National Audit Office

BRIEFING FOR THE HOUSE OF COMMONS ENVIRONMENTAL AUDIT COMMITTEE

JULY 2011

A briefing on delivery of the target to reduce central government's office carbon emissions by 10 per cent in the 12 months since the 2010 General Election

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The National Audit Office study team consisted of: Rosie Buckley, Jessica Colville, Sudip Dasgupta, Marcus Popplewell and David Walter under the direction of Jill Goldsmith.

This report can be found on the National Audit Office website at www.nao.org.uk

For further information about the National Audit Office please contact:
National Audit Office
Press Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP
Tel: 020 7798 7400
Email: enquiries@nao.gsi.gov.uk

Summary

1 On 14 May 2010, the Prime Minister announced his intention for his administration to be the 'greenest government ever'. As part of this, the government announced a target to cut central government carbon emissions by 10 per cent in the following 12 months and raise public accountability by publishing headquarters buildings' real-time emissions data on-line. The target covers the properties used by UK central government departments but does not apply to the devolved administrations.

2 This briefing for the Environmental Audit Committee sets out how departments have sought to meet the government's target to reduce carbon emissions by 10 per cent in 12 months (the 10 per cent target). The scope of this briefing is set out in Part One. Part Two summarises the government's performance and assesses the reliability of the data used to assess that performance. Part Three sets out how far departments have followed a structured approach to reducing office carbon emissions and the initiatives used to help meet the target.

3 The main sources of evidence for our briefing were: a review of the adequacy of the Cabinet Office's systems used to collate departmental office carbon emissions data; a review of the office carbon emissions data in the four departments with the highest level of carbon emissions (the Department for Work and Pensions, the Ministry of Justice, the Ministry of Defence and HM Revenue and Customs); case studies of initiatives to reduce carbon emissions in these four departments; and a survey of the 17 Ministerial central government departments covered by the 10 per cent target to identify and assess their approaches to reducing energy use.

Key findings

4 In the 12 months to 13 May 2011, departments reduced the carbon emissions of their office buildings, through lower energy use, by 13.8 per cent, exceeding the 10 per cent target by 3.8 percentage points. The Cabinet Office estimates this has reduced government energy bills by some £13 million. Our checks of data validity revealed no issues that cause us to believe that the reported consumption data are not fairly reported.

5 Energy use in the buildings included within the 10 per cent target has fallen at a faster rate in one year than was achieved under the first 10 years of the Sustainable Operations on the Government Estate (SOGE) target, when office carbon emissions fell by 17 per cent between 1999-00 and 2009-10, an average of 1.7 per cent a year.

The wider SOGE target required a reduction in carbon emissions of 12.5 per cent by 2010-11 relative to 1999-00 levels.

6 The buildings covered by the 10 per cent target included only central government's office estate, comprising some 3,000 buildings compared to the 48,000 included under the SOGE initiative. The 10 per cent target resulted in a total carbon emissions reduction of 103,000 tonnes of carbon dioxide (tonnes CO_2) in the target year. Under SOGE, carbon emissions reduced by an average of 50,000 tonnes CO_2 a year, from 2.92 million tonnes CO_2 in 1999-00 to 2.42 million tonnes CO_2 in 2009-10 (the data relating to performance for 2010-11 are not yet available). The number of buildings covered by the 10 per cent target was considerably smaller than that for the SOGE initiative principally because it covered the Ministry of Defence's civilian office estate but not its military estate. The military estate continues to be covered by the SOGE targets. Performance against SOGE targets will be reported in autumn 2011.

7 A Ministerial Working Group held departments to account for meeting the 10 per cent target. This Group, and senior management engagement from the Cabinet Office, the Department of Energy and Climate Change and other departments, helped raise the profile of efforts to achieve the 10 per cent target. The Department of Energy and Climate Change and the Cabinet Office's Centre of Expertise in Sustainable Procurement have supported departments' efforts by reviewing performance, providing good practice advice and encouraging the sharing of knowledge, building on the progress made under the previous SOGE targets.

8 We identified four main stages in a structured approach to reducing energy use:

- drawing up a carbon reduction strategy;
- assessing energy use;
- identifying and implementing carbon reduction initiatives; and
- evaluating initiatives to inform a revised strategy.

9 Departments have generally followed the stages of the structured approach outlined above. All departments had carbon reduction strategies and most had assessed their energy use in most of their buildings. We identified the following factors as key in helping them meet the 10 per cent target:

- **Devoting sufficient resources to the initiative, such as investment funding and staff with relevant skills.** A number of departments identified additional funding from within their overall budgets to deliver the 10 per cent target. Their spending ranged from nothing to some £13 million. Departments which reported relatively lower costs typically used behavioural change and greening IT projects to meet the target. In contrast, those departments which used technological initiatives to deliver their reductions typically reported relatively higher costs.

- **Gaining support from facilities management partners, such as through gain share agreements.** Facilities management partners are widely used and are crucial to delivering carbon savings because they often understand the most appropriate initiatives to use, have relevant skills to implement projects effectively and, where contractually obliged, provide funding for initiatives.
- **Thoroughly reviewing energy use data to determine how best to make the greatest savings and where.** We found departments were sharing lessons on the relative effectiveness of different energy saving approaches.
- **Making the most of support from senior managers.** The Prime Minister's announcement raised the target's profile. Senior managers pledged their support to delivery of their target, made more funding available and monitored progress against their target more frequently.

10 In July 2011, the government set a further target for reducing departmental carbon emissions, requiring a total reduction of 25 per cent compared with 2009-10 by 2014-15. Our review found scope remains for further carbon reductions. Departments have an incentive to continue to reduce their carbon emissions because of the savings available through lower energy consumption and because of the Carbon Reduction Commitment Energy Efficiency Scheme, which will require all central government departments to purchase allowances to match their carbon emissions. The Committee may wish to consider the following issues for improving departmental carbon reduction efforts:

- the level of challenge posed by the government's recently set carbon emission reduction target for the rest of the current parliament;
- whether the baseline for the carbon emission reduction target is sufficiently wide;
- opportunities and barriers for further departmental carbon emission reductions (for example, in relation to resources, facilities management, estate rationalisation and the need to collect more accurate data);
- the case for central coordination and leadership of departmental efforts to reduce carbon emissions; and
- the need for evaluation of carbon reduction projects to assess their impact and to help better identify good practice.

Part One

Scope

1.1 On 14 May 2010, the Prime Minister announced his intention for his administration to be the 'greenest government ever'. As part of this, the government announced a target to cut central government carbon emissions by 10 per cent in the following 12 months (the 10 per cent target) and raise public accountability by publishing headquarters buildings' real-time emissions data on-line. The target covers UK government properties but does not apply to the devolved administrations.

1.2 The 10 per cent target builds on the last government's efforts to reduce energy consumption and coincided with the final year of reporting against the wider Sustainable Operations on the Government Estate (SOGE) targets. SOGE set targets in June 2006 to reduce carbon emissions by 12.5 per cent by 2010-11 compared to 1999-00 levels and to improve energy efficiency, sustainable consumption and production and natural resource protection.

