Scottish Government Carbon Management Plan Revisited – 2014

working with:

CARBON TRUST

CARBON TRUST STANDARD

REDUCING CO2 YEAR ON YEAR

The Scottish Government
Riaghaltas na h-Alba

- Management structure
- Funding and timetable
- Changing the way services are delivered.
- Action Plan and Standard Operating Procedures

6   Behaviour Change

- Embedding the low carbon agenda
- Carbon Trust Estimated Abatement Potential
- CMP Communications

7   Conclusions and Summary of Findings

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Appendix A: Details of Carbon Footprint methodology including emission factors.

Appendix B: Details of Business as usual carbon and financial model.

Appendix C: Details of Carbon Management Project Register.

1. CMP Background and Remit

The Scottish Government (SG) signed up to the Carbon Management Programme in 2008 which resulted in the publication of our first Carbon Management Plan (CMP) in May 2009. In 2012 we signed up to the Carbon Trust's CM Revisited Programme and consequently we have restated our commitment to reducing our estate emissions. This revised CMP sets out the activities that will enable us to reduce our carbon emissions and meet our reduction targets. It resets our baseline carbon emissions to reflect our increased estate boundary and includes a register of projects, both technical and corporate, that will help us deliver our 30% reduction target by 2020.

This CM Plan is a framework for future carbon measurement, monitoring and forecasting which will be subject to regular review. The Plan does not seek to provide updates on previous carbon reduction activities across our estate, since this work is summarised in our published Annual Sustainability Report. However, the CMP aims to support the wider SG environmental policies and will be the main tool for managing our carbon footprint information and reduction measures up to 2020 and beyond.

The ownership of the CMP rests with our People Services Division which is responsible for managing the assets, services and resources used throughout the estate. The CM Revisited Programme started in September 2012 and initially led to the production of a diagnostic report. This report included an action plan that enabled the Carbon Management Team to complete the CMP review by March 2013. The diagnostic report established the overall trend of emissions and our progress to date against the reduction targets.

The findings showed an overall downward trend in our emissions and that we were on track to meet our original 2014 target, had the size of the estate remained at 2007/08 levels. However, it also showed that we are unlikely to achieve our 2020 carbon reduction target based on the current rate of progress and the enlarged estate. The review of the 2009 CMP offered an opportunity for the baseline and interim emission reduction target to be reconsidered. The new CMP reflects the expanded estate and the resultant increase in the SG carbon footprint (estimated at three fold since the original 2007/08 baseline).

<u>What has changed?</u>

In 2008/09, the offices, laboratories and other buildings used by Marine Scotland, Communities Scotland and the Scottish Building Standards Agency became part of the Scottish Government estate. These corporate changes brought an increase in the number of sites within the scope of SG operational responsibilities, and significantly, also included the emissions from Marine Scotland's research and surveillance activities. Consequently, the scope of the SG estate increased from 40 to over 80 sites. As well as changing the scope of SG operational activities, this expansion of the estate significantly increased our carbon emissions threefold. This meant that the projects identified within our initial CMP were no longer adequate to achieve our emission reduction targets.

The table below shows the carbon footprint for each of the seven years and underneath a brief summary of what the footprint includes.

Figure 1.1 How the SG carbon footprint boundary has changed over time.

Footprint year	Size of footprint (tCO$_2$e)	Description of carbon footprint boundary
2007/08	12,788	Original Carbon Management Plan baseline which included 18 key sites
2008/09	13,723	Subset of 18 sites (energy and waste) and business travel (all SG staff) from the Environmental Performance Annual Report 2008/09
2009/10	41,881	Revised CMP baseline, including 29 key sites and MS estate, research and surveillance emissions
2010/11	38,564	Same boundary as 2009/10
2011/12	36,417	Same boundary as 2009/10
2012/13	37,819	Same boundary as 2009/10
2013/14	34,869	Same boundary as 2009/10

This revised CMP better reflects the challenges faced by the SG's expanded estate by establishing 2009/10 as our new baseline year and identifying additional projects that will allow us to deliver reductions in emissions of:

❖ 15% by March 2015 and;

❖ 30% by March 2020.

Technical improvements will be complemented by behaviour change measures as we work with colleagues to ensure the Government's operations are delivered in the most sustainable and efficient way.

The two figures below show the breakdown of the SG baseline (2009/10) carbon footprint by carbon and by cost. This shows that some of the minor sources of carbon such as travel are very important in terms of cost.

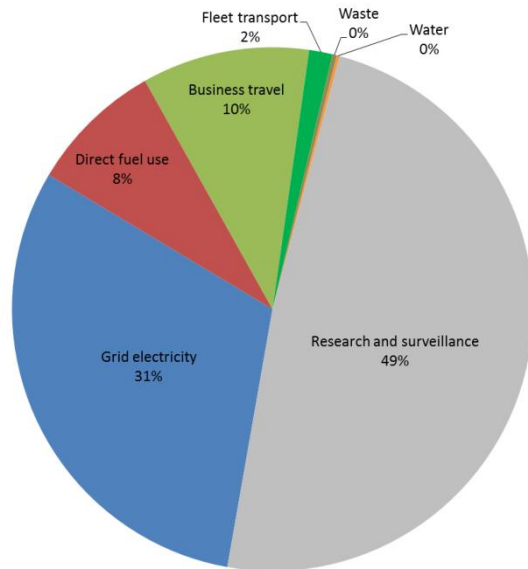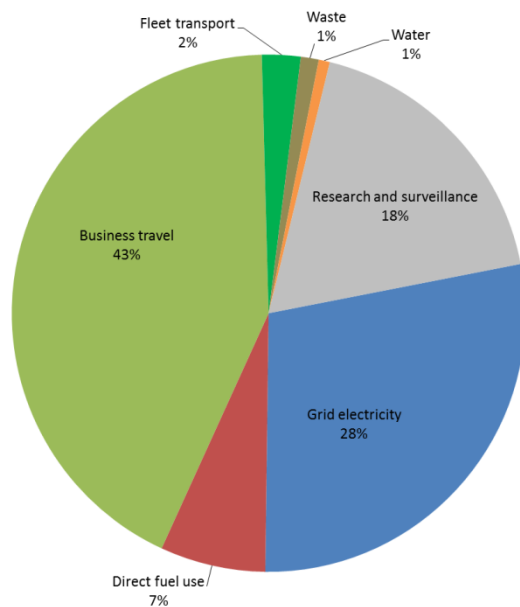**Figure 1.2 – Composition of baseline SG footprint by emission source.**

Figure 1.3 - Composition of baseline SG footprint by spend

What has been achieved so far?

Over the past three years, the Energy Directorate has provided funds which enabled Facilities Services to spend over £2.3 million on energy efficiency measures that are delivering carbon savings at several sites. During 2012 and 2013, we successfully completed our statutory carbon reporting obligations under the CRC Energy Efficiency Scheme (formerly known as the Carbon Reduction Commitment) and Section 76 of the Climate Change (Scotland) Act 2009. In order to facilitate the transparent, consistent and reliable disclosure of SG environmental information, we moved our annual environmental reports to an online platform called Government On-Line Sustainable Performance Information Exchange (GOLSPIE).

http://www.scotland.gov.uk/Topics/Government/sustainabilityperformance

What is planned for the future?

As a result of the CMP review, a project register has been developed. This register identifies, quantifies and prioritises those projects that need to be implemented to keep us on track to achieve our targets. Around 127 live projects (54 of which are completed) are now recorded and the progress made against our carbon reduction targets through their delivery is monitored using the Carbon Trust's Carbon Management Project Register (CMPR) tool. Plans are already underway to work closely with our property and planned maintenance contractor to develop further energy management procedures and projects, and to deliver a staff awareness campaign to promote the CMP and encourage behaviour change across our estate.

The SG was awarded initial certification to the Carbon Trust Standard in July 2012. This award recognised that carbon reductions associated with our energy and vehicle fleet usage had reduced over a three-year period. Due to the continued achievement against Carbon Trust Standard criteria, we will be submitting an application for recertification in 2014. This would include the measurement and assessment of our business travel emissions and fugitive emissions from refrigerants or air conditioning units etc. which are known to be difficult to measure and control.

http://www.carbontrust.com/client-services/footprinting/footprint-certification/carbon-trust-standard/

What is our CMP vision?

We seek to put carbon management at the heart of SG business and achieve sustainable environmental best practice to minimise the impacts of our business activities throughout our estate. This will be achieved through the delivery of our environmental policy and the implementation of the measures outlined in this CMP.

2. **Carbon Management Strategy**

This section looks at the drivers, objectives, targets and strategy behind the CMP. In order to develop an effective plan it is important to recognise firstly what is driving change within SG. Next are the objectives which describe where we want to get to, followed by the targets which measure when these objectives have been reached. Finally, there is the strategy which identifies how we are going to achieve our targets. The CMP is then the vehicle through which this strategy will be delivered and the remaining sections in this document outline the main measures that need to be implemented if our carbon reduction targets are to be met.

National Policy Driver - Climate Change and Energy Efficiency Targets

The main legislative driver for reducing our carbon emissions is the Climate Change (Scotland) Act 2009, which requires Scotland as a whole to reduce its greenhouse gas emissions by 42% by 2020 and 80% by 2050. Section 44 of the Act places duties on Scottish public bodies in relation to climate change. A public body must, in exercising its functions, act:

- ❖ in the way best calculated to contribute to the delivery of the Act's emission reduction targets;
- ❖ in the way best calculated to help deliver any statutory programme for adapting to the impacts of climate change; and
- ❖ in a way it considers most sustainable.

National Policy Driver – the draft second Report on Proposals and Policies (RPP2)

RPP2 was published in January 2013 and sets out Scotland's statutory annual climate change targets as well as a range of policies and proposals with the required abatement potential to deliver against those targets. This high profile document makes clear that ensuring progress towards meeting the Scottish Government's targets relies on three key elements: 1) Driving Delivery, 2) Monitoring and Reporting and 3) Visible Leadership.

http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action

The SG recognises the need to lead by example and therefore this CMP is the main vehicle to implement carbon reductions from its own estate and operations. The Climate Change Scotland Act also required the SG to set a Scotland-wide energy efficiency target in the Energy Efficiency Action Plan. This national target is to reduce energy consumption by 12% against a three year average baseline over the period 2005-2007 and establishes a minimum level of ambition for all sectors, including the public sector and SG itself.

http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan

External Financial Drivers

The CRC Energy Efficiency Scheme is a mandatory cap and trade scheme for emissions from energy intensive businesses and the public sector. It covers carbon emissions from electricity and natural gas, and excludes other fuels, as well as fleet transport and third party emissions from waste and water. The scheme is run jointly by the UK Government and the devolved administrations and all central government departments are required to participate. Organisations operating in the UK who consume over 6,000 kWh annually on the half hourly market must also participate.

The CRC scheme is designed to incentivise the installation of cost-effective energy efficiency measures by charging organisations in respect of certain emissions, effectively increasing the cost of their energy consumption and thereby making efficiency measures more attractive.

SG paid the UK Government £200,000 to settle its CRC obligations for 2013-14. For 2014-15 the cost exposure for carbon allowances was increased by one-third to an average of £16 per tonne. Further increases are expected in future years of the scheme because the cost of allowances is linked to the Retail Price Index. Allowance costs may also become more variable as the trading element is increasingly used by scheme participants.

http://www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx

UK Energy Market – Combatting the likely increases in utility costs over the next six years is an important driver for implementing the CMP, which will reduce our consumption and generate cost savings (or avoid cost increases) across the SG estate.

EU Energy Efficiency Directive –

Article 5 of the EU Energy Efficiency Directive deals with energy performance of central government buildings. The Directive was brought into force in December 2012 and transposed on 31 December 2013.

