE/GS	1,600	6,000	67			
14	Time controls on drinks machines, photocopiers and office equipment	TC/DM	£200	£800	220			2009-10
15	Replacement campus external lighting upgrade	DF	On-going		100			2008-11
16	School of Arts refurbishment reduce energy consumption of building by min. 20%	AW		28,540	303			2010-13
17	Improved Space utilisation , reduce estate by 10%	MK						

AW- Allan Watson

BE- Brian Ewing

CG – Colin Girdwood

DF- Derek Fleming

DM- Derek Mitchell

JK- Jean Keighren

LA-Louise Aird

MK- Marianne Kenley

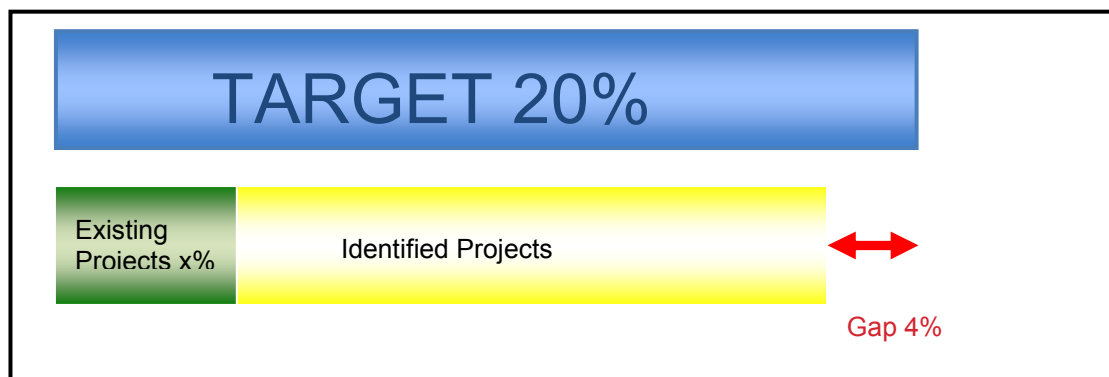
TC- Trudy Cunningham

GS- Gordon Smith

Total Quantified savings = 3949 Tonnes This does not include savings which have been hard to quantify e.g. improved space utilization, which has the potential to save another 10 % of our target.

4.2 Projected achievement towards target

All projects have been confirmed and are either part of a current on-going energy efficiency maintenance strategy, backlog maintenance programme or will begin when stated in table. Some projects have been difficult to quantify i.e. improved space utilization, printer rationalization.



5 Carbon Management Plan Financing

The exact criteria will be different for each project, as it will require alignment and careful timing with existing maintenance projects and new developments already planned on campus. A scoring matrix has been developed for evaluation of projects. The priority will be different dependent on the requirements of each driver e.g:

- Total carbon savings
- Lowest £/Tonne CO₂ saved
- Improved environmental conditions
- BREEAM points score
- Payback period
- Lowest life cycle cost

N.B. As can be seen above many factors are drivers towards our carbon reduction target.

5.1 Assumptions

The basis of all calculations is the baseline spreadsheet tool provided by the Carbon Trust, therefore the conclusions are subject to the suppositions and conversion factors embedded in the tool . Conversion factors are listed in section 3, table 2

- Rate of inflation – 0.7%
- Bottled water has a carbon footprint 400 times that of tap water [Tap V's Bottled study](#)

5.2 Benefits/savings

Unless carbon management policies are implemented at the University, its manageable CO₂ emissions are predicted to increase by 13,916 tonnes by 2017 from its baseline. This is projected to cost the University an extra £3,822,621 by 2017.

5.3 Sources of funding

The University already invests in carbon reduction through its capital and maintenance programmes. We are already looking at a 10-12% reduction by these means but will prioritise carbon hits when we can (through disposals) and through improving the estate by addressing



the quality of the buildings (inside and out) and by using them more intensively. By improving the quality of the buildings, we will reduce our running costs through investment in energy saving measures.

There shall be no additional resources made available from department's budgets. Currently all projects itemised will be met from existing budgets. Estates and Buildings will be primarily responsible for the monitoring and reporting of the plan.

6 Actions to Embed Carbon Management in Your Organisation

Embedding the principles of carbon management at the heart of the University's policies, strategies and projects is key to ensuring the success of the carbon management plan and we will continue actively promote these principles.

6.1 Corporate Strategy

Embedding CO₂ saving across our organisation

The university has made carbon management one of its key performance indicators. Each College, School, Directorate and Service department in the University have been encouraged to draw up generic carbon management plans to 'best fit' their departments' needs.