1.3 The Environmental Audit Committee has regularly reviewed the government's progress under the SOGE targets, most recently in July 2009. The Committee concluded then that "*There has been some progress against targets for sustainable operations on the government estate. But the Sustainable Development Commission has found that in 2007-08 the Government was not on track to meet its target for the reduction of carbon emissions from its own buildings…The ease with which the Government continues to meet some targets, even when its performance worsens, indicates the urgent need for the Government to set itself stringent targets that match the high level of ambition of its own policies on climate change and sustainable development*." [1] In 2009-10 the Government continued to achieve reductions in energy use, waste arisings and water use.[2] And in March 2010 the last government set new sustainability targets, in its replacement Sustainable Development in Government targets, which included the target to reduce carbon emissions from the government office estate by 34 per cent by 2020, compared to 1999-00 levels.[3]

[1] Greening Government, Environmental Audit Committee, Sixth Report of session 2008-09, July 2009, extract from Summary

[2] Performance under the Sustainable Operations on the Government Estate for 2009-10 are published on-line by the Department for Environment, Food and Rural Affairs

[3] Sustainable Development in Government, Department for Environment, Food and Rural Affairs, March 2010

1.4 In February 2011, the government announced its Greening Government Operations and Procurement sustainability framework which replaced the SOGE targets and the last government's updated Sustainable Development in Government targets. The Greening Government commitments seek to reduce the government's environmental impact by 2015 compared to a 2009-10 baseline for: business-related transport (a 20 per cent reduction in domestic flights); waste (a 25 per cent reduction); water consumption (reduce consumption against best practice benchmarks); sustainable procurement (ensure products are more sustainable); and greenhouse gas emissions from the whole estate. In July 2011, the government set a further target for reducing departmental carbon emissions, requiring a total reduction of 25 per cent compared with 2009-10 by 2014-15.

1.5 In May 2011, in the annual statutory State of the Estate report 2010, the government further set out its intentions to make better use of its civil office estate, to enable work practices that are more modern and flexible, while helping government to reduce its carbon footprint.[4] It reported that the aim of the Government Property Unit, established in June 2010, is to take a cross-government approach to the management of government property, accelerate the delivery of cost savings and to identify surplus and under utilised property assets. The Unit expects to work with departments to help accelerate the delivery of cost savings and thereby to contribute towards delivery of the broader sustainability targets.

1.6 The Environmental Audit Committee is committed to regularly examining the government's progress against its sustainable operations and procurement targets.[5] We have prepared this briefing to support the Committee's consideration of performance against the 10 per cent carbon emissions reduction target. Part Two of the briefing summarises the government's performance against the target and comments on the reliability of the reported data. Part Three sets out a structured approach to reducing energy use and how far departments applied it in their efforts to meet the 10 per cent target.

[4] HM Government, The State of the Estate in 2010, May 2011

[5] Embedding sustainable development across Government, after the Secretary of State's announcement on the future of the Sustainable Development Commission - Environmental Audit Committee, Environmental Audit Committee, First Report of session 2010-11, December 2010

1.7 The main sources of evidence for our briefing were:

- a review of the adequacy of systems used by the Cabinet Office to collate departmental energy reduction data;
- a review of the energy reduction data in the four departments with the highest level of carbon emissions (the Department for Work and Pensions, the Ministry of Justice, the Ministry of Defence and HM Revenue and Customs), which together are responsible for some 77 per cent of the total office carbon emissions relating to the 10 per cent target;
- case studies of initiatives to reduce carbon emissions in these four departments; and
- a survey of the 17 Ministerial central government departments covered by the 10 per cent target to identify and assess their approaches to reducing energy use.

Part Two

Performance against the 10 per cent target and data quality

2.1 The government has reported its performance against its target to cut carbon emissions from central government by 10 per cent in its first 12 months in office (the 10 per cent target) in the Cabinet Office's report *10% Challenge: Carbon Reduction on the Government Office Estate,* published in July 2011. This part of our briefing summarises the government's performance and assesses the reliability of the data used to assess that performance.

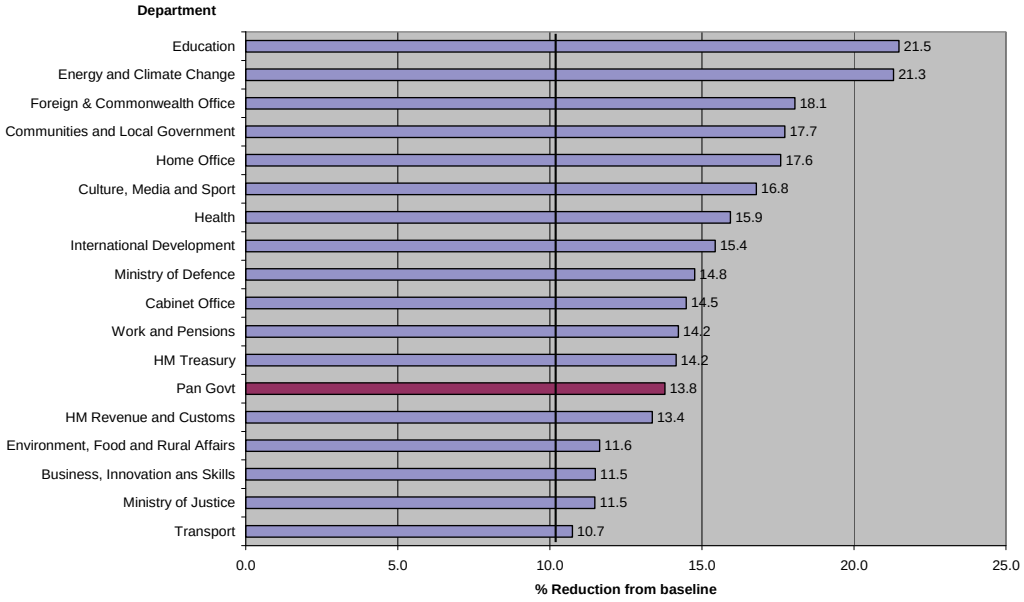
Summary performance against the 10 per cent target

2.2 Between May 2010 and May 2011, the government achieved a 13.8 per cent reduction in office carbon emissions against its target of 10 per cent. The Cabinet Office estimates this has reduced government energy bills by some £13 million. **Figure 1** shows that all departments achieved at least a 10 per cent reduction, with the Department for Education achieving the biggest reduction and the Department for Transport the smallest.

2.3 Departments achieved a higher percentage reduction in energy use in the year to May 2011 in the buildings that reported under the 10 per cent target than the average yearly figure under the wider Sustainable Operations on the Government Estate (SOGE) initiative. Under SOGE, the level of carbon emissions across the government office estate fell by 17 per cent from 1999-2000 to 2009-10, an average reduction of around 1.7 per cent a year (the data relating to performance over 2010-11 are not yet available).

2.4 The 10 per cent target results are based on data which have been weather corrected. Weather correction is a widely used way of adjusting energy use data to remove the effect of unusually cold temperatures over a particular period of time. Making such a correction enables comparison of energy use over time, without distortion from weather effects. The non-weather corrected data show emissions fell by 13.7 per cent across government in the 10 per cent target period. Performance ranged from a 21.5 per cent reduction at the Department for Education to an 11.2 per cent reduction at the Department for Transport.