Article 5 is designed to promote energy efficiency through the use of central government buildings as exemplars. Articles 5(1) to 5(5) set out the measures required to comply with the Directive and Article 5(6) offers Member States the option to adopt an "alternative approach" that will deliver an equivalent level of savings. Both the United Kingdom and Scottish Governments agreed that the alternative approach should be adopted as it will enable the energy savings being delivered through existing administrative measures, such as the Greening Government Commitments in English and UK-wide departments and the Scottish Government's Carbon Management Plan, to be recognised and will avoid the significant costs that would be incurred adopting the other obligations of the Article.

http://ec.europa.eu/energy/efficiency/eed/eed_en.htm

CMP Internal Driver - SG Environment Policy

The key internal driver for implementing the measures outlined in the CMP is to support the objectives of the SG Environmental Policy which, in turn, seeks to make a valuable contribution towards achieving national climate change targets (which are discussed below). Our Environmental Policy covers the corporate activities within a recognised estate boundary and sets out our environmental management objectives:

- ❖ We make efficient use of space in order to deliver Ministers' objectives:
- ❖ We use energy efficiently to minimise greenhouse gas emissions;
- ❖ We conserve water by efficient use and detecting and preventing leaks.
- ❖ We reduce the need to travel and increase the uptake of sustainable travel options where travel is unavoidable;
- ❖ We minimise waste by smarter procurement and will reuse, recycle and recover resources wherever possible instead of treating them as waste;
- ❖ We prevent pollution by avoiding unnecessary use of hazardous substances and, where their use is essential, we shall effectively manage processes, activities and disposal;
- ❖ We purchase products and services that have the lowest environmental impact;
- ❖ We protect and enhance biodiversity on our estate;
- ❖ We educate our people and contractors in complying with all relevant environmental and related legislative requirements; and
- ❖ We make environmental data and information openly accessible to employees and the public.

To help us make progress against these objectives, and deliver our targets, we will continue to implement our CMP. This plan is helping us change our ways of working and realise the benefits of lower operational impacts and costs. We monitor, review and publish information in respect of our environmental performance and in doing so ensure that our targets remain appropriate and challenging.

Specific focus on SG own estate and reduction measures will be managed by the Carbon Management Team. The Team will monitor progress on delivering our Environmental Policy aims and implementing the measures outlined in our CMP.

CMP aims

The CMP aims to support the objectives of the SG Environmental Policy by reducing the carbon emissions from our own estate operations by implementing viable reduction projects detailed in the Plan. Through continuous improvement in our policies, procedures and workplace practices, we will deliver reductions in our carbon footprint that will enable us to contribute, alongside other public and private sector organisations, in supporting our national climate change goals.

The key objective of the CMP is to provide a structured approach to reducing the environmental impacts of our business activities. We are committed to reducing our carbon emissions from energy, waste, water, transport and business travel activities. This will be achieved through the implementation of the CMP, which will be managed by the Carbon Management Team.

CMP Targets

15% reduction in CO_2e by March 2015 and 30% by March 2020, from a 2009/10 baseline

To ensure the SG is achieving efficiencies of a magnitude sufficient to deliver our 2020 target, we will use this Plan to identify projects with the potential to deliver the reductions in emissions of 15% by March 2015 and 30% by March 2020, from a 2009/10 baseline. The SG reduction target for this CMP has been set by determining the initial baseline and current trend in emissions (Section 3.2), forecasting the 'business as usual' scenario (Section 3.3) and calculating the likely savings available from existing and future carbon reduction projects (Section 3.4). The CMP target is:

1) **Specific** – the target relates to the carbon footprint boundary (described in Section 3.1).
2) **Measurable** – the target is based on the annual calculated emissions of SG based on this boundary.
3) **Attainable** – the target is realistic and has been based on key information about likely future factors and savings.
4) **Relevant** – the target is based on emissions SG directly or indirectly control.
5) **Time-bound** – the target will be achieved by March 2020, with an interim target of March 2015 to make sure that SG stays on track.

Table 2.1 shows how the overall target has been broken down into sub-targets for different emission sources within the footprint. These are indicative rather than mandatory; as long as the overall targets are achieved, the exact reduction contributions of these different areas can vary. However, the carbon reduction strategy is based on understanding the internal and external factors and this is the current best guess of where reductions are likely to come from.

Table 2.1 – Overall CMP reduction targets, broken down by emission sources (excluding Marine Scotland research and surveillance emissions).

	Baseline carbon footprint (tCO$_2$e) 2009/10	Interim Target reduction (%) 2014/15	Target reduction (%) 2019/20	Interim target carbon footprint (tCO$_2$e) 2014/2015	Target carbon footprint (tCO$_2$e) 2019/20
Grid electricity	12,895	-18%	-30%	10,563	9,019
Direct fuel use	3,474	-9%	-15%	3,165	2,956
Waste	114	-25%	-41%	85	74
Water	74	53%	32%	114	98
Business travel/fleet	4,958	-23%	-41%	3,819	2,937
Overall	**21,515**	**-18%**	**-30%**	**18,287**	**15,060**

CMP Reduction Strategy

Grid electricity – it is anticipated that this will be achieved through a combination of the decarbonisation of the National Grid (which could contribute around a 7% reduction in grid electricity emissions by 2019/20), reduction in the size of the SG estate and also specific carbon reduction projects to save electricity.

Direct fuel use (natural gas and gas oil) – this target should be met through a reduction in the size of the estate through non-renewal of leases for buildings no longer required and more efficient use of space in the buildings retained. There are also a number of specific carbon reduction projects to reduce consumption of natural gas and gas oil.

Waste – this target is likely to be achieved primarily through the diversion of waste from landfill to recycling, composting or anaerobic digestion, all of which have lower carbon emissions per tonne of waste treated. This will be achieved through better segregation of waste, management of waste contracts and internal waste policy. There are also likely to be some gains through reduction in overall waste quantity.

Water – this is the only area where emissions are predicted to increase due to a large increase in consumption (Marine Scotland scientific research facilities) between the baseline year of 2009/10 and 2010/11. The water target set means that emissions from water would need to reduce by 20% from the most recent footprint year (2011/12) by 2019/20. This reduction is likely to come from a combination of estate reductions and also some external efficiency gains by Scottish Water in the supply and treatment of water.

Business travel/fleet transport – this is an area where significant gains are predicted through reinforcing the existing travel policy, leading to staff using lower carbon modes of transport (e.g. switching from planes to trains), making increased use of alternative technologies such as video, telephone and desktop conferencing rather than travelling and reducing use of taxis/private cars. In addition, there is likely to be some external reduction through the introduction of more efficient vehicles/lower carbon fuels.

CMP Strategy Actions

The CMP operations will be managed and delivered through the work of the Carbon Management Team and the higher level Resources Board. This work includes securing funding and support to implement the measures outlined in the CMP and the project register. Our CMP has a number of strategic actions which include:-

- ❖ To establish year-on-year financial support from Senior Management to implement the CMP;
- ❖ To improve practices and procedures within Facilities Services to ensure carbon management is a key driver in determining the projects to be taken forward;
- ❖ To embed carbon reduction into wider policies and practices across the estate;
- ❖ To integrate carbon management throughout the SG, particularly in IT, Procurement, Transport, Travel, Finance, HR and contractor services.
- ❖ To encourage behaviour change through increased staff awareness.
- ❖ To align the low carbon strategy for the estate with wider policies and targets.

CMP- Staff Involvement

Staff at all levels of the organisation, as well as contractors, have an important role to play in delivering carbon reductions over the next six years by implementing the following corporate actions:

- ❖ Help reduce business travel emissions by avoiding the need to travel through increased use of audio, video and desktop conferencing facilities and choice of lower carbon travel options when it is necessary;
- ❖ Help reduce our electricity consumption through best practice use of controls for heating, lighting and IT;
- ❖ Help reduce heating fuel consumption, particularly through the monitoring and regulation of room temperatures in line with SG thermal comfort guidance;
- ❖ Help reduce our waste produced and increase our recycling of waste products;
- ❖ Help reduce water consumption through conservation practices;
- ❖ Participate in environmental management training and other activities; and
- ❖ Become aware of environmental management information in the building where you work and promote understanding and actions to others.

3. Emissions Baseline and Projections

Introduction

This section covers the emission sources that have been included within the SG carbon footprint boundary (energy, waste, water, transport and business travel), the emissions baseline for 2009/10, and the progress to date. It also forecasts the future carbon emissions and costs to demonstrate the impact on SG meeting its targets.

What is a carbon footprint?

A carbon footprint is an estimate of the annual climate change impact of an organisation. Typically, a carbon footprint is calculated by estimating not just the CO_2 emissions from an activity, but also any emissions of other greenhouse gases (such as methane and nitrous oxide). For simplicity, all these impacts are added together and expressed as a single number in units of carbon dioxide equivalent (CO_2e) which is the amount of CO_2 that would create the same amount of warming.

To calculate a carbon footprint, the organisation needs to collect activity data such as kWh of electricity used or business miles travelled or tonnes of waste produced. These are then multiplied using standard conversion UK factors to give an estimate of the tonnes of CO_2e produced from each activity.

Setting carbon footprint boundaries

Carbon footprints are defined in relation to two boundaries:

1) The **operational boundary** sets out which emission sources are to be included in the footprint. Based on the Greenhouse Gas Protocol (WRI, 2004), this should include;

- ❖ All Scope 1 emissions – these are the direct emissions that an organisation is responsible for and include on-site fuel use e.g. natural   gas, and fuel use in company owned vehicles;

- ❖ All Scope 2 emissions – these are indirect emissions caused by the generation of grid electricity; and

- ❖ Selected Scope 3 emissions – these are indirect emissions arising elsewhere from an organisation's activities e.g. emissions from air travel, waste disposal, water supply and treatment, and grid electricity transmission and distribution. These should be included where the organisation feels that they have sufficient control and are able to collect data to make an assessment.

2) The **organisational boundary** sets out which assets are to be included in the footprint and how any shared assets will be accounted for. The SG reports on its climate change impacts for a number of different reporting obligations, each of which has a different boundary.

Scottish Government CMP carbon footprint boundary

The changing nature of the estate, relating to both long-term asset management plans and shifting relationships between the SG and some executive agencies has created challenges for maintaining a consistent carbon footprint boundary. The SG began the Carbon Management Programme in May 2008, setting up a CMP covering the target period 2008/09 to 2013/14.

This original plan set a target of a 20% reduction by 2014 compared to the baseline footprint of 12,788 tCO$_2$e, measured in 2007/08. Sufficient projects were identified within the CMP to meet the target and processes for measuring and reporting the footprint were set up.

However, in April 2009, Marine Scotland was created and this not only increased the organisational boundary of the estate but also added a number of new emission sources, including the marine and jet fuel used in research and surveillance operations.

As a result, it was acknowledged that the CMP had to be updated, with respect to both the organisational boundary and the processes covered. It was also decided that these changes would require a reassessment of the previous plan's reduction targets to determine if they remained realistic.

During the process of revising the CMP, the boundary has been revised to make it consistent with the buildings included in the boundary for the Carbon Trust Standard.

The CMP carbon footprint boundary is shown in Figure 3.1.

Figure 3.1 – Revised Scottish Government CMP carbon footprint boundary.