- Climate change legislation/commitments will be embedded into existing policies and strategies wherever possible. Annual waste, water and energy targets are published on the web.
- New policies developed wherever necessary
- The Environmental Task Group (ETG) and Carbon Management Board will set targets and have a review of targets annually. Board and ETG to meet once a semester
- Carbon groups and committees have been established in key carbon management areas. Each College has its own carbon committee, which meets at least once a semester.
- The Energy and Environment office will implement the carbon management Plan and policies relating to climate change legislation.
- Training programmes will be implemented for all staff in energy awareness



- Ideally, to have carbon management responsibilities embedded within all job descriptions (as H&S has been) but there are many practical issues associated with this, but is something to aspire to in the future.

6.2 Responsibility (Being clear that saving CO₂ is everyone's job)

A series of carbon committees have been set up in all Colleges. These committees ideally consist of one member of staff (or student) from each building used by that College. They will be represented and have a 'voice' on carbon committee meetings. These meetings held every 2 months, report back directly to that College's carbon team leader, who is responsible for producing an individual carbon reduction plan for that particular College..

6.3 Data Management (Measuring the difference, measuring the benefit)

- Data on energy performance will be coordinated and collated monthly by the University's Energy manager. Monthly energy figures for each College will be published on the web, as well as annual energy consumption across the main campus. [Electricity Consumption](#)
- Annual water usage is provided by our Energy Manager and Scottish Water. Procurement provide annual data on bottled water purchased for chillers (in process of replacing)
- Our business air and rail miles are provided by the University's travel booking provider D P & L travel, and will provide an annual spreadsheet of journeys booked.
https://secure.dundee.ac.uk/procurement/dundeeonly/CI_Travel_Services.htm
- Car business miles will be calculated from staff expense forms, which currently are paper-based expense forms but we will shortly develop an electronic version to ease in the collection of data.
- Waste figures are provided by our Waste Manager and Dundee City Council Waste Management Team

6.4 Communication and Training (Ensuring everyone is aware)

We have a communications strategy in place for dissemination of information.

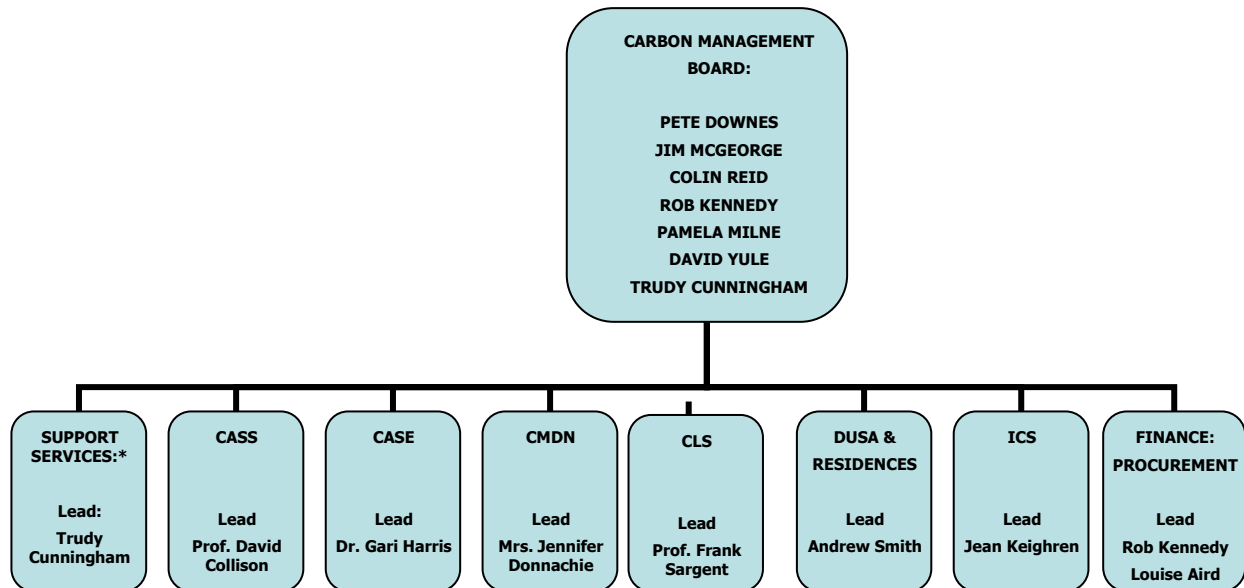


- Project leaders within Colleges disseminate information through their carbon committees.
- We have created new University web pages on carbon management [Carbon Management](#)
- Develop a good housekeeping practice list. [Good Housekeeping list](#)
- Messages are posted on our electronic noticeboard 'Hermes'
- Targeted emails on carbon management to all staff from Carbon Board
- Press releases for University Press Office and local newspapers.
- Development of carbon training module for all staff to participate in, beginning with new staff induction days
- Review of strategy to be undertaken annually.
- Principal to 'star' in video about carbon management on campus, filmed and directed by students
- Post daily carbon saving tips on start up of computers (Carbon tip of the day)
- Have a carbon champion for each building- 57 (possibly one member of staff and one student/ building)
- Monthly/weekly announcement on *My Dundee* noticeboard accessed by most students & academics
- Conduct waste, energy audits of buildings