Figure 1 Performance of departments against the target to reduce carbon emissions from offices by 10 per cent between 14 May 2010 and 13 May 2011 (weather corrected)

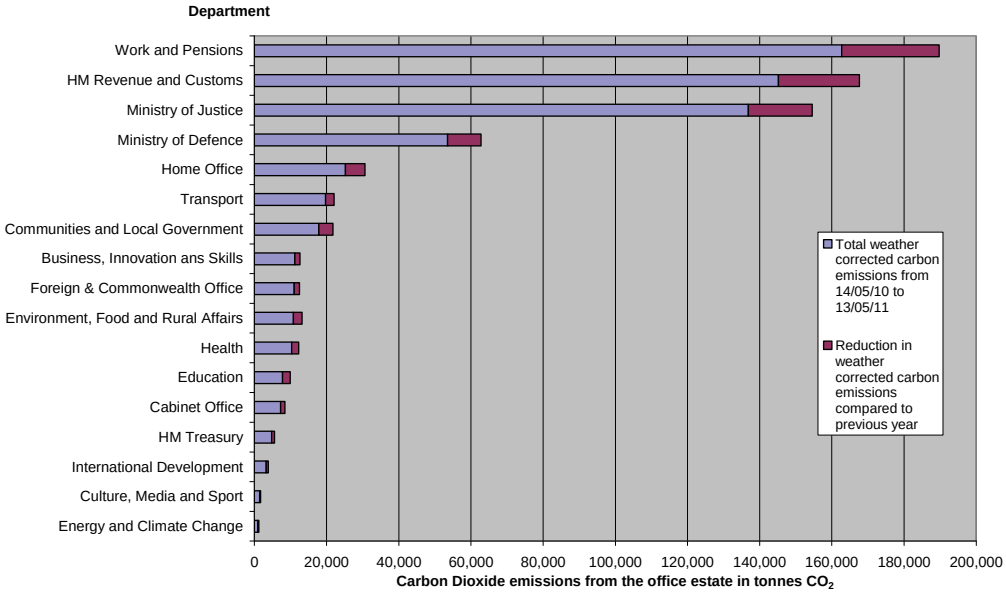


Source: Cabinet Office

Note: The data in this figure show departmental carbon emissions as corrected for weather. Weather correction is a widely used way of adjusting energy use data to remove the effect of unusually cold temperatures over a particular period of time. Making such a correction enables comparison of energy use over time, without distortion from weather effects.

2.5 The absolute level of carbon emissions from each department varies considerably. We have shown actual carbon emissions data in **Figure 2**. Under the 10 per cent target, emissions reduced by 103,000 tonnes CO_2 (from 750,000 tonnes CO_2 to 647,000 tonnes CO_2). This compared to an average reduction of 50,000 tonnes CO_2 a year from the wider Sustainable Operations on the Government Estate (SOGE) initiative over the period 1999-2000 to 2009-10. However these comparisons are not like for like because the 10 per cent target relates to fewer buildings than were covered in SOGE.

Figure 2: Absolute reductions in carbon dioxide emissions by department between 14 May 2010 and 13 May 2011 (weather corrected)



Source: Cabinet Office
Note: The data in this figure show departmental carbon emissions as corrected for weather.

Properties assessed against the 10 per cent target

2.6 The government's target to reduce carbon dioxide emissions from departmental office buildings by 10 per cent has a narrower scope than the Sustainable Operations on the Government Estate (SOGE) targets. The 10 per cent target relates to the UK central government 'office estate', which is defined as all buildings used by departments and executive agencies where professional, administrative or clerical duties are performed.[6] Departmental office buildings in Scotland, Wales and Northern Ireland are within the scope of the target, whilst those outside the UK are not. The target does not apply to the devolved administrations.

[6] The target covered the same bodies as covered under the SOGE targets (i.e. the 17 Ministerial central government departments, the UK Statistics Authority and the Law Officers' Departments) although some smaller non-Ministerial departments, such as the Forestry Commission and Ofgem, were excluded.

2.7 The 10 per cent target applies to some 3,000 office buildings, ranging from central London departmental headquarters to benefit offices, local tax offices and courts. This compares to 48,000 buildings monitored for SOGE purposes. The principal exclusion from the 10 per cent target is the Ministry of Defence's military estate, which accounts for some 45,000 buildings, which were previously assessed against the SOGE targets. The Ministerial Working Group decided that the definition of the central government office estate for the 10 per cent target should not include the military estate. This left the Ministry of Defence's target covering its 63 office buildings in excess of 1000 m^2 (over 23 sites) which was more comparable to other government departments.[7] The Ministerial Working Group agreed with the Ministry of Defence that including its military estate would have made the 10 per cent target "unachievable without jeopardising operational capability".

2.8 The Ministry of Defence is the largest energy user of all government departments and it has reduced carbon emissions significantly over the last few years. Under the Sustainable Operations on the Government Estate (SOGE) targets, the Department achieved 415,000 tonnes CO_2 reductions between 1999-00 and 2009-10. This represents a 19.4 per cent reduction by 2010 against the SOGE target of 12.5 per cent by 2011 (an average reduction of 41,500 tonnes CO_2 a year). The Department's total planned emissions reductions from April 2010, including the 10 per cent target, were, however, smaller than what it has achieved each year under its SOGE targets. The Department planned reductions of 6,400 tonnes CO_2 from its civil office estate to meet the 10 per cent target and a further 32,000 tonnes CO_2 between April 2010 and March 2011 to meet an internally set target for its military estate. The Department has delivered a reduction of 9,300 tonnes CO_2 on its office estate as its contribution to the 10 per cent target. The relatively low internal target reflected the Department's uncertainty about which buildings it was going to keep following the Strategic Defence and Security Review, the loss of internal staff and the budgetary constraints following the Comprehensive Spending Review. Data for the Department's achievements on the military estate are not yet available.

2.9 The Cabinet Office and the Department of Energy and Climate Change also excluded from the 10 per cent target baseline properties not included in the Sustainable Operations on the Government Estate baseline because of a lack of reliable and timely data. So, the target excluded:

- the Department for Environment, Food and Rural Affairs' laboratories. The Department had identified opportunities for technology upgrades on its laboratory estate for 2010-11 which could have delivered an annual saving of approximately 1,300 tonnes CO_2 in 2011-12 for a cost of £200,000. The

[7] In some cases there are multiple buildings on the same site. In these circumstances, the Ministry of Defence has only counted those buildings which are in excess of 1000m^2.

Department postponed this project until after the end of the 10 per cent initiative, however, because its laboratories were not included in the target baseline and it had to focus its resources on its office estate. Under the 10 per cent initiative the Department's target was to achieve reductions of 1,271 tonnes CO_2.

- 209 tenanted properties. One hundred and forty nine of these properties were occupied by the Ministry of Justice and 60 by the Department for Work and Pensions. Both departments pay for utilities for these premises using service charge agreements but receive no energy use data from their landlords.

Quality of the data

2.10 The Cabinet Office has been responsible for collecting energy consumption data from departments to assess cross government performance monthly against the 10 per cent target. It has published results on both individual departments and on central government as a whole through the *data.gov* website.

2.11 We reviewed the process of collecting and collating information on energy consumption and the quality of departmental data. We reviewed the Cabinet Office's controls on the extent to which data were estimated, the properties included in the baseline and the process for dealing with changes to the baseline. We reviewed departmental controls over the completeness and accuracy of energy data in four departments (the Ministry of Justice, the Department for Work and Pensions, the Ministry of Defence and HM Revenue and Customs). Together, these four departments are responsible for some 77 per cent of the emissions covered by the 10 per cent target. Our checks of data validity revealed no issues that cause us to believe that the reported consumption data are not fairly reported.

2.12 The Cabinet Office's monthly reporting framework provided more timely data than previously and we found that the Department had undertaken checks of the reasonableness of the data before publishing them. The Cabinet Office used an appropriate pro rata approximation technique to calculate consumption for the final few weeks of the 10 per cent target period to 13 May 2011. During our testing in March 2011 we found that the Department for Work and Pensions had not updated estimated data with actual figures for some of its properties since March 2010. This meant that it had under reported consumption in quarter 2 by 1.1 per cent and over reported it in the following month by a similar amount. The Department has since updated its estimated data with actual figures.

2.13 The risk to reported performance at the end of the year lies in the extent to which the final data are estimated. The Department for Work and Pensions has reduced the extent of estimation in its final year data by moving to monthly reporting and increasing the proportion of its consumption measured by half-hourly meters. It estimates that around 1.5 per cent of data for the year as a whole might be estimated. The Cabinet Office considers that, across the central government office estate, approximately 2.8 per cent of carbon emissions data for the year are based on estimates.