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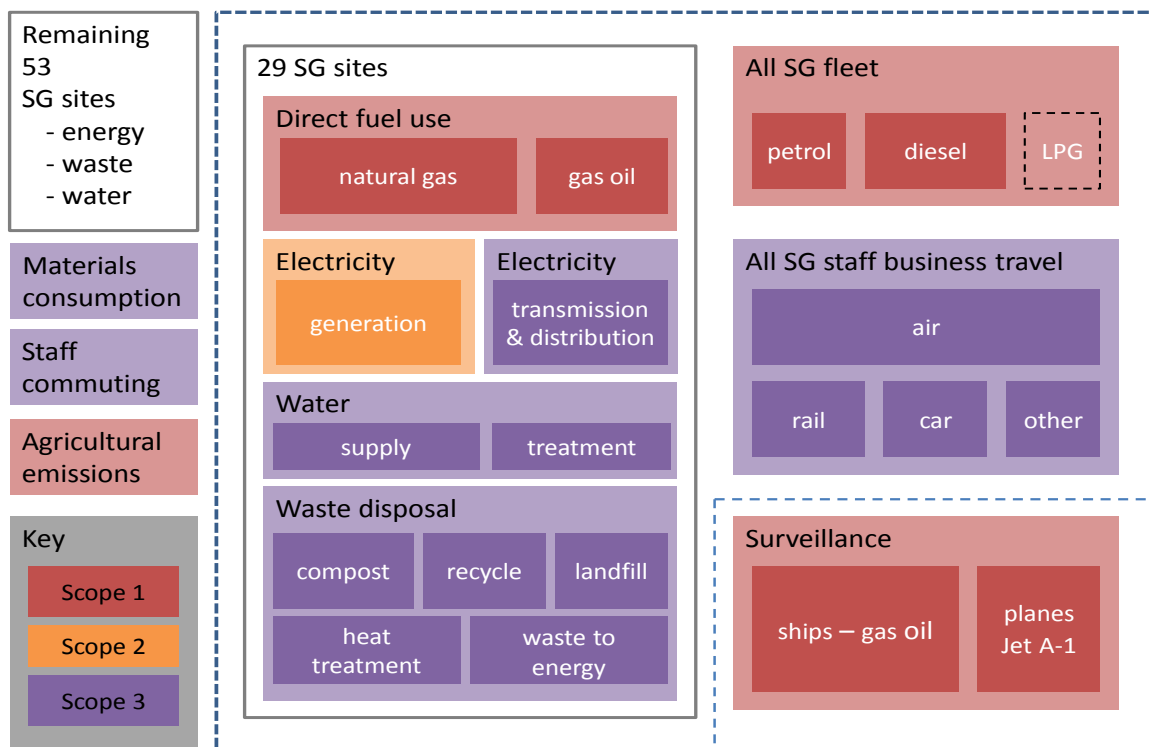
Boundary of SG CMP footprint

The estate boundary includes 29 SG sites representing over 97% of the total direct fuel use and electricity consumption. These buildings are identified as the most effective locations for implementing carbon reduction opportunities. The remaining 53 SG sites are outside the measured boundary because of the lack of metered consumption data available.

- ❖ Waste and water consumption are included for the same 29 buildings.
- ❖ Fleet travel is for all vehicles controlled directly by the SG and business travel is for all staff journeys. LPG was included in the baseline footprint (2009/10) and the footprint in 2010/11 but it is no longer used for fleet transport.
- ❖ The emissions from research and surveillance operations run by Marine Scotland have been included in the overall footprint, but should be seen as separate (represented in Fig. 3.1 by a dotted line) from the baseline for the purposes of forecasting and targeting.

There are a number of activities that are outwith the CMP carbon footprint boundary (materials consumption, staff commuting and agricultural activities are the key ones identified). These activities have been excluded due to difficulties in collecting accurate data and modelling emissions (agriculture) or lack of control over the emissions (commuting).

Data sources for the SG carbon footprint

The following list provides an overview of the activity data sources for calculating the carbon footprint. Further information on the carbon footprint methodology can be found in Appendix A.

Energy – automatic metering from the 29 major usage sites, including SASA and Marine Scotland research and science facilities.

Waste – annual waste figures taken from the management information collected by MITIE and recorded in the Public Sector Sustainability Report covering major sites.

Water - annual water figures taken from the management information collected by MITIE and recorded in the Public Sector Sustainability Report covering major sites.

Business Travel – figures are provided by our Travel Management Company and other smaller contracts for most business travel. Off-contract bookings are collected through our internal Travel & Subsistence process. Other information comes quarterly from Expotel, Arnold Clark, Central Taxis and T&S.

Transport – the mileage figures and fuel use recorded on the monthly log sheets of all official vehicles, including vehicles used by Marine Scotland and SASA, are collated and recorded on the fleet management database.

Research and Surveillance Operations – figures are provided by Marine Scotland for the fuel use for one aircraft and three marine vessels.

Conversion factors

In order to calculate the carbon footprint, consumption/activity data needs to be converted to units of tonnes CO_2e. This is done using standard factors issued by the UK Government for Company Reporting. These factors are reviewed centrally on an annual basis; some factors such as direct consumption units (e.g. litres or kWh) of fossil fuels change very little because the amount of CO_2e produced when burned is very consistent. Others, such as grid electricity change on an annual basis depending on the exact grid composition reported by generators (this is influenced by factors such as weather, relative market prices for gas and coal etc). In order to make sure that the CMP carbon footprint is as accurate as possible, conversion factors should be checked and updated annually and the relevant factor from the reporting year applied.

2009/10 baseline and subsequent progress to date

The scale of change to the carbon footprint boundary has meant that the baseline year needed to be reset. The revised baseline year is 2009/10 and future targets and progress will be measured against this starting point. Table 3.1 shows the carbon footprint for the baseline year of 2009/10 and for the three subsequent years. It can be seen from Table 3.1 that the key sources of emissions are grid electricity consumption, direct fuel use and business travel. In the baseline year, research and surveillance accounts for over 50% of the total footprint and is therefore an important part of our climate change impact. However, it presents a problem in terms of setting targets because the emissions are closely related to research and surveillance activities and weather: In a year with poorer weather conditions and/or more extensive monitoring activities the increases in surveillance fuel consumption could reverse any reductions made by buildings or travel. The same could be true for marine research activities. **Therefore, Marine Scotland research and surveillance fuels have been excluded from the footprint in terms of forecasting and target setting.**

Table 3.1 – Breakdown of overall SG CMP carbon footprint 2009-14.

Emissions Source	2009/10		2010/11		2011/12		2012/13		2013/14		% change since 2009/10
	tCO2e	%	tCO2e	%	tCO2e	%	tCO2e	%	tCO2e	%	
Grid electricity	12,895	59.9%	12,657	59.0%	11,490	59.0%	11,561	56.0%	10,763	57.3%	-16.5%
Direct fuel use (gas/gas oil)	3,474	16.1%	3,808	17.7%	3,290	16.9%	4,332	21.0%	3,271	17.4%	-5.9%
Waste	114	0.5%	159	0.7%	92	0.5%	50	0.2%	30	0.2%	-73.4%
Water	74	0.3%	94	0.4%	123	0.6%	120	0.6%	68	0.4%	-8.1%
Fleet transport	608	2.8%	669	3.1%	653	3.4%	750	3.6%	696	3.7%	14.5%
Business travel	4,350	20.2%	4,072	19.0%	3,812	19.6%	3,816	18.5%	3,949	21.0%	-9.2%
Sub-total	21,515	100.0%	21,459	100.0%	19,461	100.0%	20,629	100.0%	18,777	100.0%	-12.7%
Surveillance	20,367	48.6%	17,105	44.4%	17,073	46.7%	17,131	45.4%	16,047	46.1%	-21.2%
Overall total	41,881	249%	38,564	244%	36,534	247%	37,760	245%	34,825	246%	-12.8%

Figure 3.2 – Progress to date with SG CMP carbon footprint (excluding carbon emissions from Marine Scotland research and surveillance operations).
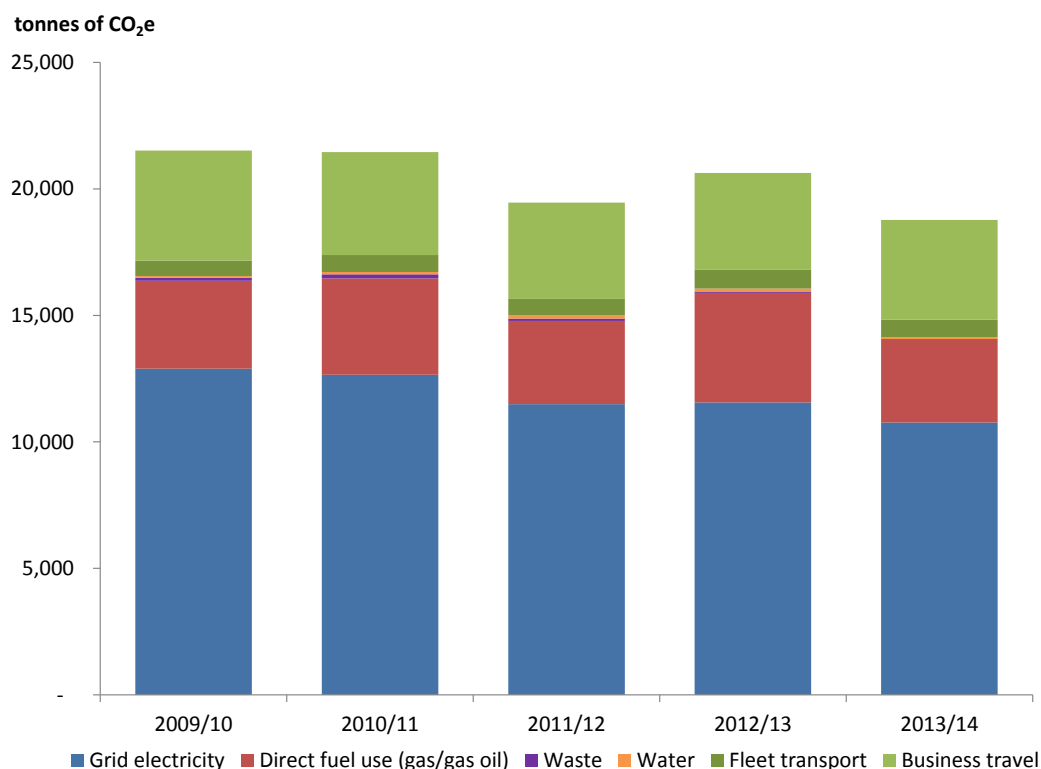

Table 3.2 shows the percentage change between the baseline year and most recent footprint year and provides a brief explanation of the reasons.

Table 3.2 –Change in footprint between baseline and most recent year.

Emissions source	% change (2009/10 to 2013/14)	Reason
Grid electricity	-16.5%	Part of this decrease is due to a reduction in the carbon factor for grid electricity, which decreased by 9% between these two years. The remaining reduction is a combination of a rationalisation of the estate and the impact of projects across the estate. It is worth noting these savings take into account the consumption increase at Saughton House of 61% due to the increased level of use of the data centre.
Direct fuel use (gas/gas oil)	-5.9%	Part of the decrease is due to a reduction in the carbon factor for gas and gas oil, which decreased by 2.6% and 2.2% respectively. The remaining reduction is a combination of a rationalisation of the estate and the impact of projects across the estate. It is worth noting these savings take into account the consumption increase at Marine Lab of 53% due to Ellis Building coming online.
Waste	-73.4%	A slight increase in waste tonnage has been more than compensated by improved segregation and recycling of waste, resulting in lower carbon emissions per tonne of waste produced.
Water	-8.1%	Water consumption is highly influenced by the scientific activities at Marine Laboratory and 2013-14 was a year of very low use at this site. This may not be replicated in future years. There has been an increase of around 15% in the carbon conversion factors for water supply.
Fleet transport	+14.5%	A rationalisation exercise and further investment has helped to reduce the overall carbon impact of the whole fleet.
Business travel	-9.2%	A culture change across the organisation, where staff avoid travel or choose lower carbon options, in part due to the availability of better internal conferencing facilities, has contributed towards a reduction in travel-related emissions. There has been a slight decrease in the carbon emission factors for air travel over this time.
Overall change	**-12.8%**	

In order to set a realistic and achievable carbon reduction target, it is important to know what the likely trend of the carbon footprint would be in the future, if no specific action were taken to reduce it, the 'business as usual' (BAU). This forecast helps the organisation to predict how much carbon would need to be saved annually to meet the future target and therefore assess if this is realistic. The future SG carbon footprint has been predicted by looking at the range of factors that could influence different emission sources within the footprint. The factors that have been included in the forecast are discussed below. More detail about the method used to estimate the future BAU footprint can be found in Appendix B.

Grid electricity - 3 factors have been included to forecast future emissions from grid electricity. Two of these are internal:

1) Reduction in the size of the core estate by 25% by 2016 will result in some buildings being taken out of the footprint and some staff movements to other buildings, resulting in changing patterns of consumption at different buildings
2) At the same time, there is forecast to be an annual growth in intensity of electricity consumption for IT and other equipment (estimated at 1% per year)

The third factor is external – the carbon intensity of the National Grid (measured in kg of CO_2 per kWh) is expected to decrease as more renewable energy is generated and also as existing coal-fired plant is retired due to the implementation of the Large Combustion Plant Directive. A cautious projection has been used to model the impact of the decarbonisation of the grid.

