

Energy consumption and carbon emissions in government departments



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Summary

1 In March 2004, the government published the energy section of the Framework for Sustainable Development on the Government Estate. It includes energy use and carbon emissions targets that individual departments and the government as a whole should achieve within specified time limits. In 2005-06, the Government carried out an internal review of the Framework, with the objective of improving the Government's performance in the way it manages sustainably its land and buildings, whilst reducing the burden on departments and rationalising the targets on which they were obliged to report. The revised initiative, now called 'Sustainable Operations on the Government Estate' (SOGE), was launched by the Prime Minister in June 2006.

2 Each year, the Sustainable Development Commission reports on the extent to which departments are making progress against the Framework targets. Their latest Sustainable Development in Government (SDiG) annual report – covering performance in 2005-06 – was published in March 2007. This review, undertaken in response to a recommendation from the Environmental Audit Committee, is based on the data underpinning that report and an in-depth analysis of departmental performance against energy targets.

Key findings

- 3** The main findings from our review are as follows:
- Performance against the key target for reducing carbon emissions by 12.5 per cent by 2010-11 is poor. Across the central government estate, emissions have fallen by 0.5 per cent since 1999-2000, but there is no clear downward trend and the fall is due entirely to changes in the Defence estate. If the impact of these changes is excluded, carbon emissions would have risen by two per cent. The rise has been particularly marked in civil departments, where emissions have risen by 12 per cent over the reporting period.
 - In 2006, the Government set a new target for achieving carbon neutrality across the central government estate by 2012. Given current progress in reducing emissions, it is clear that carbon neutrality can only be achieved by the extensive use of offsetting (i.e. by purchasing carbon credits), and/or by treating bought-in renewable energy as carbon-free.
 - The overall figures for energy consumption mask conflicting trends for fossil fuel use (heating) and electricity (lighting and IT). While gas consumption across the entire estate has declined by 9.5 per cent since the baseline year, electricity consumption has

increased by over 12 per cent. This trend is particularly marked in civil departments where there has been an increase of 34 per cent in electricity use due mainly to the growth in the use of IT-related equipment.

- In relation to energy efficiency, there has been a small improvement of two per cent compared to the target of 15 per cent by 2010-11. However, the performance of the MoD against this target cannot be assessed because of the absence of reliable baseline data. Moreover, there are very large variations both between and within civil departments over time. This measure is also difficult to interpret and does not reflect departmental performance in reducing carbon emissions.
- Civil departments are now purchasing large amounts of 'green' electricity, but no allowance is made for this in calculating carbon emissions.¹ This is due to concerns about the carbon-free nature of green tariffs, and about the extent to which they contribute additional carbon reductions beyond those which would otherwise have been achieved by electricity suppliers. Allowing departments to claim credit for green electricity could therefore result in the double counting of emission reductions at a national level. Ofgem has recently issued a consultation with a view to establishing an independent accreditation system for green tariffs.
- There are large unexplained variations in data for some departments, and in some cases performance cannot be assessed against the 1999-2000 baseline due to the lack of reliable data and the impact of departmental restructurings. This limits the extent to which departmental performance can meaningfully be assessed and compared.
- Initiatives now in progress – including OGC's Property Benchmarking Programme, DCLG's implementation of the Energy Performance of Buildings Directive, and the development of the Carbon Reduction Commitment – are likely to lead to a significant improvement in measuring and reporting.

¹ If bought-in renewable electricity were to be treated as carbon-free, emissions from the central government estate would have fallen by 12 per cent in 2005-06 instead of only 0.5 per cent.

Issues for Committee scrutiny

4 Issues the Environmental Audit Committee might wish to examine include:

- i** The adequacy of overall governance arrangements for setting targets, analyzing variations in performance, and enforcing departmental compliance with energy targets and commitments.
- ii** The reasons for poor performance against the carbon reduction target, including the quality of monitoring and analysis within individual departments and the steps being taken by them to reverse the current upward trend in emissions.
- iii** The extent to which the government has developed a strategy for achieving its target of carbon neutrality for the central government office estate, including the feasibility of substantial reductions in carbon emissions and the use of offsetting,
- iv** The utility of the energy efficiency target as a reliable measure of performance.
- v** The outcome of Ofgem's consultation to establish an independent accreditation system for green tariffs, and the impact which this might have on the extent to which bought-in renewable electricity might be considered a carbon-free source of energy.
- vi** The progress being made by OGC in rolling out its Property Benchmarking Scheme to all departments and ensuring full participation; and the likely impact on departments of the Energy Performance of Buildings Directive and the Carbon Reduction Commitment.

Introduction

1.1 This review responds to a request from the Environmental Audit Committee (EAC) to investigate anomalies in published data for energy consumption and carbon emissions in government departments. In November 2005, the EAC published a report on *Greening Government* which highlighted some key findings from the Government's *Sustainable Development in Government 2004 Annual Report* (SDiG 2004). The Committee conducted some further analysis of SDiG 2004 data which showed a significant overall increase in carbon emissions from government departments, a failure on the part of some departments to provide information on carbon emissions, and some cases of apparent inconsistencies between different data sets.