2.14 We found the Cabinet Office maintains appropriate controls over any changes to the buildings included in the 10 per cent target baseline. The Cabinet Office established a Baseline Change Panel for the 10 per cent target. Its scope was similar to that of the Panel covering the baseline for the Sustainable Operations on the Government Estate initiative. The 10 per cent target Baseline Panel comprised staff from the Cabinet Office, the Department of Energy and Climate Change and the Department for Environment, Food and Rural Affairs. In May 2011, the Panel considered changes to the baseline over the 10 per cent target period. We found the Panel had approved changes to the baseline only where there had been changes in departmental responsibilities, where there were corrections or where departments could provide more accurate or complete consumption figures.

2.15 In the four Departments we reviewed, we found a range of controls to ensure the quality of energy consumption and emissions reduction data. The Departments monitored data and compared monthly consumption by fuel type and against projections to identify anomalous readings for further investigation and they corrected errors (such as inaccurate data entry and late invoices) following their identification.

Part Three

How the target was achieved

3.1 This part of the briefing sets out how the government has driven delivery of the target and how far departments have followed a structured approach to reducing energy use.

The government's drive to meet the target

3.2 The Prime Minister, the Cabinet Office and the Department of Energy and Climate Change played key central roles in driving delivery to meet the 10 per cent target. The Prime Minister asked the Secretary of State for Energy and Climate Change to chair a Ministerial Working Group including industry representatives with experience in delivering carbon reductions, from HSBC, Kingfisher, Tesco and EDF. The Group was established to provide advice and hold departments to account in meeting the 10 per cent target and share good practice. This and senior official level engagement between the Department of Energy and Climate Change, the Cabinet Office and other departments' officials increased the profile of efforts to meet the target. The government also developed in July 2010 an Energy Efficiency Code, a voluntary agreement between government and the facilities management sector, committing the government to engaging with the industry to work in partnership to identify and deliver energy savings for the mutual benefit of both parties.[8]

3.3 The Department of Energy and Climate Change and the Cabinet Office have supported departments' efforts by reviewing performance, providing good practice advice and encouraging the sharing of knowledge. The Cabinet Office collated and published departments' monthly carbon emission data and their progress towards achieving their targets. In July 2010 the Cabinet Office published, for consultation, guidance and suggested clauses for energy efficiency in facilities management contracts. In September 2010 they published, with the Carbon Trust and the Chartered Institution of Building Services Engineers (CIBSE), practical advice on priority actions for improving energy efficiency. They circulated guidance across government; for example on reducing carbon emissions from IT systems. The Cabinet Office and the Department of Energy and Climate Change ran a competition to see which department could deliver the greatest energy use reduction in head office buildings in October compared with September 2010. And the Cabinet Office

[8] Energy Efficiency Code: A Partnership to Deliver Energy Savings, Cabinet Office July 2010

organised regular meetings of practitioners from departments to share good practice.

3.4 The Department of Energy and Climate Change used its Public Sector Low Carbon Programme team during the target period to support the Ministerial Working Group and oversee delivery of the target. The team had an existing budget of £276,000 for 2010 to cover this work and other activities. As a result of the Department's business planning decisions, the Public Sector Low Carbon Programme ceased in April 2011. However, the equivalent of three full time members of the Department will continue working on public sector energy efficiency issues until the end of March 2012.

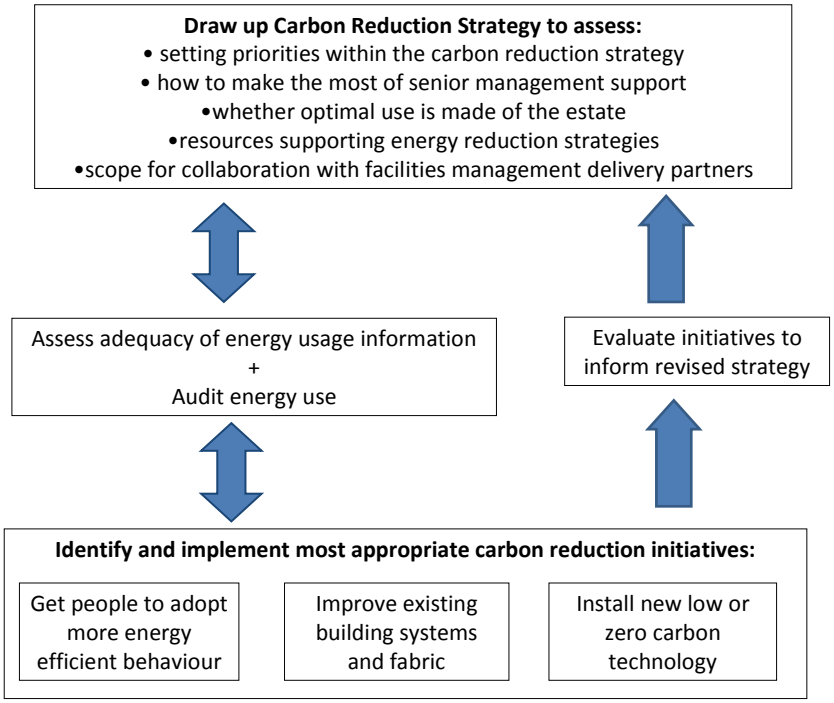
3.5 The Cabinet Office has incurred no additional administrative costs to support reporting of the 10 per cent target. The Centre of Expertise in Sustainable Procurement team was put in place in 2008 to ensure the sustainability of government operations and procurement. Performance management and reporting of government's delivery of the Sustainable Operations in the Government Estate targets and the 10 per cent target were absorbed within the Centre's programme of work, which included promoting best practice across government. The total spend for this work in 2010-11 was £906,000 (including staff costs). The Cabinet Office cannot reliably attribute a specific percentage of this to reporting on the 10 per cent target. There were four full time equivalent staff, at a cost of £220,000, in the team which managed reporting on the 10 per cent target although this was only part of their role. They were supported by the Deputy Director and Chief Sustainability Officer.

A structured departmental approach to reducing energy use

3.6 We have identified four main stages in a structured approach to reducing energy use, as summarised in **Figure 3** below:

- drawing up a carbon reduction strategy;
- assessing energy management data systems and auditing energy performance;
- identifying and implementing the most appropriate carbon reduction initiatives; and
- evaluating initiatives to inform a revised strategy.

Figure 3: The key steps in a structured approach to reducing energy use



Source: National Audit Office

3.7 The following sections discuss how far departments have followed the structured approach to reducing energy use set out in Figure 3.

Drawing up carbon reduction strategies

3.8 A carbon reduction strategy should be the starting point for a department's efforts to reduce energy use. Departments have been required to have Sustainable Development Action Plans since 2005, including their proposals for carbon reductions and meeting Sustainable Operations on the Government Estate targets.[9] The following sections set out how departments developed their carbon reduction strategies and the impact of the 10 per cent target.