Direct fuel use (gas/gas oil) and water - direct fuel use will be affected by the strategy to reduce the size of the core estate by 25% by 2016 – as with electricity, there are likely to be changing patterns of consumption at different buildings.

Waste and business travel & transport fleet - emissions generated by staff activity will be affected by reduction in administration costs by at least 20%, however, the exact nature of the changes is not yet known and therefore this is currently left out of the BAU scenario.

Table 3.3 shows the baseline carbon footprint emissions next to the forecast emissions in 2019/20. This table shows that the emissions are forecast to reduce for all emission sources within the footprint, apart from water. It is recognised the baseline year of 2009/10 for water is not representative of the subsequent years: consumption of water increased significantly in 2010/11 due to the use of mains water, rather than sea water, for the Marine Scotland aquarium at the research facility at Torry in Aberdeen. The overall reduction in emissions is mostly due to forecast reductions in consumption, however decarbonisation of the grid provides an additional element to the forecast reduction in emissions from electricity use.

Table 3.3 – Forecast BAU for the SG CMP carbon footprint.

Emissions source	Estimated emissions (tCO$_2$e)		% between 2009/10 and 2019/20 (%)
	2009/10	2019/20	
Grid electricity	12,895	12,770	-1.0%
Direct fuel use (gas/gas oil)	3,474	3,125	-10.1%
Waste	114	92.3	-18.7%
Water	74	123.4	66.0%
Business Travel & Fleet	4,958	4,348	-12.3%
Total	**21,515**	**20,458**	**-4.9%**

Figure 3.3 shows the forecast trend in emissions for the 'Business as Usual' (BAU) scenario over the time period of the CM plan. The graph shows that from 2014/15 onwards the trend is almost static; although underlying this trend there are some factors that will tend to increase the carbon footprint and others that will tend to push it downwards; the overall net effect is to keep the BAU footprint fairly constant.

Figure 3.3 – Forecast trend in carbon emissions for the BAU scenario.
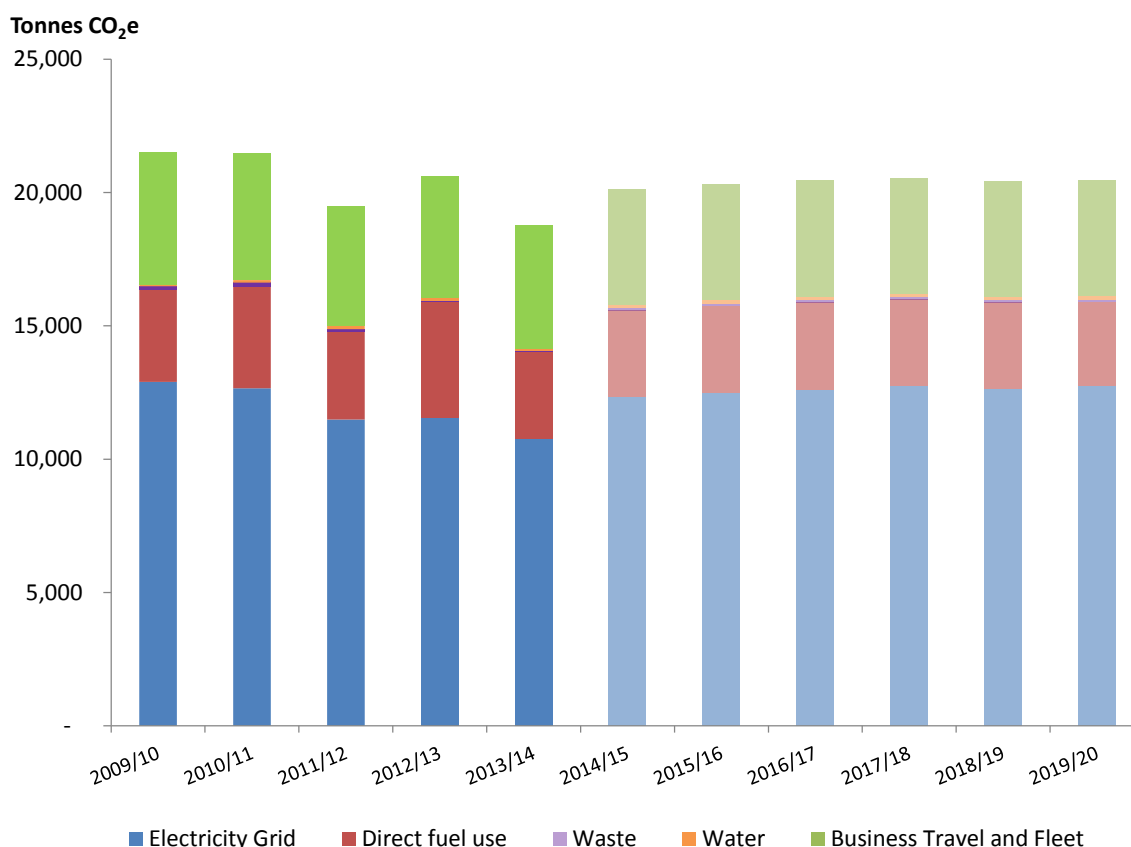
<u>Utility cost and expenditure forecast</u>

The forecast emissions from the various sources were used in combination with unit price forecasts to develop a utility cost and expenditure forecast for the 'Business as Usual' scenario. Table 3.4 shows how the SG expenditure on utilities and business travel is predicted to change between 2009/10 to 2019/20. This table shows that overall spend is likely to increase because prices are forecast to rise faster than consumption will decrease.

Overall, the price increase is estimated to be around 17% over the 11 year period; however, there is a great deal of variation between different areas, for example electricity expenditure is predicted to increase by 28% whereas expenditure on business travel is only predicted to increase by 11%.

Table 3.4 – Forecast BAU for the SG CMP utility costs.

Utility/other expenditure	Estimated spend (£ million)		Change between 2009/10 and 2019/20 (%)
	2009/10	2019/20	
Grid electricity	3,053	3,906	28%
Direct fuel use	717	619	-14%
Waste	122	258	112%
Water	76	132	75%
Business Travel & Fleet	4,880	5,435	11%
Total	**8,847**	**10,350**	**17%**

These costs include additional obligations such as the CRC which adds, at current prices, £12 per tonne of emissions for both grid electricity and direct fuel use. Figure 3.4 shows how utility/business travel expenditure is forecast to increase between 2009/10 and 2019/20. This graph shows the relative importance of minor emissions sources as proportions of the total cost **– waste, water and transport are jointly responsible for only 24% of the total annual carbon emissions, but 57% of the total annual cost.**

Figure 3.4 - Forecast trend in utility cost for the BAU scenario.
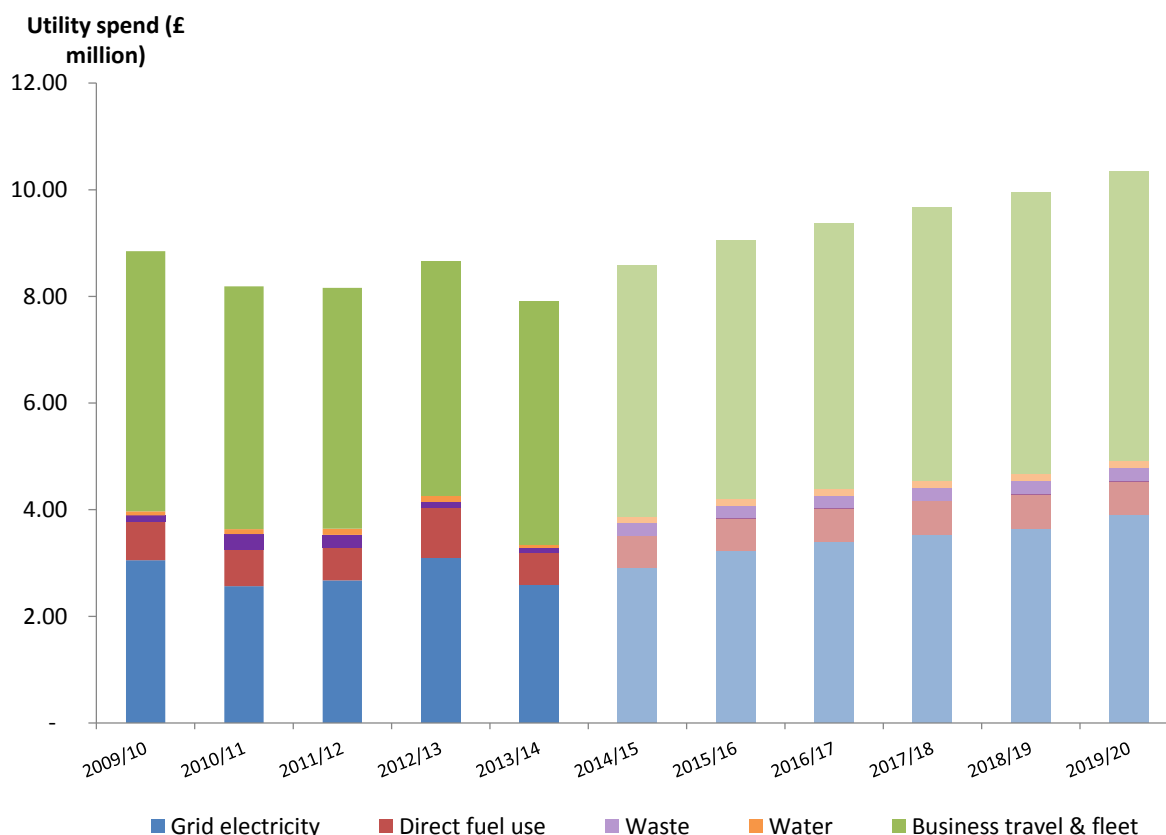
Value at Stake of the Carbon Management Plan target

In order to work out the Value at Stake (VAS) of the planned investment, the annual carbon savings from the projects described in Section 4 have been 'added' to the BAU scenario (because the projects produce savings, the net effect is to lower the predicted emissions).

This is shown in Figure 3.5 below, which demonstrates the forecast carbon footprint for SG if all the carbon reduction projects are successfully implemented. The blue line shows the target of 15% by 2014/15 and 30% by 2019/20. **This graph shows that there should be sufficient projects identified to meet, and potentially exceed, the interim carbon target in 2014/15, but further projects will need to be identified and implemented in order to meet the longer term 30% target in 2019/20.**

Figure 3.5 - Forecast CMP footprint with all carbon reduction projects implemented.

tonnes of CO$_2$e

Legend: Project plan | target (15% by March 2015 and 30% by March 2020)
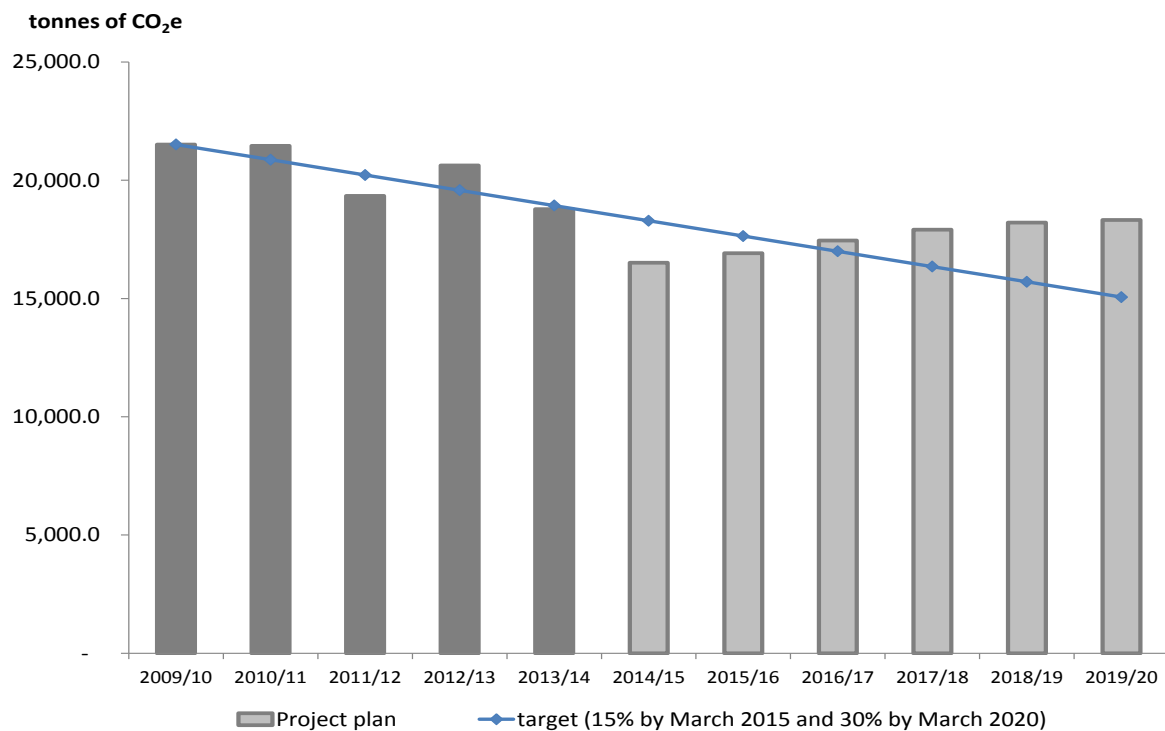
The final graph in this section shows the forecast utility and business travel spend for following three scenarios:

1) The **Business as Usual** scenario, where the SG does not invest in specific carbon reduction opportunities and therefore no action is taken to implement identified projects;
2) The **CMP project scenario**, where current list of carbon reduction opportunities is implemented successfully; and
3) The **Carbon reduction target scenario**, where the Scottish Government successfully implements existing and future carbon reductions in order to meet the 30% reduction target in 2019/20.