6.5 Policy Alignment – saving CO₂ across your operations

Targets and policies will be reviewed annually by the Carbon Management Board or The Environmental Task Group depending on the nature of the policy. Our Procurement Office is developing a sustainable procurement policy. We are also developing in conjunction with our Procurement Office a printer rationalization policy and a travel policy to be implemented later this year.

7 Organizational Chart of the CM Plan



7.1 The Carbon Board – strategic ownership and oversight

The University Principal chairs the Carbon management board. The other members are University Secretary, Director of Finance, Director of Human Resources, Director of Campus Services, Senior Academic & Chair of Environmental Task group and Environment & Sustainability Officer.

7.2 The Carbon Management Team – delivering the projects

The Carbon Management Team consists of a team leader for each College or department. Meetings are held once a semester or sooner if required.

7.3 Succession planning for key roles

The Director of Campus Services is the project sponsor. The Environment & Sustainability Officer is the project leader. These roles are associated with the posts and not the individuals.

7.4 Annual progress review

The project sponsor and project leader shall review progress annually and report to the Carbon Management Board

Appendix A: Carbon Management Matrix – Embedding

2009 – Green

2014 -Grey

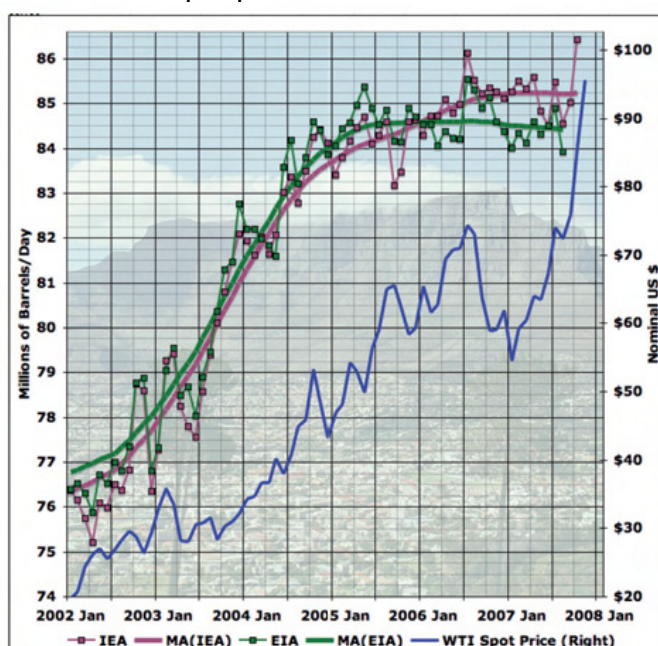
	CORPORATE STRATEGY	PROGRAMME MANAGEMENT	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION & TRAINING	FINANCE & INVESTMENT	POLICY ALIGNMENT *
BEST 5	<ul style="list-style-type: none"> Top level target allocated across organisation CO₂ reduction targets in Directorate Business Plans 	<ul style="list-style-type: none"> Senior Management Team/Committee/Court review progress against targets on quarterly basis Quarterly diagnostic reports provided to Directorates Progress against target published externally 	<ul style="list-style-type: none"> CM integrated in responsibilities of senior managers CM part of all job descriptions Central CO₂ reduction advice available Green Champions leading local action groups 	<ul style="list-style-type: none"> Quarterly collation of CO₂ emissions for all sources Data externally verified M&T in place for <ul style="list-style-type: none"> buildings street lighting waste transport 	<ul style="list-style-type: none"> All staff given formalised CO₂ reduction <ul style="list-style-type: none"> induction and training communications Joint CM communications with key partners Staff awareness tested through surveys 	<ul style="list-style-type: none"> Finance committed for 2+ yrs of Programme External funding being routinely obtained Ring-fenced fund for carbon reduction initiatives 	<ul style="list-style-type: none"> CO₂ friendly operating procedure in place Central team provide advice and review when requested Barriers to CO₂ reduction routinely considered and removed
4	<ul style="list-style-type: none"> CO₂ reduction commitment in Corporate Strategy Top level targets set for CO₂ reduction Climate Change Strategy reviewed annually 	<ul style="list-style-type: none"> Sponsor reviews progress and removes blockages through regular Programme Boards Progress against targets routinely reported to Senior Mgt Team 	<ul style="list-style-type: none"> CM integrated in to responsibilities of department heads Senior Management Team/Committee/Court regularly updated Staff engaged through Green Champion network 	<ul style="list-style-type: none"> Annual collation of CO₂ emissions for <ul style="list-style-type: none"> buildings street lighting waste transport Data internally reviewed 	<ul style="list-style-type: none"> All staff given CO₂ reduction <ul style="list-style-type: none"> induction communications CM matters communicated to external community 	<ul style="list-style-type: none"> Coordinated financing for CO₂ reduction projects via Programme Board Finances committed 1yr ahead Some external financing 	<ul style="list-style-type: none"> Comprehensive review of policies complete Lower level policies reviewed locally Unpopular changes being considered
3	<ul style="list-style-type: none"> CO₂ reduction vision clearly stated and published Climate Change Strategy endorsed by Cabinet and publicised with staff 	<ul style="list-style-type: none"> Core team regularly review CM progress: <ul style="list-style-type: none"> actions profile & targets new opportunities 	<ul style="list-style-type: none"> An individual provides full time focus for CO₂ reduction and coordination across the organisation Senior Sponsor actively engaged 	<ul style="list-style-type: none"> Collation of CO₂ emissions for limited scope i.e. buildings only 	<ul style="list-style-type: none"> Environmental / energy group(s) given ad hoc: <ul style="list-style-type: none"> training communications 	<ul style="list-style-type: none"> A view of the cost of CO₂ reduction is developing, but finance remains ad-hoc Some centralised resource allocated Finance representation on CM Team 	<ul style="list-style-type: none"> All high level and some mid level policies reviewed, irregularly Substantial changes made, showing CO₂ savings
2	<ul style="list-style-type: none"> Draft Climate Change Policy Climate Change references in other strategies 	<ul style="list-style-type: none"> Ad hoc reviews of CM actions progress 	<ul style="list-style-type: none"> CO₂ reduction a part-time responsibility of a few department champions 	<ul style="list-style-type: none"> No CO₂ emissions data compiled Energy data compiled on a regular basis 	<ul style="list-style-type: none"> Regular awareness campaigns Staff given CM information on ad-hoc basis 	<ul style="list-style-type: none"> Ad hoc financing for CO₂ reduction projects 	<ul style="list-style-type: none"> Partial review of key, high level policies Some financial quick wins made
1 Worst	<ul style="list-style-type: none"> No policy No Climate Change reference 	<ul style="list-style-type: none"> No CM monitoring 	<ul style="list-style-type: none"> No recognised CO₂ reduction responsibility 	<ul style="list-style-type: none"> No CO₂ emissions data compiled Estimated billing 	<ul style="list-style-type: none"> No communication or training 	<ul style="list-style-type: none"> No specific funding for CO₂ reduction projects 	<ul style="list-style-type: none"> No alignment of policies for CO₂ reduction