[9] The requirement was set out in Securing the Future, delivering UK sustainable development strategy, The UK Sustainable Development Strategy, Department for Environment, Food and Rural Affairs, March 2005

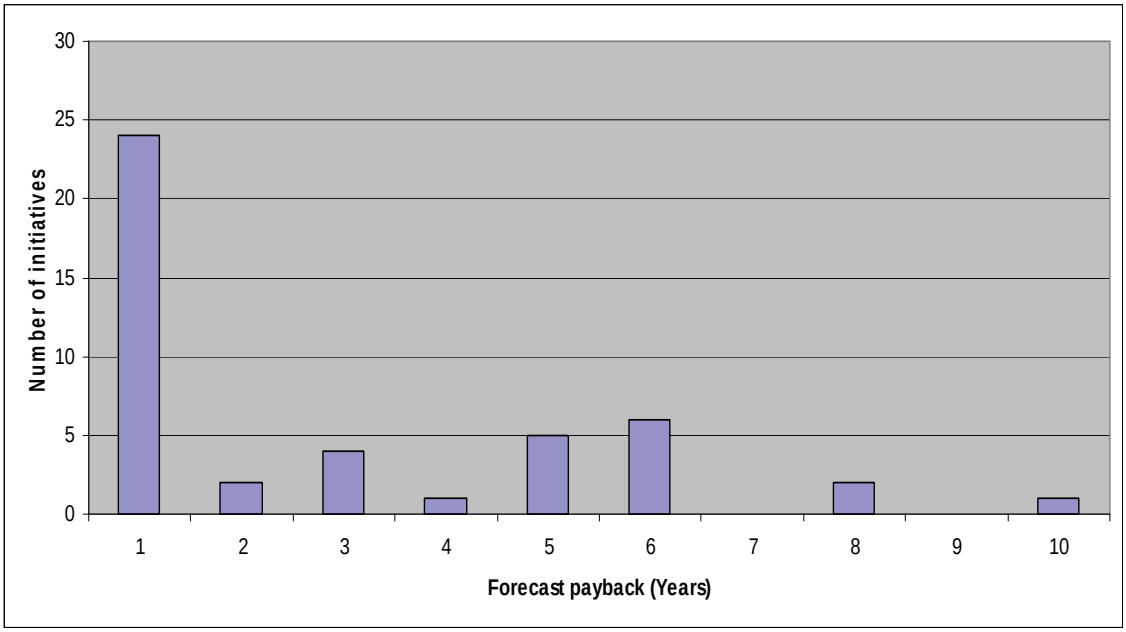
Setting priorities within the carbon reduction strategy

3.9 Developing a carbon reduction strategy should help reduce emissions by identifying and communicating an organisation's priorities for action. A strategy will address the use and efficiency of the estate, the range of improvement opportunities available and the priorities for investment.

3.10 Departments already had carbon reduction strategies in place before the government announced its 10 per cent target. After the announcement departments reviewed their strategies in light of their revised targets. Some departments, such as the Department for Work and Pensions, were largely able to continue with their existing plans. Some departments made fairly small changes. The Ministry of Justice, for example, changed its investment criterion from tonnes of carbon per £ invested to tonnes of carbon saved up until 13 May 2011 per £ invested. This change raised the priority of projects that would deliver carbon reductions by May 2011. Other departments, such as the Department for Environment, Food and Rural Affairs and the Ministry of Defence, had to defer major long term projects to make sure they met the 10 per cent target. They expect to deliver these projects now that the 10 per cent target period has passed.

3.11 In choosing the most appropriate initiatives, departments recognised the need to achieve the 10 per cent target meant, in some cases, a focus on initiatives, which could deliver carbon savings before the end of the reporting year. In our survey, we found six out of 17 departments had carried out short term initiatives to help deliver the 10 per cent target. Other departments focussed on projects with a faster payback. Our survey found that, for 45 initiatives for which information was available, the average forecast payback period was approximately 2.4 years, ranging from one to ten years (Figure 4). Twenty four of these projects had a payback of a year or less, six more should payback within three years. Of the 30 projects with a three year pay-back or less: 14 were building fixture or controls upgrades (such as using light emitting diodes rather than tungsten filament lights or better heating controls); five were estate rationalisations; five were IT projects; four were 'switch-off' projects; and two installed automated meter reading equipment. In contrast, the two eight-year payback projects related to voltage optimisation projects carried out by the Department for Communities and Local Government and the Department for Environment, Food and Rural Affairs. The 10 year project was also from Department for Environment, Food and Rural Affairs and related to voltage optimisation and insulation.

Figure 4: The number of departmental initiatives with payback between one and ten years



Source: National Audit Office

Senior management support

3.12 Senior managers played an important role in driving delivery of carbon reduction targets. We found that 15 of the 17 departments had identified a Management Board champion for delivery of their reductions in office carbon emissions. All departments reported their performance to their senior managers, of which 11 reported to Management Boards or Committees. Six departments reported performance to senior management monthly; five quarterly; two reported both monthly and quarterly (depending on the Committee); one reported six weekly; and the three others reported on an ad hoc basis.

3.13 The four departments we visited for our data validation work (the Ministry of Justice, the Ministry of Defence, the Department for Work and Pensions and HM Revenue and Customs) noted the importance of their senior management support to their energy reduction work. For example, HM Revenue and Customs felt that the importance given by senior managers to delivering the target, and the tone set, were critical to ensuring that staff took behaviour change initiatives seriously. At the Ministry of Defence senior management monitoring of performance meant business areas devoted more time to ensuring energy consumption data were complete and accurate.

Reviewing the organisation's estate

3.14 An estate strategy, including a rationalisation plan, allows a department to assess which of its buildings and properties it should keep to meet its needs efficiently and which can be disposed of to provide opportunities for reducing energy use. An estate strategy reduces the risk that departments might invest in properties that they intend to vacate in the short term. We noted one example where a department had encountered this risk. The Department for Communities and Local Government decided nonetheless to invest in a building it was due to vacate to maximise carbon reductions during the 10 per cent target period. It installed equipment to reduce the flow of hot air to supply occupied floors only. The cost of equipment and installation was some £15,000 and the Department estimates it resulted in financial savings of some £22,000. The Department subsequently removed the equipment and deployed it elsewhere once it had vacated the premises.

3.15 An estate strategy is particularly important where estate management risks and opportunities are shared with third party facilities managers. For example, we found that one of HM Revenue and Customs' facilities management partners was reluctant to invest in low carbon initiatives at the start of the 12 month period as it was not sure how long the Department would keep its properties. The Department's business is complex and spread across the UK and it has been making significant changes to its workforce and estate to meet its future commitments. These changes meant that it agreed the principles of its Estates Strategy in November 2010, six months after the 10 per cent target period began.

3.16 The Cabinet Office and Department for Business Innovation and Skills jointly established a Government Property Unit in June 2010 to lead on property strategy across the public sector. Its strategic aim is to reduce the government estate and move staff to freehold or cheaper leasehold properties, so reducing costs. During May 2010, the government established a moratorium on any new or renewed leases of property by government without approval, which the Government Property Unit extended until 2015. The moratorium was expected to provide an impetus for departments to review their strategies and use their estate as efficiently as possible and the government has estimated it has resulted in financial savings of £50 million in 2010.[10]

[10] HM Government, The State of the Estate 2010, May 2011

Resources to support energy reduction initiatives

3.17 Determining the resources available to support energy efficiency is an important part of a carbon reduction strategy. Eight departments set a budget for carbon reduction initiatives for the year to 31 March 2011 (Figure 5). The other nine departments had no separate budget for this period, with four reliant on their facilities management contract or PFI contractor to fund initiatives. Five departments identified additional funding from within their budget for the year to 31 March 2011 following the government's announcement of the 10 per cent target. Two departments (the Department for Environment, Food and Rural Affairs and HM Revenue and Customs) set a specific budget for the 10 per cent target period. Ten months through the target year, our survey found that six of the 17 departments had spent more on low carbon initiatives to deliver the target than they had originally planned before the target was announced.