Figure 3.6 – Forecast utility and business travel spend for three scenarios.
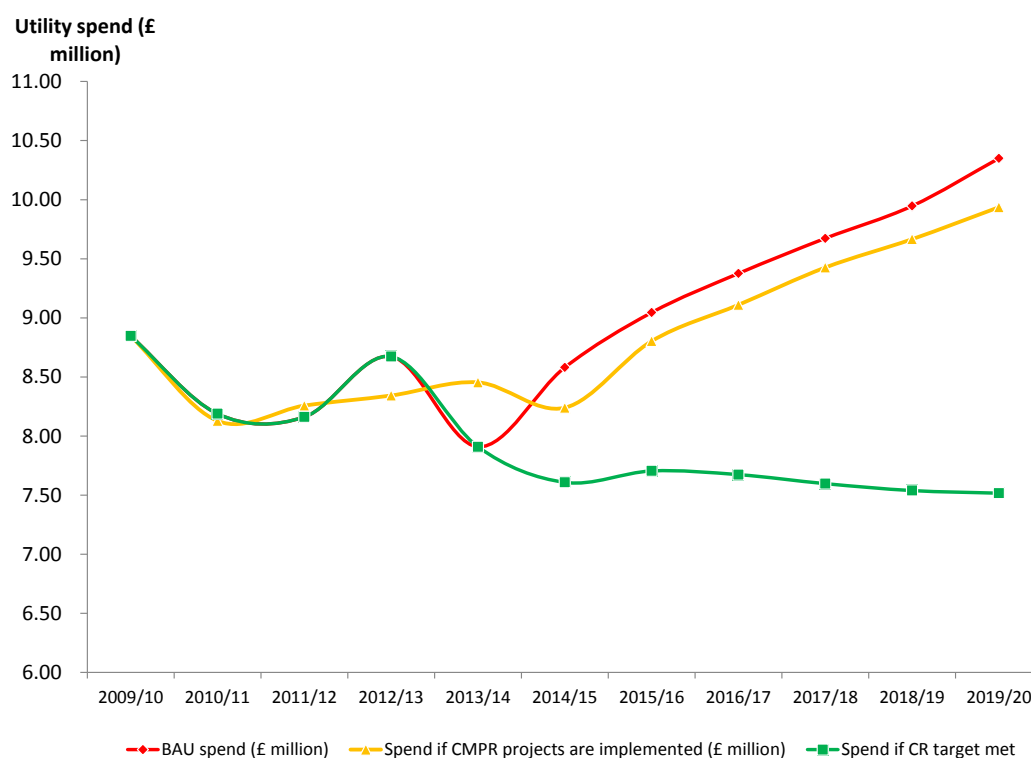
The 'Value at Stake' is calculated as the area gap between the BAU scenario and either the CMP project scenario or the carbon reduction target scenario. The total VAS for the whole target period is shown in table 3.5 below.

Table 3.5 – Value at Stake based on different scenarios.

	CM Plan project scenario compared to BAU	CM Plan target scenario compared to BAU
Carbon Value At Stake (total tCO$_2$e)	20,730	22,678
Utility/business Travel spend VAS (total £)	£3,831,000	£13,233,000

Therefore, it is estimated that by implementing the existing CMP project list, the SG will avoid expenditure of £3.8 million over the next six years, as well as reducing total emissions by over 20,000 tCO$_2$e. If the CMP targets are met, through the identification and implementation of additional projects, these figures should increase to over £13 million and over 22,000 tCO$_2$e.

These figures demonstrate how the CMP offers good value for money in terms of investment and helps tackle climate change. Delays in the predicted implementation dates currently recorded in the CMP Register will negatively affect any future cost avoidance forecasts.

4. Carbon Reduction Project Register

<u>Introduction</u>

All of the SG's identified carbon reduction projects have been collated and entered into the Carbon Trust's Carbon Management Projects Register (CMPR); this tool enables the organisation to track opportunities, compare cost effectiveness of different measures and determine whether they are likely to meet their carbon reduction target.

The current list contains 127 active carbon reduction projects, of which 54 are complete, covering all aspects of the CMP carbon footprint (apart from reduction opportunities relating to the marine operations). The project list has been identified through Carbon Trust audits, site surveys and maintenance programmes by the SG's maintenance contractor, and projects resulting from internal policies such as the Business Travel policy.

The CMPR is a live document and will be updated as part of the Carbon Management Plan processes. Table 4.1 provides an overview of the active projects currently in CMPR; this will evolve over the lifetime of this CMP.

Projects designed to reduce waste/water and travel emissions are generally less effective in terms of carbon savings, but produce large cost savings; projects to save energy tend to produce higher carbon savings but proportionally smaller cost savings. **For this reason, the SG strategy is to maintain a balanced mix of projects, seeking to identify and implement both carbon and cost saving opportunities**. (i.e. strategic policy, operational procedures, technological solutions, behaviour change, sustainable procurement etc.)

The CMPR tool also contains scheduling information in terms of project start and implementation dates. Table 4.1 shows when savings are likely to appear as reductions in the carbon footprint. The current register has the majority of the projects due to be implemented in the next three years so that savings will appear in the carbon footprint around 2014/15 and 2015/16. Details of the SG Carbon Management Project Register can be found in <u>Appendix C.</u>

Table 4.1 – Future scheduling of active projects.

Year of first saving	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Number of new projects	2	42	28	24	3	1	0	0
Cumulative carbon savings implemented	207	1,599	2,764	2,831	3,016	3,017	3,017	3,017

Successfully implemented projects taking SG towards targets

There are 54 low carbon projects identified as complete, which are calculated to save 1,706 tonnes of CO_2e annually. In addition to energy efficiency projects identified for inclusion in the project register, other projects that were commissioned for different reasons, will also have contributed to reducing the SG's emissions.. In the future, all opportunities will be registered in the CMPR in order to make sure that the SG can comprehensively track progress towards the carbon reduction target.

Table 4.2 shows the top 5 completed projects in terms of carbon saving. It should be noted that the lighting upgrade for Victoria Quay was not designed principally to save energy, but to upgrade the control software for telephone dimming capability and to meet mandatory lighting standards. However, a further benefit of the project was to reduce electricity consumption for the lighting of our largest office on the estate.

Table 4.2 – Top five completed projects in terms of carbon saving.

Top 5 completed projects in terms of carbon saving	Annual saving tCO$_2$ as per year 1)	Capital cost (£)	Annual fuel cost saving (as per year1)	Fuel saved	Annual fuel saving (kWh)
Interior Lighting Upgrade – Victoria Quay	198	3,000,000	45,300	electricity	409,000
Voltage Optimisation – Marine Lab	171	53,400	39,000	electricity	353,000
Voltage Optimisation – Saughton House	163	60,000	37,000	electricity	338,000
BMS HVAC Controls Upgrade – Atlantic Quay	106	209,950	21,000	electricity/ gas	90,000 /336,000
Car Park Lighting Upgrade – Atlantic Quay	54	12,287	12,500	electricity	112,000

Project Selection

The development of a project selection system would enable the best rate of return for low carbon projects to be realised for the investment made (tCO_2/£). In setting the priorities for project selection and before a project is authorised for implementation, many operational issues can be considered, such as cost/carbon policy, timeline, value for money, payback period, whole life-cycle costs, product/service quality and supply, business continuity, statutory obligations, operational resilience, health and safety, customer relations etc. In this respect, it could be said that no single selection system can be applied to all the potential low carbon projects currently identified on the CMP register. Consequently, the implementation of each project will continue to be considered on its own merits, to enable value for money to be achieved.

Project Processes

Facilities Services already has due diligence procedures in place to initiate and implement projects through the FM contract. When a client manager plans to carry out a project, the agreed procedure is for a "Works Order" to be raised requesting the contractor to develop and cost the proposal under the terms of the contract. The contractor then submits a project template which sets out the specific project details for consideration. The client manager is responsible for checking the project credentials to ensure the project deployment is justified, that it represents value for money and accords with the FM contract arrangements. Consequently, a "Project Authorisation" is issued to the contractor for the proposal(s) to be undertaken to the agreed specification, cost and timescale.

Project Procurement

Sustainability (environmental, social and economic) sits at the head of the 'value for money triangle' of cost, quality and sustainability which is at the heart of the Scottish model for public procurement. The Scottish Sustainable Procurement Action Plan encourages organisations to commit to sustainable public procurement.

Project Management

The Scottish Government Programme and Project Management – Centre of Excellence provides a focal point for programme and project management in the SG and also manages the SG Gateway Review and Starting Gate processes. Projects come in all shapes and sizes, but their delivery must adhere to our Programme and Project Management Principles. SG Managers can use the BAU/PPM Diagram to help decide the most appropriate approach. A Project Toolkit is also available to support those with a project to deliver.

SG Case Studies

The SG has piloted several emerging low carbon technologies to trial their performance in the workplace.   Subject to successful outcomes being evaluated, we will consider how these technologies can be replicated at other suitable SG managed sites.

The case study categories are as follows;

❖ Behaviour Change – Energy Monitoring at Endeavour House, Dundee.
❖ Renewables – Installation of Solar Panels at Saughton House, Edinburgh.
❖ Technical Solutions – Lighting Upgrade at Victoria Quay, Edinburgh.
❖ Corporate Policy – Sustainability and Utilities Procurement.

<u>Investment required to implement CMP Projects</u>

The total capital expenditure to date on complete projects has been around £2.3 million. Table 4.3 shows the estimated future investment required to implement the existing projects within the Carbon Management Project Register.

Table 4.3 – Investment required to implement currently identified projects.

Year of capital expenditure	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Estimated capital expenditure (£ million)	0.97	0.93	0.98	0.60			

The total investment for active projects over the next 4 years is estimated at around £3.6 million. This compares to the estimated Value at Stake of implementing the project list of £3.8 over the remaining reduction target lifetime (2012/13 to 2019/20). However, many of the projects will continue to provide savings further into the future.

The Carbon Management Project Register is managed by SG Facilities Services Division. The CMPR enables forecasting, comparisons of cost effectiveness of different measures, and monitoring of progress towards carbon reduction targets.