* Major operational policies and procedures, e.g. Capital Projects, Procurement, HR, Business Travel

Appendix B: Energy Prices

Historically, electricity prices have been determined by the price of fuel, the efficiency of the plant burning the fuel, and the capital and operating cost of the plants that employ this fuel. In recent years, natural gas has been cheap and especially attractive if one discounts the fact that it is a finite resource. Consequently, since the early 1990s there has been a rapid growth of low-capital-cost, high efficiency, gas-fired combined cycle gas turbines (CCGT, CHP) in all OECD countries.

Enthusiasts for gas sincerely believed that its price, based on regional markets, could be de-linked from other hydrocarbons such as oil and coal and that as depletion took place, new sources would be found. However, it is increasingly clear that this is not the case, a fact that is particularly troubling given current oil price trajectories. The following chart shows the monthly rates for oil production during the past five years as recorded by the International Energy Agency (IEA) and the Energy Information Administration (EIA) of the US Department of Energy (DoE), together with the spot price:



10. Monthly rates of oil production for the past five years, data from the IEA, the EIA, the US DoE, and the WTI Spot Price.¹⁴

It is clear that the rate of growth in global oil production has been decreasing since about 2004, and appears to be flattening out, despite steadily rising demand driven by China and India. It is, of course, possible that the somewhat irregular plateau of production shown in this chart is temporary and that production rates will resume their ascent in response to what appears to be relatively price-inflexible demand growth for transport fuel.¹¹

Within the energy sector currently, prices are fairly stable; however they are predicted to rise again during 2012/2013. An 8% rise in fuel costs would account for £232,195 based on 2008/2009 consumption figures.

¹¹ Source. The Oil Drum: http://www.theoil Drum.com/files/plateau_price_end_nov.png.