Figure 5: Departmental carbon reduction budgets and expenditure to March 2011

Department	Carbon reduction budget before 10 per cent target announced (April 2010 to March 2011)	Carbon reduction budget after 10 per cent target announced (April 2010 to March 2011)	Forecast carbon reduction spend (14 May 2010 to 13 May 2011) as at 31 March
Ministry of Justice	£2 million	£15 million	£13 million[1]
Foreign and Commonwealth Office	£820,000	£820,000	£1.3 million
Cabinet Office	£910,000	£910,000	£910,000
Ministry of Defence	No separate budget	No separate budget	£655,000
HM Revenue and Customs	No separate budget	£680,000	£564,000
Environment, Food and Rural Affairs	Nil	£773,000	£400,000
Communities and Local Government	£420,000	£340,000	£360,000
Home Office	Facilities contractor responsible	Facilities contractor responsible	£295,000
Transport	£235,000	£235,000	£250,000
Energy and Climate Change	No separate budget	No separate budget	£180,000
HM Treasury	£110,000	£160,000	£170,000
Health	Facilities contractor responsible	Facilities contractor responsible	£75,000
Education	£50,000	£190,000	£66,000
Business, Innovation and Skills	£48,000	£70,000	£56,000
International Development	No separate budget	No separate budget	£30,000
Culture, Media and Sport	Facilities contractor responsible	Facilities contractor responsible	£3,000
Work and Pensions	PFI contractor responsible	PFI contractor responsible	Nil

Source: National Audit Office survey of departments

Note 1. This sum includes planned preventative maintenance costs on the HM Court Service estate. For the Departmental group as a whole, projects implemented specifically for the 10 per cent target amounted to £4.9 million and included voltage optimisation, boiler load optimisation, solar-thermal and photovoltaic installations.

3.18 We asked departments what staff resources they used to deliver their carbon emissions reduction and whether this represented an increase on the number previously supporting their drive to meet their Sustainable Operations on the Government Estate (SOGE) targets. We found:

- Across all departments, excluding the Ministry of Defence, 59 whole-time equivalent staff worked on sustainable operations as a whole, of which 48 whole-time equivalent staff worked on reducing office carbon emissions.
- The Department for Culture, Media and Sport and the Department for Business Innovation and Skills did not have departmental staff working to deliver their targets, working instead with their facilities management partners to deliver savings.
- Six departments reported that they had used more people to drive delivery of their carbon reduction target than they had previously, seven departments used the same number and four reported lower staff numbers.

3.19 With its much larger estate the Ministry of Defence has approximately 120 staff involved in carbon reduction activities across its whole estate, including overseas. A central programme team was formed to support the 23 offices covered by the 10 per cent target. Each site was required to assign a site lead as a minimum and realign local resources to meet the office carbon emission target.

3.20 Departments reported to us that funding and staff resources will be key to delivering future carbon reductions. Thirteen departments thought a lack of financial resources, including capital funding, would be a key barrier to achieving further reductions in office carbon emissions in 2011-12. Nine departments considered a lack of human resources would be a key barrier. Other barriers departments identified during our discussions with them were: a lack of staff support for tackling office carbon emission; a lack of staff with relevant skills; contractual arrangements with facilities managers or PFI contractors; and changes in the nature of the services being provided, for example requiring extended office opening hours or taking on additional projects and hence staff and buildings.

Working with facilities management delivery partners

3.21 It is common practice for a department's facilities to be managed by a specialist company under contract rather than managed in-house. Sixteen of the 17 departments have contracted out facilities management operations on their buildings to at least some extent, including under Private Finance Initiative (PFI) contracts. Departments have used their facilities management partners to help deliver carbon emission reductions in a range of ways including: identifying the best ways to improve energy efficiency; providing technical expertise; and directly implementing energy reduction initiatives.

3.22 Our survey found that five of the 16 departments reported their facilities management contract arrangements have neither been a barrier nor assisted in their drive to reduce their carbon emissions. But the remaining 11 found their approach was affected by their facilities management arrangements:

- Five departments said their partners had assisted in implementing energy reduction initiatives. For example, the Department of Health reported that its new facilities provider had appointed an energy manager tasked with identifying ways to improve energy efficiency and further reduce office carbon emissions; and the Department for International Development reported its new facilities management contract includes key targets for the contractor to reduce carbon emissions from its energy usage.

- Three departments said their arrangements had been a barrier to implementing energy reduction initiatives. In particular, this was where: accurate energy use data were hard to obtain; the partner lacked the necessary expertise and skills to deliver initiatives; partners were not sufficiently incentivised to suggest and implement additional energy saving measures; and where there were commercial or contractual constraints. For example HM Revenue and Customs reported that the lack of energy related targets and flexible gain share arrangements in some of its older PFI contracts were barriers. It noted it was seeking to renegotiate terms to overcome these barriers.

- Three departments said they had mixed experience with their facilities contractors, some assisting and some acting as a barrier in delivering against their carbon reduction strategy. For example, the Department for Work and Pensions' gain share arrangement with its Private Finance Initiative facilities management partner incentivises the partner to fund energy reduction initiatives and the partner brings technical expertise to its approach. The contractor's investment has been critical to the Department's improved performance, but its commercial approach means it will only commit to projects which pay back within at least three years.

3.23 The government has recognised the scope for improving its collaboration with its facilities managers to deliver carbon reduction. In addition to establishing a voluntary agreement with facilities management contractors, in July 2010 the Centre of Expertise in Sustainable Procurement published guidance on energy efficiency principles that should be built into facilities management contracts and suggested clauses that could be used.[11] The guidance suggests contracts should include targets for energy consumption, incentives for achieving them and penalty clauses where targets are not met.

[11] Energy Efficiency in Facilities Management contracts: guidance and suggested clauses, Office of Government Commerce, 2010

Assessing energy management data systems and auditing energy performance

3.24 Reliable, timely and comprehensive data on energy use are essential for a structured approach to carbon reduction in an organisation. Organisations should regularly assess the adequacy of their data systems and improve them where necessary. Once there are sufficient data, organisations can use them to audit energy performance to assess how efficiently energy is being used in their buildings.

Assessing energy management data systems

3.25 A key approach to improving data quality is to install automatic meter reading systems. The accuracy and frequency of automatic meter reading data means that departments can carry out more reliable building performance assessments and monitor more accurately the impact of low carbon initiatives.

3.26 We found most departments carried out health checks of their buildings' energy management systems (comprising connection of, and data collection from, energy meters) to determine the quality of their energy consumption data. In our survey, we asked departments about the number of buildings on which they had carried out assessments. Thirteen of the 17 departments had reviewed their Energy Management Systems in the majority of their buildings. Four departments (HM Revenue and Customs, Department for Transport, HM Treasury and the Ministry of Defence) reviewed systems in some, but not the majority, of their buildings. HM Revenue and Customs, for example, has reviewed systems in some 209 of its buildings (44 per cent of the estate).

3.27 Installation of automatic meter reading devices, which had started before the 10 per cent target was announced, has been a key element in the Ministry of Justice's strategy for improving carbon emissions across its estate. The Department installed 171 electricity and 269 gas meters at a cost of £300,000 to date and a forecast cost of £800,000 over the project lifetime. The project was forecast to pay back over a period of between one and two years but energy savings to date indicate a payback of less than six months. The meters record and relay information on the amount of electricity or gas that is being used by a building every 30 minutes. The Department receives the data between 24 and 72 hours later. The Department has used the data to produce a league table of energy consumption performance across its different sites. It has sent this to local managers to encourage improved performance. The Department was already providing monthly energy data for court buildings but considers automatic meter reading data meant staff took the information more seriously and led to actions which have reduced energy consumption by 7 per cent, of which 3 per cent was in the year to 13 May 2011.