It also contains scheduling information for project start and implementation dates. This carbon management tool will play a central role in tracking emissions from five key sources (energy, waste, water, transport and travel) and will inform reports on our overall carbon footprint against the CMP targets. The project register will be updated and maintained by the appointed CMP Manager. As listed projects are completed the actual carbon reductions, costs and implementation dates will be recorded. The register will remain a fluid document and will require further projects to be identified and deployed in order to achieve the 30% target which represents an SG emission reduction of over 22,000 tCO$_2$e by 2020.

5. CMP Implementation

<u>Introduction</u>

A "Top Down" management approach is required to drive forward the CMP to give the operations the best possible chance of being implemented successfully. **Without a firm commitment from key decision makers within the People Directorate, the CMP operations will lack focus and credibility.** The revived reporting structure set out in this Plan seeks to engage the existing management structure in supporting, funding delivering and reviewing the effectiveness of the CMP.

The outcome of the CMP rests on the successful implementation of both processes and projects. This can only be achieved through year-on-year funding by SG and putting carbon management at the heart of decision-making across all the Directorates in SG. This section details the management structure and processes that will deliver the CMP measures and achieve the reduction target. Any future implementation of CMP measures should be aligned with the current accommodation strategy for the estate and other relevant corporate policy issues.

During the review of the Carbon Management Plan several operational improvement actions were identified which have been recorded on pages 32-35.

<u>CMP Mandate to deliver</u>

The CMP must deliver genuine carbon reduction results and be underpinned by a management mandate with clear governance. The mandate to deliver this CMP has to be based on the inclusion of the CMP in the HROD Divisional Plan 2012/15; this is a clear commitment at the highest level, reinforcing the need for action throughout the CMP hierarchy.

<u>CMP Governance</u>

In order to enable effective and on-going ownership of the CMP, it is important to define a governance structure. The governance structure for the SG carbon management plan is relatively simple. The CMT Team will have operational responsibility to deliver the measures required to achieve the carbon reduction targets. This team is chaired by the Facilities Services: Head of Delivery, who will be responsible for overseeing the implementation of the CMPI and reporting progress to the Resources Board.

The CMP will also be reviewed annually by the Resources Board. Work undertaken to implement the capital and maintenance programmes across the SG estate is reviewed at the monthly FM client/contractor meetings, when contractor representatives provide progress updates on projects approved by Facilities Services managers. Other Facilities Services project/contract meetings provide an excellent opportunity for the CMP objectives and interventions to be understood by stakeholders and encourage joint working to deliver carbon reductions and develop solutions to any potential operational challenges.

The Carbon Management Team (CMT)

The CMT comprises staff from a wide range of SG delivery areas and the FM contractor managers. A number of policy areas across SG have a role in delivering a complex range of environmental objectives. The overall aim of the Team will be to optimise the environmental performance of the SG estate though the implementation of CMP measures and increased staff awareness

The CMT will meet on a quarterly basis to:

- ❖ Manage the CMP operations and budget;
- ❖ Approve the implementation of CMP projects & behaviour change measures;
- ❖ Update the CM Project Register with any corporate BAU changes:
- ❖ Monitor emissions performance against estate targets;
- ❖ Produce an annual CMP report to be reviewed by the Resources Board;
- ❖ Support and promote CMP activities via Saltire & other communications; and
- ❖ Update the CM project register with new and completed projects, recording the expected carbon reduction and cost of installation.
- ❖ Allocate funds to implement the CMP measures year on year;
- ❖ Support the objectives of the SG Environmental Policy;
- ❖ Strive to embed low carbon policy measures across all Directorates;
- ❖ Increase staff awareness and encourage behaviour change across the estate;
- ❖ Provide a strategic link between the CMT and the Resources Board;
- ❖ Review CMP performance, reports, plans and publications; and
- ❖ Support the CMT by Identifying and resolving specific challenges faced in achieving environmental objectives and targets.

The Team will monitor the progress of a range of environmental projects and provide leadership to the CMP to ensure projects are consistent with SG aims, overcome difficulties and allocate adequate resources and priority to implement the CMP. The Chair will provide an annual progress update to the Resources Board.

The Resources Board

The Resources Board will be asked to review progress made with the CMP against the estate carbon reduction targets and consider the financial support required to continue to develop and implement the measures outlined in the Plan. Our carbon performance will be monitored and financially supported through a robust management reporting structure linking the roles of the Carbon Management Team and the Resources Board to ensure we are visible participants in the public sector and to ensure that social, environmental and economic implications are taken into account in all our policies.

The key roles of the Board are to:

❖ Annually review the estate carbon management performance against the reduction targets;
❖ Provide support and funding to enable the development and implementation of the CMP;
❖ Inform the CM Team of any future policy or strategy implications that would impact on the estate boundary and carbon footprint; and
❖ Broker cross-policy support from other Directorates to deliver the CMP.

CMP Funding.

Under the current SG budgetary constraints, opportunities for ring-fencing money year on year to spend on specific emissions reduction projects are limited. The primary route for achieving emissions reductions will be through building sustainability into spending decisions by considering the carbon impact of all major projects. As well as technical interventions, there are real savings to be made by strategic cultural changes across the organisation. Engaging with other policy areas may be the key to unlocking additional funding for low carbon projects and the overall effectiveness and success of this CMP.

Over the last decade, Facilities Services has funded work to improve our energy efficiency across the estate. Many of these improvements have been introduced as part of planned maintenance regimes or building refurbishment projects. In addition to this on-going estate work, over £1 million has been invested by the Energy Directorate in energy efficiency projects between 2011/12 and 12/13.

Table 5.1 – Estimated lifetime carbon savings resulting from Tranche 1 & 2 funding.

Estimated lifetime savings (tonnes CO_2e)	Tranche 1	Tranche 2
Gas	925	421
Electricity	2,124	4,850
Total	**3,049**	**4,515**

Changing the way services are delivered

Building on existing relationships between Energy, ISIS (IT), Climate Change and Property areas and continuing to develop cross - policy working to ensure the low carbon agenda is introduced throughout the SG is the key to unlocking the full carbon reduction potential. Other key policy areas such as Behaviour Change, HR, Environment, Built Environment, Procurement and Transport Scotland also have a role in helping to improve our estate performance and promoting sustainability.

There are also savings to be made through raising staff awareness on how to make more efficient use of the facilities provided. The SG is reviewing the way it encourages environmental **behaviour change** amongst its staff. It is currently researching different models using the "Better Business: How to go greener with staff

to improve performance" guidance. Technical improvements will be complemented by behaviour change initiatives as we work alongside contractors and colleagues to ensure our operations can be delivered in the most sustainable and efficient fashion.

http://www.scotland.gov.uk/Resource/0038/00389489.pdf

A new **Facilities Management** contract was awarded in 2012, which can be called upon by other eligible SG agencies and NDPBs. This contract will drive further operational improvements in building management, cleaning, space utilisation and property data collection. In addition, other contracts are in place to provide efficient and sustainable catering, and waste recycling services at major sites, where it is economical to do so.

Sustainable Construction - Future SG estate projects will be undertaken using the Royal Institution of Chartered Surveyors Ska Rating assessment scheme, devised to manage office refurbishment projects using sustainable best practice procedures. In the case of new-build construction projects, we will continue to aspire to the best environmental rating we can achieve in particular circumstances, but accept that in some localities and property markets the best available option may not be a Building Research Establishment Environmental Assessment Method (BREEAM) "excellent" rating.

Sustainable Travel – During 2010/11, we reviewed our Travel Plan and developed a more strategic document which aligned Travel with both the Carbon Management Plan and Climate Change (Scotland) Act 2009.

http://www.scotland.gov.uk/Resource/Doc/206159/0054789.pdf

The SG **Travel Strategy** includes a travel hierarchy that encourages staff to avoid travelling where possible, through the use of video conferencing, and promotes walking, cycling and the use of public transport. **Air travel within the UK should only be undertaken as a last resort**. As part of our commute to work initiatives the SG offers salary sacrifice schemes for the purchase of bus and train season tickets and the purchase of bicycles. There is also a car sharing scheme and staff are encouraged to share taxis, where possible.

http://www.scotland.gov.uk/About/travel-strategy

Transport - The SG aims to reduce the average vehicle CO_2 level to below 130 g/km, as cited in the UK "Meeting the Energy Challenge" Energy White Paper. This aim was published in September 2011. Currently, the SG vehicle fleet replenishment policy is to consider a replacement when a vehicle has reached 80,000 miles or six years of age. The replacement decision depends on the condition and history of the

vehicle. The replacement vehicle must be fit for purpose and offer a significantly lower CO_2 output than the vehicle being replaced.

Our procurement policies and strategy ensures good procurement is sustainable procurement and will contribute to more and better employment opportunities for our citizens and to a reduction in the impact of our consumption and production.
The Scottish Sustainable Procurement Action Plan (2009) encourages organisations to commit to sustainable procurement.

http://www.scotland.gov.uk/Publications/2009/10/sspap#a3

Table 5.2 – CMP Action Plan.

No.	CMP Aim	Action	Owner	Priority	Timing
1	Adopt a strategic approach to managing the CMP.	Revive the CMP reporting structure to inform & engage senior management.	RB+ CMT	High	On-going
2	Set a corporate goal to enable SG to reduce its estate footprint and support climate change targets.	Include the implementation of CMP as an objective in the annual HROD Divisional Business Plan.	CMT	High	Annual
3	Investigate all potential internal and external funding support for CMP activities.	Broker meetings with key Directors and contractors to discuss joint funding options.	CMT	High	On-going
4	Secure year on year funding to implement CMP projects. (secure, allocate & approve)	Develop a 7 year funding strategy to Implement the CMP measures.	CMT	High	Annual
5	Continue to monitor SG carbon footprint against CMP emission reduction targets.	Adopt the CMPR modelling tool to inform SOSG quarterly updates and annual reduction target forecasts.	CMT	High	On-going
6	Track CMP progress and footprint performance.	Update the CMP Register to record project outcomes and BAU changes. (actual carbon/cost/implement date)	CMT	High	Quarterly
7	Replenish the CMP register with new carbon reduction policies and measures.	Invite staff, contractors, the CM Team and SOSG managers to identify further carbon reduction measures.	CMT	High	Quarterly
8	Optimise carbon reductions by reviewing CMP travel and transport policy/strategy.	Liaise with Transport Scotland staff to consider adopting further sustainable business travel and transport policies.	CMT	High	Bi-Annual

No.	CMP Aim	Action	Owner	Priority	Timing
9	Engage all SG Directorates to deliver carbon reductions through behaviour change.	Work collaboratively with MITIE and Corporate Comms to develop an effective staff awareness campaign.	CMT	High	On-going
10	Establish bespoke CMPR training for FS/MITIE staff.	Connect to the Resource Efficiency Scotland support programme.	CMT	High	Now
11	Enable the best projects to be selected for CMP deployment.	Develop a project priority system using the CMPR tool to selected the best VFM projects for deployment.	CMT	Medium	On-going
12	Ensure cross-policy working with other Directorates to develop and introduce low carbon policies and measures.	Encourage members of the SOSG and Resources Board to identify, support and implement wider corporate carbon reductions.	CMT + RB	Medium	On-going
13	Embed low carbon/sustainable policy into future SG contracts to deliver corporate benefits.	Liaise with Procurement staff to review tender specifications and assessment criteria to deliver improved carbon performance.	CMT	Medium	On-going
14	Agree the CMP waste & water reduction targets for the estate	Consider baseline data and adopt new reduction targets as outlined on page 23 in line with new waste recycling and water conservation practices.	CMT	Medium	Now
15	Review Marine Scotland research and surveillance operations.	Work with MS to consider fleet fuel usage and future footprint reductions.	CMT	Medium	On-going
16	Review FS/MITIE data collection procedures to produce accessible & accurate reporting information.	Undertake a data mapping exercise and develop a data handling strategy.	CMT	Medium	On-going

No.	CMP Aim	Action	Owner	Priority	Timing
17	Standardise carbon emissions data to align with SG reporting obligations.	Review emission source data and SG reporting criteria.	CMT	Medium	On-going
18	Develop Case Studies from successful pilot projects.	Use Case Studies to engage staff and replicate best practice projects across the estate	CMT	Low	Bi-Annual
19	Use the SG self- assessment ratings to improve FS policy and procedures.	Focus corrective action on all CMAT categories with a rating of 25% or less	CMT	Low	On-going
20	Annually review the CMAT ratings for SG.	Undertake a self- assessment workshop to evaluate CMP progress.	CMT	Low	Annual
21	Improve the resilience of CMP operations and management.	Develop and implement Standard Operating Procedures for CMP tasks.	CMT	Low	On-going
22	Standardise SG environmental performance reporting.	Update GOLSPIE site and publish CMP + relevant environmental info.	CMT	Low	Quarterly
23	Review the Scottish Government 2013 CMP.	Refresh the CMP to take account of BAU policy & footprint changes.	CMT	Low	Mar 2016

CMP Standard Operating Procedures

We aim to develop and implement Standard Operating Procedures (SOPs) for key CMP activities, to enable robust and resilient management of the CMP. SOPs will be developed by Facilities Services and MITIE staff to clearly define the steps involved to undertake the following activities: Reporting the SG annual carbon footprint; Updating the Carbon Management Project Register ; CMP Funding; CMP Management; and CMP Implementation.

Setting out SOPs for these key CMP activities will clarify the relevant staff roles and responsibilities for specific CMP tasks to be implemented. When introduced in practice, the SOPs will help facilitate the continuity of business operations in the event of future staff changes within Facilities Services and/or MITIE.

6.Behaviour Change

 The development of a behaviour change campaign is an important area of work. It will play a vital role in improving our overall carbon performance year-on-year. The best carbon reductions over the target period can be achieved by implementing a co-ordinated and effective campaign in parallel with this CM Plan. We are already working with our Behaviour Change and Corporate Communications colleagues to provide an environment for encouraging cultural change of staff and contractors, in order to reduce our carbon emissions and running costs.

We started work on behavioural change by looking at business flights. Flying on business is a significant contributor to our carbon emissions. We believe changing the behaviours of our people will help reduce these emissions. With this in mind, we held a behavioural change workshop in June 2014 using the ISM behavioural change tool to assess all of the behavioural influences on people taking business flights from Edinburgh/Glasgow to London. Using information from the workshop, we held a further meeting to identify potential improvement projects that can be taken forward. We are now looking to pilot improvement projects identified at the meeting with a view to rolling-out successful ones across the SG.

We intend to hold further behavioural change workshops/improvement project meetings as we identify key areas to tackle.

Another key component of our behavioural change efforts will be the work of our network of Environmental Champions. We see our Environmental Champions as a valuable resource in our efforts to promote environmental awareness and to encourage the people they work beside to change their behaviours to act in a way that considers environmental and sustainable issues.

To boost the numbers of Champions across our estate we carried out a recruitment drive in the Summer of 2014 and arranged environmental awareness training sessions for them in the September/October 2014.

Going forward we will be looking for our Environmental Champions to complete an Action Plan. These plans will outline activities that they are going to take forward to help reduce our carbon emissions. They will include activities such as switch off campaigns, recycling awareness sessions, and the promotion of the SG's travel hierarchy, advising the people they work of possible alternatives to travel such as telekits/ video conferencing. The Action Plans will be logged and tracked by the Environmental Management Team to ensure that they are fully supported and kept on track.

The CMP project register is a mixture of both technical interventions and behaviour change initiatives that require participation and co-operation across the organisation. The development and delivery of both the CM Plan and our Behaviour Change campaign will be managed by the CM Team.

7. Conclusions and Summary of Findings

It is important that SG is able to demonstrate consistent carbon footprint reductions for its own estate and is seen to support the aims of RPP2 in making a valuable contribution towards meeting the climate change targets set by Scottish Ministers. The implementation of the CMP now requires significant and sustained support at Directorate and Divisional level, if our emissions footprint is to be reduced to meet the CMP targets.

The forecast emissions from the various SG sources were used in combination with predicted future prices to develop a utility cost and expenditure forecast for the 'Business as Usual' scenario. SG spend on utilities and business travel is predicted to increase significantly between the baseline year and the target year (2019/20) as prices are forecast to rise faster than consumption will decrease. Overall, the price increase is estimated to be around 17% over the 11 year period.

Although Marine Scotland's research and surveillance emissions account for 50% of the total SG CMP carbon footprint, and are therefore an important part of our climate change impact, they present a problem in terms of setting targets because they are closely related to variable marine activities and weather conditions. Indeed, large increases in the research and surveillance fuel consumption could reverse any reductions made by buildings or travel. Therefore, Marine Scotland research and surveillance fuels have been excluded from the footprint in terms of forecasting and target setting.

Recent modelling of our estate carbon emissions, past, present and future, shows that our original carbon reduction target of 30% by 2020 is realistic and should be retained. A new interim target of 15% by March 2015 has been adopted, based on the revised baseline year of 2009/10, which reflects the significant increases to our estate. These targets are achievable, provided investment is made year on year until 2020 to implement all the low carbon measures identified in the CMPR.

The cost of implementing the 100+ carbon reduction projects identified in the current CMP register is estimated at £3.6 million. A CMP investment strategy is required to enable funding to be secured and allocated to implement low carbon "spend to save" measures over the next 6 years. The current CMP register of projects will have to be replenished in order to deliver the necessary emission reductions by the 2020 target.

It is estimated that by implementing the current CMP project list, SG would avoid expenditure of over £3.8 million between 2009/10 and 2019/20, as well as reducing total emissions by nearly 21,000 tCO_2e. If the CMP targets are met, these figures would increase to £13.2 million and over 22,000 tCO_2e. These figures demonstrate how the CMP offers good value for money in terms of investment.

Reducing the environmental impacts from our business travel and our use of energy will produce significant reductions in the overall running costs of the organisation. Avoiding a tonne of carbon now will cost significantly less than doing so in 2019/20, based on the projected increases in the cost of energy, transport fuel, water charges, business travel, CRC payments, equipment costs and landfill tax.

Integrating the CMP funding and implementation into the HROD Business Plan will also require a realistic level of Facilities Services Environmental Management staff to enable the activities to be managed across the estate. Putting low carbon at the heart of our business will also require an innovative and sustained staff awareness campaign to successfully bring about behaviour change throughout the workplace to help reduce our carbon footprint and to underpin our wider SG environmental policy objectives. Co-ordinating these campaign activities will also require staff resources.

The revived CMP reporting structure clearly defines the roles for tracking progress, reviewing performance and resolving any implementation challenges. The CM Team has primary ownership of the Plan and will manage the day to day operations. The Team has the key role to record CMP outcomes and provide quarterly performance reports to the Resources Board. The CMT has a role to monitor progress against targets and allocate the required resources to implement the CMP. The Resources Board has a strategic role to secure and approve the necessary resources and annually review the effectiveness of the CMP.

Year-on-year carbon footprint reductions will enable us to provide stronger responses to Ministerial correspondence, briefing requests, mandatory carbon reports, Parliamentary Questions, FOI replies & Press enquiries. Continual reduction of our carbon footprint will bring high profile environmental, financial and reputational benefits and set a good example to other public and private sector organisations.

	Summary of the key CMP review findings.
1	Original interim target was 20% by 2014, based on 2007/08 baseline.
2	Estimated cost savings since baseline year 2007/08 - £1 million.
3	New baseline year of 2009/10 adopted for 2013 refreshed CMP.
4	New interim carbon reduction target set at 15% by March 2015.
5	Original long term carbon reduction target retained at 30% by 2020.
6	Investment made in energy efficiency over the last 3 years - over £2.3 million.
7	Lifetime carbon savings anticipated from tranches 1&2 funding – 7,564 tCO_2e
8	Current estimated cost of implementing CMP projects - £3.6 million.
9	SG costs avoided by implementing all CMP projects - £3.8 million.
10	Estimated potential cost avoidance to SG if 2020 target is met - £13.2 million.
11	Overall, utility & travel spend is set to increase by 17% over 11 year period.
12	Travel represents 10% of carbon footprint, but 43% of our composition spend.

Appendix A – Carbon Footprint Methodology

Methodology

Measurement is a vital part of managing greenhouse gas emissions, enabling us to understand how much is released and from which activities The Scottish Government completed 7 years of its operational Carbon Footprint (2007/08, 2008/09, 2009/10, 2010/11, 2011/12, 2012/13 and 2014/15). The carbon footprint is produced in-house with the contribution of data from a variety of sources. The footprint covers the following greenhouse gases:

- ❖ **Carbon dioxide (CO_2) –** the dominant greenhouse gas, emitted directly from burning of fuel for heating and transport and indirectly from electricity use in our assets and buildings and business travel;

- ❖ **Methane (CH_4) –** produced in small quantities from direct burning of fuels and generation of electricity and also from the disposal of wastes to landfill and treatment of waste water;

- ❖ **Nitrous Oxide (N_2O) –** produced in small quantities from direct burning of fuels and generation of electricity and also from the disposal of wastes to landfill and treatment of waste water.

Greenhouse gases are converted to a common 'currency' of carbon dioxide equivalents. Both methane and nitrous oxide have a higher global warming impact per molecule than CO_2 (for example 1 tonne of methane is equivalent to 21 tonnes of CO_2) and therefore converting these gases into CO_2 equivalents allows for simple comparison between emission sources.

Uncertainty/data improvement

As with all carbon footprints there are uncertainties within the overall footprint. The main sources of certainty and uncertainty include:

- ❖ **Measurement accuracy of consumption/production**:

  - o <u>High</u> – Utilities that are metered half-hourly, including electricity, gas and many water supplies. Accuracy can be assessed by requesting information about the meter class from the supplier.

  - o <u>Medium</u> – Fuel consumption of vehicles is measured directly, through invoices via fuel cards for vehicles. This requires suitable operating procedures to make sure all fuel is paid for and recorded using those methods. Waste is segregated off-site and tonnage information for individual uplifts across several different waste streams and disposal routes is now provided by the waste management facilities. Accuracy can be assessed by conducting waste journey audits to reveal the measurements behind waste composition. Energy consumption that is not measured through half-hourly metering is based on less regular

meter inspection. Accuracy can be assessed by checking consumption trends against previous periods.

- o Low - Unmetered data is usually less accurate and third party emissions depend on the ability of internal systems to accurately record when an activity is occurring. Business travel relies on travel agents reporting mileages, or internal estimates based on cost, and accuracy can be assessed by auditing journey information and the internal calculation procedures. Sites with unmetered water consumption may be either estimated or omitted owing to their small contribution. Waste streams that are outside the main waste management contract often require broad assumptions of the weight of individual items, although the counting of those items is likely to be highly accurate.

- ❖ **Data conversions** – Some data will be ready to use, e.g. kWh of electricity from half-hourly meters, and therefore no uncertainty will occur at this stage. For other data such as waste where the number of items requires conversion to a tonnage, or cost to an equivalent mileage, uncertainty can occur.

- ❖ **Emissions factors** – These are usually beyond the control of an organisation because emission factors are calculated for the UK as a whole by DECC/Defra. For direct emissions, such as burning natural gas, these factors are highly accurate. For indirect emissions, e.g. waste, water, grid electricity, and vehicles, there is likely to be some uncertainty in the emission factor because processes and activities are measured across the UK and averaged.

It not possible to eliminate uncertainty completely within the reported carbon footprint and it is good practice to report a quantitative or qualitative assessment of the uncertainty with the footprint.

It is also good practice therefore to undertake a regular programme of data improvement to reduce uncertainty and improve both quality and accuracy. This programme should be pre-determined and evaluated post-implementation.

Data Sources

Energy ICT - Under the SG Facilities Management contract, the SG's maintenance contractor operates an Energy Bureau utilising the Energy ICT (Remote Monitoring & Targeting) system to provide energy management and bill validation services. This ensures that energy performance is closely managed and utility accounts are checked against meter readings, prior to accounts being settled with utility supply companies. SG sites and utilities meters are loaded onto Energy ICT and data is populated directly from the supply companies. The SG's maintenance contractor provides performance reports and comparisons of this utility data on a monthly basis which is presented to FS managers.