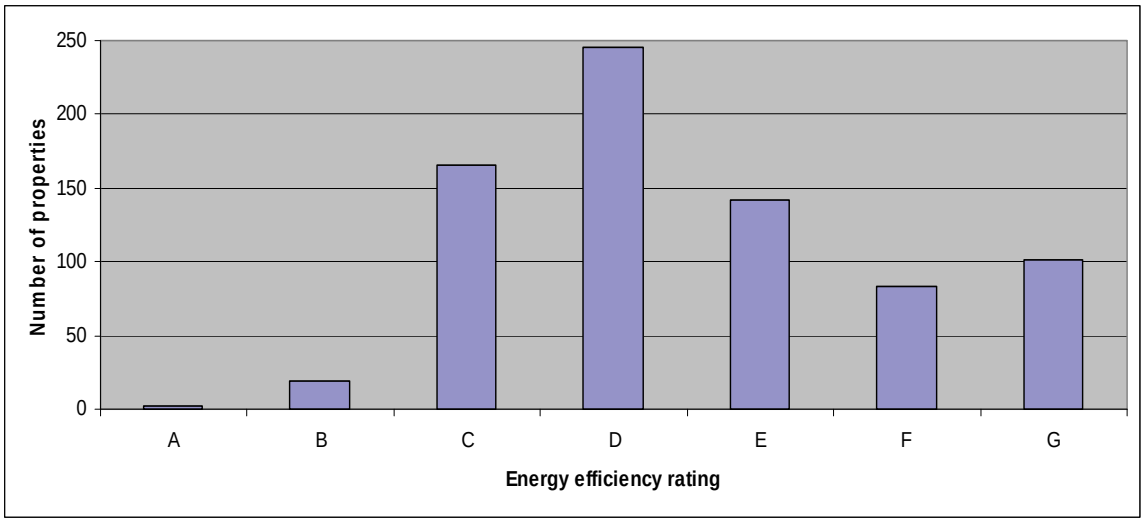
3.28 In May 2010, the Prime Minister announced, alongside the 10 per cent target, that all departments' head offices should display their real time energy consumption by 1 August. The departments used different approaches to deliver this initiative, depending on the building management systems they had in place, and some used automated meter reading equipment, such as the Department of Energy and Climate Change where the initiative cost some £10,000.

Auditing energy performance

3.29 A building performance assessment, or energy audit, examines the energy use of a particular property over a period of time or in comparison to other similar properties. Analysis of the data enables facilities managers to benchmark the energy use of their buildings to target the poorest performers and monitor progress over time. Managers can use the data to identify anomalous usage such as unusual energy fluctuations or significant variations in usage out of office hours.

3.30 The most common form of assessment is once a year and leads to a Display Energy Certificate (DEC), a requirement under the European Buildings Directive. The Certificate shows the operational energy performance of a building. DEC ratings reflect a building's performance over a 12 month period when compared with an average building of its type which is represented by a score of 100 (or rating of 'D'). Since 1 October 2008, occupiers of properties with a total useful floor area greater than 1,000m^2, and occupied by either a public sector entity or by an entity providing a public service to a large number of individuals, must display a DEC in a prominent place. The Department for Communities and Local Government collects the results of annual Display Energy Certificates from across government and the Cabinet Office publishes central government's performance every six months. The latest results show that a significant number of public sector buildings achieve an average performance rating ('D') or better. There are also a large number of properties in the least efficient category 'G' (Figure 6).

Figure 6: Energy efficiency performance assessments across public sector properties in September 2010



Source: Cabinet Office
Note: Energy efficiency ratings in the graph are based on Display Energy Certificate assessments. The data exclude 173 properties with a default rating of G. A default rating is given where there are insufficient data to carry out a Display Energy Certificate assessment.

3.31 Some 1,350 central government properties fall within the scope of the Buildings Directive. However, as at September 2010, Display Energy Certificates relating to 417 buildings have expired.[12] The extent to which Display Energy Certificates can drive energy efficiency is limited because, although certificates are accompanied by an Advisory Report to indicate how property managers might improve efficiency, organisations produce them just once a year. In contrast, energy consumption data from automatic meter reading equipment is collated every 30 minutes.

3.32 Departments have generally carried out performance assessments for their properties. Sixteen departments have carried out performance assessments on all or most of their buildings. The Department for Work and Pensions has carried them out on less than half of its buildings.

[12] HM Government, State of the Estate, May 2011

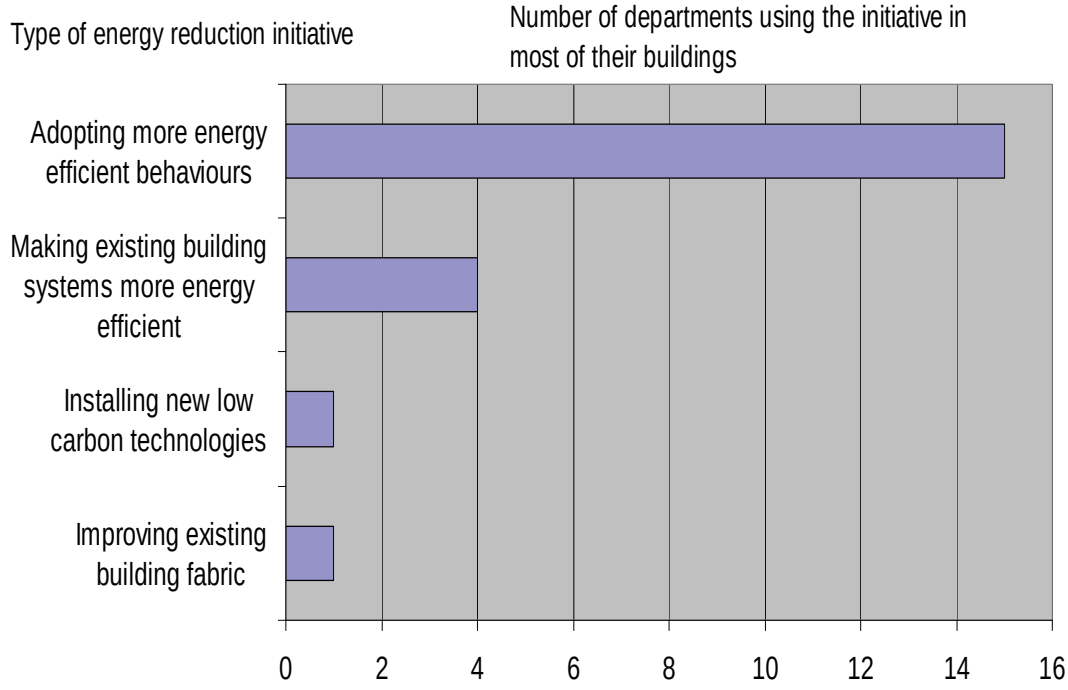
Identifying and implementing the most appropriate carbon reduction initiatives

3.33 Once departments have access to good data on energy use and have carried out energy audits on their properties, they should be in a position to use the resulting analysis to choose the most appropriate energy reduction initiatives to apply to their buildings. We found that the types of carbon reduction initiatives used by departments included behavioural change, optimisation of existing equipment, improvements to existing building fabric and installation of new low carbon technologies. We would expect departments to implement easier, low cost initiatives before adopting more complicated and expensive initiatives and this is reflected in the Cabinet Office's practical advice on priority actions for improving energy efficiency.[13]

3.34 The results of our survey suggest that 15 of 17 departments had implemented projects promoting staff behavioural change in all or most of their buildings, whilst the other two departments had implemented them in at least some properties (Figure 7). Departments' next most common initiative in most of their buildings was maximising the efficiency of existing equipment (for example, by optimising voltage supplies or boiler usage). Our survey revealed that four departments had implemented this type of initiative in most or all of their properties. Only two departments improved the fabric or used new technology to reduce carbon emissions in most or all of their buildings. One (the Department for International Development) invested in improving the fabric of its two buildings, such as better insulation. The other, the Department of Energy and Climate Change, invested in new or low carbon technologies in the vast majority of its estate.

[13] Efficiency Reform Group: Priority actions for improving energy efficiency across the Government estate, September 2010

Figure 7: Types of energy reduction initiatives used by departments to help meet the 10 per cent target



Source: Results of NAO survey

Behaviour change initiatives

3.35 Behaviour change can be as simple and low cost as messages for all staff to switch the lights off when leaving a room, establishing a staff petition to enable staff to express support for reducing office carbon emissions, making the facilities managers more visible to staff and displaying energy performance prominently. However, initiatives can also be more complex and resource intensive based on research into energy use behaviour. For example, the Department for Work and Pensions' AWaRE campaign provided staff with an on-line energy pack with suggestions for reducing energy use, involved a call for volunteer champions to work with colleagues and used the Department's central carbon reduction team to support change in behaviour. HM Revenue and Customs held a communication campaign supported by an intranet site, a carbon calculator and action packs for its "Green Volunteers" who helped promote low carbon work practices throughout the business.

3.36 Departments generally considered behaviour change initiatives could make an important contribution to delivering their carbon emission reduction targets. HM Revenue and Customs estimated behaviour change initiatives delivered around 16 per cent of its carbon reduction target while the Department for Work and Pensions estimated the approach delivered 11 per cent of its target.

3.37 It is not always easy to cost the efforts or to monitor the results arising from behaviour change projects as distinct from the results of other initiatives. HM Revenue and Customs, the Department of Energy and Climate Change and the Cabinet Office have worked to develop methods for evaluating the value of carbon reduction initiatives which may have wider take-up across Whitehall:

- HM Revenue and Customs has developed a calculator tool that allows a member of staff to calculate the carbon emissions of an activity. For example, the Department is comparing the carbon footprint of on-line and paper-based tax returns. The Department is expecting the comparison to highlight the greater environmental savings that can arise from on-line tax returns. The tool measures the emissions in units of kg of carbon dioxide. In due course, the Department expects the tool to be used in all future business cases.
- The Department of Energy and Climate Change promoted a number of initiatives across central government. These included a one-month competition in October 2010 to reduce carbon emissions and a pledge wall for staff to sign to demonstrate their commitment to reducing office carbon. The Department suggested activities to increase awareness of the facilities management team and made the energy efficient ratings of public sector headquarters buildings more prominent.

Improving building systems and fabric

3.38 Buildings can be made more energy efficient by optimising their existing voltage supply, by maximising the efficiency of individual pieces of equipment, such as boilers, green IT or by installing new low energy technologies. It is generally easier and cheaper to improve the performance of existing equipment and systems compared to installing new low carbon technologies.

3.39 We found more departments had started to improve the use of existing equipment and systems than had invested in improving their buildings' fabric or installing low energy technologies. Four departments had carried out initiatives to improve how the systems in their buildings worked together in all or most of their properties (the Ministry of Justice, the Department for Business, Innovation and Skills, the Department for Communities and Local Government and the Foreign and Commonwealth Office) whilst two had implemented them in the majority of their properties. The other 11 departments had used such approaches in some, but not the majority of their properties.

3.40 Voltage optimisation equipment can save energy without adversely affecting use of electrical supplies. The optimisation units act as transformers to reduce the supply voltage to 220v leading to a reduced level of energy usage. Voltage optimisation was implemented by five departments in the 10 per cent target period (the Ministry of Justice, the Department for Business, Innovation and Skills, the Department for Communities and Local Government, Department for Environment, Food and Rural Affairs and the Foreign and Commonwealth Office). Three of the departments reported their projects would payback in four to five years, the other two reported a payback of eight years and 10 years. For example, between May 2010 and May 2011, the Ministry of Justice installed voltage optimisation equipment in 22 buildings at a cost of £700,000 as part of a longer running project costing £2.8 million and covering 102 buildings in total. The Department combined this initiative with installation of automated meter reading equipment so that it could monitor the impact of the voltage optimisation equipment on energy usage. The Department estimates it saved, across each of the buildings included in the initiative, between seven per cent and 12 per cent of its electricity usage and has forecasted a payback of five years (although these figures are provisional and subject to a full review).

3.41 The relatively long payback of voltage optimisation projects discouraged some departments from investing in this equipment. The Department for Work and Pensions, for example, explained that its PFI partners' requirement to only invest in projects with a three year pay-back or less prevented it from implementing more expensive projects, such as optimisation equipment.

Installing low carbon technology

3.42 The Technology Strategy Board and the Department of Energy and Climate Change are co-funding investment of £1.75 million in innovative energy efficient technologies and user behaviour approaches. The pilot projects aim to demonstrate how departments can improve their energy performance, cut energy bills and reduce carbon emissions. The Department of Energy and Climate Change, the Department for Business, Innovation and Skills, the Department for Communities and Local Government and the Foreign and Commonwealth Office will install nine technologies between them.

3.43 The Department of Energy and Climate Change has installed LED (Light Emitting Diode) lighting in the communal parts of its building, such as corridors, toilets and the canteen. The Department estimates the project could save around 45 tonnes of carbon a year (worth some £5,400 in reduced electricity bills a year). Other initiatives in the Energy Efficient Whitehall programme include ceiling tiles which store heat during the day and release it in the evening and wirelessly-controlled sockets which allow staff to see their own individual energy use over time. The Department for Communities and Local Government improved use of air conditioning and cooling in a building through a mixture of window treatment to reduce solar heat gain, a thermal energy store to enhance the cooling process, improved air conditioning chillers and use of heat storage tubes.

Evaluating energy reduction initiatives

3.44 It is important for departments to evaluate the impact of their energy reduction initiatives to assess whether they are having the desired effect and how much they have cost, to identify what has worked well and to amend their carbon reduction strategies accordingly. The Department of Energy and Climate Change and the Cabinet Office encourage departments to monitor the impact of carbon reduction initiatives and share the findings so that others can learn from their experience. The Cabinet Office has provided departments with fact sheets to help share knowledge about technologies.

3.45 The 10 per cent target and central monitoring has led to departments closely assessing their energy use and carbon emissions. However, we found that departments had not all introduced initiatives in a way that they could evaluate them. Departments had established information collection for 34 out of 60 of their initiatives, but for the remaining 26 could measure reductions for only some aspects of the initiative or not at all. Evaluation of carbon reduction initiatives is not straightforward and Departments noted that, because they have generally had to implement a number of initiatives at the same time to achieve their carbon reduction targets, it has been more difficult to assess the impact of individual initiatives. The lack of evaluation of energy reduction initiatives undermines the ability of departments to identify the best value for money for prioritising projects in future.

Future drivers for further reducing carbon emissions on the government estate

3.46 Looking forward, departments will be incentivised to seek further carbon emission reductions by two initiatives in particular:

- The Greening Government Operations and Procurement commitments, which the government announced in February 2011, included a new five-year commitment to reduce greenhouse gases and set out its intention to make sustainability reporting mandatory across the central government sector with effect from 2011-12. These commitments will be aligned, from 2012-13, with HM Treasury's Accounting for Sustainability reporting requirements, under which departments will be required to report their energy use, their cost of energy, their progress towards government targets and their own internal targets.
- The Carbon Reduction Commitment (CRC) Energy Efficiency Scheme which, from April 2010, required large carbon emitters, public sector organisations and government departments, who were covered by the scheme to show leadership and to pay for allowances to match their carbon emissions. The Department of Energy and Climate Change is proposing that the Scheme will require organisations to pay some £12 per tonne CO_2 for these allowances in the first year, with potential rises after that adding to the cost of energy use.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