Billing - The bill validation process for gas, electricity and water supplies are undertaken by the SG's maintenance contractor's energy bureau team. Oil bill validation is undertaken by the energy manager assigned to the SG contract. The

bills are received at the energy bureau from the various suppliers as either e-bills, access to bills on suppliers web sites or scanned copies of bills via the SG accounts team. The invoice and consumption data is recorded on Energy ICT which also holds the tariffs for each supply and automatic updates of half hourly data (HHD) from smart meters. The bill validation process recreates the bill within Energy ICT, applying the bill consumptions to the known tariffs to create a dummy bill; this bill is then compared to the actual charges to ensure the monetary values match.

The HHD is then used to ensure the consumption level indicated on the bill matches that seen through the HHD. If both these checks correspond, then the invoice is approved for payment and the energy bureau issues a report to SG accounts indicating the invoice is approved for payment. If bill discrepancies are found, figures are challenged with the supplier. Consequently, the Energy Manager and Bureau Team are informed of any metering or tariff changes. For sites where there is no HHD, the invoice is checked against the applicable tariff and then a comparison against previous consumption is made to ensure there are no consumption exceptions.

Vehicle Fleet – Scottish Government vehicles are managed by the Motor Services team and are purchased in accordance with the sustainable procurement policy. Vehicle mileage and fuel purchased for each journey are manually logged by staff. Invoices are supplied to the SG by fuel companies through the associated fuel card for each vehicle.

Each vehicle log sheet is collated by Motor Services and details are recorded in a fleet management database. The vehicle information is used to assess the need for vehicle replenishment and to monitor fleet performance. Headline information on the fleet is currently forwarded to members of the Carbon Management Team for reporting purposes.

Data Management Systems

The Scottish Government collects a wide range of consumption information which is used for annual carbon reporting purposes.

❖ The monitoring and targeting system, Energy ICT, captures around 80% of utility data (electricity, gas and water) which is also made available to the public automatically through the GOLSPIE portal.

❖ A bespoke internal database is in operation and currently includes management information on:

  o our buildings (location and occupancy);

  o our organisation (as a financial hierarchy);

  o utilities (electricity, gas, oil and water);

  o waste (arisings and disposal routes); and

  o business travel (contracted and non-contracted).

Appendix B – Details of BAU carbon and financial model

What is Business as Usual (BAU)

Business as Usual is the normal execution of standard operations within an organisation, particularly in contrast to a project or programme which would introduce change. In the context of carbon management, this means that BAU represents an estimate of what the overall carbon footprint of the Scottish Government (based on the current footprint boundary) is likely to be in future years in the absence of the Carbon Management Plan.

This BAU scenario needs to take into account internal and external growth factors that are likely to affect the carbon footprint over time. Although an overall carbon footprint is a single figure, in reality it is a complex underlying calculation, with different emission sources affected by these factors in different ways. Table 9 shows a sample of some of the key factors identified that affect BAU.

Table E.1: Examples of key internal and external factors impacting on BAU.

External factors		Internal factors	
Electricity grid carbon factor - the factor applied to convert units of kWh of electricity consumed to a figure of carbon dioxide equivalents emitted.	The grid factor changes year on year due to a variety of external factors outside of the organisation's control including relative prices of different fuels for power generation. Over a longer period of time, the grid factor will change due to energy policy and the relative contribution of different generating capacity e.g. increased percentage of renewables. The aim of energy policy is to reduce the carbon intensity of the grid and this can therefore have a large effect on the overall footprint of an organisation	**Energy intensity of service provision**	The energy used per staff member is likely to change over time, due to efficiency of equipment, nature of services delivered and energy intensity of IT use. This is one of the areas that are particularly difficult to model at this point in time and it is likely that this will require further studies to effectively model
		Estate changes	Over time organisations increase or decommission their estate in order to meet the requirements of population served. The more this can be modelled with real data e.g. known floor areas or energy efficiency data, the more accurate this forecast can be.

Why is it important to model BAU?

Previous carbon management programmes have used a single annual percentage growth figure of 0.7% for the carbon footprint to represent BAU, usually indicating an underlying growth in energy consumption of organisations over time. However, as carbon management has become more sophisticated, organisations have become aware that this is not necessarily accurate. Furthermore, by failing to model BAU, carbon managers cannot clearly demonstrate progress against targets and value for money for the carbon management programme, which in turn has a knock-on effect on internal investment.

If an organisation's BAU carbon footprint is actually increasing faster than anticipated, the efforts of the carbon management team would be underestimated. Conversely if the BAU is actually decreasing, the organisation might under-invest because the footprint is already reducing, causing the organisation to miss out on possible cost and carbon savings that are achievable. An accurate model of the BAU can help the Carbon Management Team explain the impacts of the CM plan and better identify the most effective carbon reduction measures. Sophisticated models of BAU also provide a more critical look at which parts of the footprint are increasing and decreasing over time and this, along with financial models of the costs of fuels and services such as waste and water, can help organisations make better strategic decisions for future investment.

How was BAU modelled for the Scottish Government?

In order to more accurately model BAU, an Excel spreadsheet was developed and used. The starting point was the most accurate and up-to-date carbon footprint for the organisation (2011/12 footprint of 19,343 tCO_2e). This footprint was classified down to the building level and the fuel source. A set of key BAU growth factors was developed with the Carbon Management Team and these factors were applied to the relevant sources within the footprint (e.g. anticipated changes to the UK grid electricity factor are applied only to electricity consumption).

Growth factors

The following growth factors were applied:

1) A conservative estimate of the UK grid electricity factor, which was based on a linear regression of the historic Defra/DECC figures from 2002 (which was after a large reduction in the emission factor from the switch from coal to gas) to 2010. The conversion factor for grid electricity includes both generation and transmission and distribution losses.

2) Estate changes based on discussion with the Carbon Management Team. The modelled changes included complete or partial closure of buildings and consequent movement of staff to other buildings in the SG estate.

3) Annual increases in electricity demand through increasing IT/equipment consumption were estimated at 1% per year increase for electricity in staffed buildings.

The spreadsheet thus calculates the overall estimated carbon footprint for the organisation in future years. This information was used in the CMP to forecast 'Value at Stake', confirm targets, and determine the scale of carbon saving projects required to be implemented.

Future modelling of BAU

BAU models are likely to change over time as the Scottish Government understands and incorporates more internal factors in its BAU model, especially in terms of in-depth understanding of future estate/staff/delivery model changes. There is also likely to be better information available about external factors, especially the carbon conversion factor of grid electricity which could be a key contribution to future carbon reductions. Therefore, it is recommended that BAU forecasts are updated on a yearly basis to help understand where best to allocate resources and effort in future.

Financial modelling and VAS

To get a more accurate picture of how the Scottish Government's utility and expenditure costs are likely to change over time, the BAU footprint is used to estimate consumption (converting from carbon back to units of consumption). These are then used along with forecasts of future unit prices (DECC, 2013)[1] to calculate total spend on utilities and other expenditure. Where available, actual known unit prices are incorporated into the near-term forecast.

Utility/expenditure	Unit	Current estimated unit price (2013/14)	Estimated unit price in 2019/20	% change
Electricity	p/kWh	11.08	14.50	+31%
Natural gas	p/kWh	3.20	3.37	+5%
Gas oil	p/kWh	6.15	6.58	+7%
Waste	£/tonne	195.50	213.80	+9%
Water	£/m^3	1.04	1.13	+9%
Diesel	p/ltr	140.6	150.0	+7%
Petrol	p/ltr	133.3	142.2	+7%
Business travel – air	£/tonne CO_2	748	894	+20%
Business travel – rail	£/tonne CO_2	2614	3121	+19%
Business travel – car	£/tonne CO_2	571	683	+20%
Business travel – other	£/tonne CO_2	1,584	1,892	+19%

As with the BAU, it is recommended that financial forecasting is repeated on an annual basis so that more accurate unit prices and future forecast emissions can be

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[1] Real Energy Prices: 2000-2030, DECC Updated Energy & Emissions Projections – September 2013

incorporated. Accurate financial forecasting will ensure that the Scottish Government can make strategic investment decisions based on the best available information.

Appendix C – Scottish Government Carbon Management Project Register

The Carbon Management Project Register enables opportunity tracking, comparisons of cost effectiveness of different measures, and monitoring of progress towards carbon reduction targets. It therefore also contains scheduling information for project start and implementation dates.

At present the CMPR tool contains over 100 separate low carbon projects proposed for implementation. The CMPR tool is managed by SG Facilities Services Division.

Examples of the projects currently contained in the CMPR:

Electricity
Data Centre – Replacement fans to CRAC units – Saughton
Data Centre - Space conditioning – Saughton House
IT: Server Cooling Control – Marine Lab
IT: Pay as You Go Web Conferencing
IT: Terminals for hot desks to reduce power and faster log-on for users – All sites
IT: Virtualisation of the DMZ servers – 50 outward facing physical servers with individual UPS and Screens
Installation of LED lamps in corridors – Saughton
Replacement of T8 Lamps with LED linear tubes
Installation of LED Lights in Offices – All sites
Lighting replacement – St Andrew's House
Portico Lighting – Victoria Quay
Pool lighting upgrade – Victoria Quay
Fit PIR Sensors in Common Areas – Cameron House
Switchroom PIR control – Saughton House
Split A/C Control – Victoria Quay
Variable Speed Drives on AHU Fans – Atlantic Quay
Variable Speed Drives on AHU Fans across estate
Variable Speed Drives on Nigg Bay pumps – Marine Lab
Variable Speed Drives for pool pumps – Victoria Quay
Voltage Optimisation – Leith File Store
Voltage Optimisation – Faskally
Voltage Optimisation – Tweedbank
Voltage Optimisation – SASA

Gas, Oil and Heating
BMS Installation – Cameron House
Building A/B BMS upgrade – Marine Lab
Server Room Humidity and Temperature Control – Atlantic Quay
Boiler Upgrades: Fully Modulating burner
Building A/B Boiler replacement – Marine Lab
Replace Store boiler and radiators – Unit 4A Bonnington
Separate Poolside boilers – Victoria Quay
Improved control of lower floor boiler – Cameron House
CHP Installation – Victoria Quay
Small Scale CHP for Pool Heating – Victoria Quay
Replace Direct Fired Heaters – Unit 4B Bonnington
Direct gas DHW from boilers (Plate or Calorifier)
Block C Domestic Water Heater Replacement – Marine Lab
Block C Domestic Water Heater Replacement & Solar – Marine Lab
Install new condensing DHW heaters – St Andrew's House
Direct Fired DHW provision – SASA
Double glazing for old East building – Faskally
Replace failed double glazing units – Saughton House
Pool cover – Victoria Quay
Replace Single Pipe Heating System – Strathbeg House
Review Thermal Comfort Guidance/Criteria

Renewables
Biomass Boiler self-sustaining - greenhouse/horticulture building – SASA
Biomass Boiler – Thainstone Court
Biomass Boiler – Faskally
Ground Source heat pumps for heating glass houses – SASA
Solar PV – Saughton House
Solar PV – St Andrew's House
Solar PV – Thainstone Court
Solar PV (subject to survey) – Victoria Quay
Solar Heating – Atlantic Quay

Solar Heating – St Andrew's House
Solar Heating – SASA
Solar Heating – Thainstone Court
Solar Heating for existing electric immersion heaters
Water source heat pump for Swimming Pool Plant – Victoria Quay
Water source heat pump for stores building
Wind Turbine 50kW – SASA

Water
Investigate Grey Water Systems – Cameron House
Investigate Grey Water Systems – Longman House
Investigate Grey Water Systems – Strathearn House
Investigate Grey Water Systems – Thainstone Court
Replace mixer taps with PIR/Push taps – Victoria Quay
Umax water treatment – Tweedbank Gala

Waste
Food waste capture across all buildings to meet with forthcoming legislation
Investigate catering contracts to include waste minimisation
Lug-a-Mug scheme to be rolled out in all staff restaurants

Travel
Promotion of pool car or hire car rather than private car
Promotion of all domestic travel by rail rather than air
Promotion of all domestic travel by standard class rather than first
Promotion of taxi travel as last resort
Self-booking tool for travel including carbon cost

Other Behavioural Change
Behavioural change pilot on reducing business flights
Behavioural change pilot – Energy efficiency