1.2 The EAC report included the following paragraphs:

"We are also seriously concerned about departmental progress against carbon reduction targets. The key outcome-related Framework target here is to reduce absolute carbon emissions by 12.5 per cent by 2010-11 relative to the 1999-2000 baseline. This amounts to a one per cent reduction a year for each department. However, departmental emissions have risen by three per cent against the baseline, and indeed the position for most departments is actually much worse than this. The SDiG report states that, if the Ministry of Defence is excluded, emissions from the remaining civil departments have risen by 11 per cent since 2000. This is a very poor performance given that emissions might have been expected to fall by four per cent, and one which mirrors the difficulties now facing the Government in achieving the challenging UK wide carbon reduction

targets it has set itself. It is particularly worrying that the trajectory is going so dramatically in the wrong direction.

It is disappointing that there continue to be serious problems relating to the availability and robustness of data provided by departments as part of the SDiG process. There also appear to be apparent inconsistencies between different data sets. It is, for example, difficult to reconcile the massive increase in the use of renewable energy with the large increases in carbon emissions reported by departments. We would welcome the assistance of the NAO in investigating these issues further."

1.3 This review responds to the Committee's request. It focuses only on energy, and incorporates an analysis of data for 2005-06 which departments provided as part of the SDiG process and which was published in March 2007.

Energy targets and the Framework for Sustainable Development on the Government Estate

1.4 In 2002, the government introduced the Framework for Sustainable Development on the Government Estate. This represented a more systematic and comprehensive approach to environmental management ("green housekeeping"), and in particular to the setting and monitoring of targets across all government departments. The energy section of the Framework was published in March 2004 and included six targets.

1.5 In 2006, the government carried out an internal review of the Framework, with the objective of reducing the burden on departments and rationalising the targets on which they were obliged to report. The revised initiative is now called 'Sustainable Operations on the Government Estate' (SOGE). The new targets will apply to the 2006-07 reporting year.

1.6 With regard to energy, four of the targets were retained (E1 to E4) while E5 (developing a long term strategy for renewable energy) and E6 (incorporating energy clauses into PFI and contracted-out service provision) were not included. The review did, however, include several significant new commitments – including the requirement on all departments to reduce carbon emissions by 30 per cent by 2020, and the requirement for the central government office estate to be carbon neutral by 2012. The Framework and the revised SOGE targets are set out below (**Figure 1 overleaf**).

The reporting of energy data

1.7 Each year, in order to assess progress against environmental targets, departments are required to provide a range of data on operational management. The Sustainable Development Commission (SDC) is now responsible for analysing this data and publishing the results in an annual Sustainable Development in Government (SDiG) report. Most data is collected through a questionnaire issued by the SDC and a web-based reporting system. However, for historical reasons, energy data has always been collected separately – with the Building Research Establishment (BRE) acting on behalf of Defra to collate and analyse information from departments. The analytical tables produced by BRE are incorporated in the SDiG report, and the underlying data is available on the Sustainable Development Commission website.

1.8 The role of BRE therefore consists of collecting and analysing data from departments covering energy consumption, surface area, and carbon emissions. Energy consumption is divided separately into heating and electricity, based on fossil fuel and renewable sources. CO₂ emissions per kWh/year are calculated per fuel type according to conversion

factors published by the BERR (formerly, the DTI). Annual carbon emissions, which are corrected for weather effects, are calculated for each department and a summary of the energy consumption and carbon emissions of the entire government are calculated separately. BRE bring together the results of their analysis in a series of tables corresponding to the energy targets, together with a set of explanatory notes. The SDC then incorporate the key findings from these tables in their annual SDiG report, and include the tables themselves as appendices. As BRE have been carrying out this role for many years, they have developed a systematic approach and maintain annual data in a complex spreadsheet which allows performance over time and against the baseline year (1999-2000) to be analysed.

How we approached this Review

1.9 For this review, we conducted an in-depth analysis of the latest available BRE data, published by the SDC in March 2007 and covering departmental performance in 2005-06. Our aim was to:

- identify the reasons for the apparent contradiction between trends in renewable energy and carbon emissions highlighted by the EAC;
- assess the progress of central government departments in terms of reducing energy consumption and carbon emissions;
- highlight variations in performance between departments and apparent anomalies in the data provided by them; and
- ensure that the BRE analysis is robust.

1.10 In addition, we conducted interviews with relevant staff in a number of departments to discuss the wider issues involved in energy management – including the barriers they faced in achieving the challenging targets now set.

1 Energy and carbon emissions targets for central government departments

Framework Targets (2004)

E1: By 2010-11, reduce absolute carbon emissions by 12.5% relative to 1999-2000

E2: By 2010-11, increase energy efficiency of buildings in terms of kWh of (a) fuel and (b) electricity use per m² surface area by 15% relative to 1999-2000

E3: By 2008, source at least 10% electricity from renewable sources by 2008

E4: By 2010, source at least 15% of electricity from Combined Heat and Power

E5: By March 2006, Government to develop a long-term strategy, up to 2020, for sourcing renewable energy on the Government Estate

E6: From August 2004, include clauses to ensure opportunities are identified and measures taken for reducing carbon emissions and collecting energy data (by fuel type), as far as practical, in all estate management contracts initiated from August 2004

Source: National Audit Office

Revised SOGE Targets (2006)

- By 2010-11, reduce absolute carbon emissions by 12.5%¹

- By 2020, reduce absolute carbon emissions by 30%¹

- By April 2007, reverse the current upward trend in carbon emissions¹

- By 2012, central government's office estate to be carbon neutral

- By 2010, increase energy efficiency per m² by 15% relative to 1999-2000

- By 2020, increase energy efficiency by 30%

- *By March 2008, source at least 10% electricity from renewable sources²*

- *By 2010, source at least 15% of electricity from Combined Heat and Power²*

NOTES

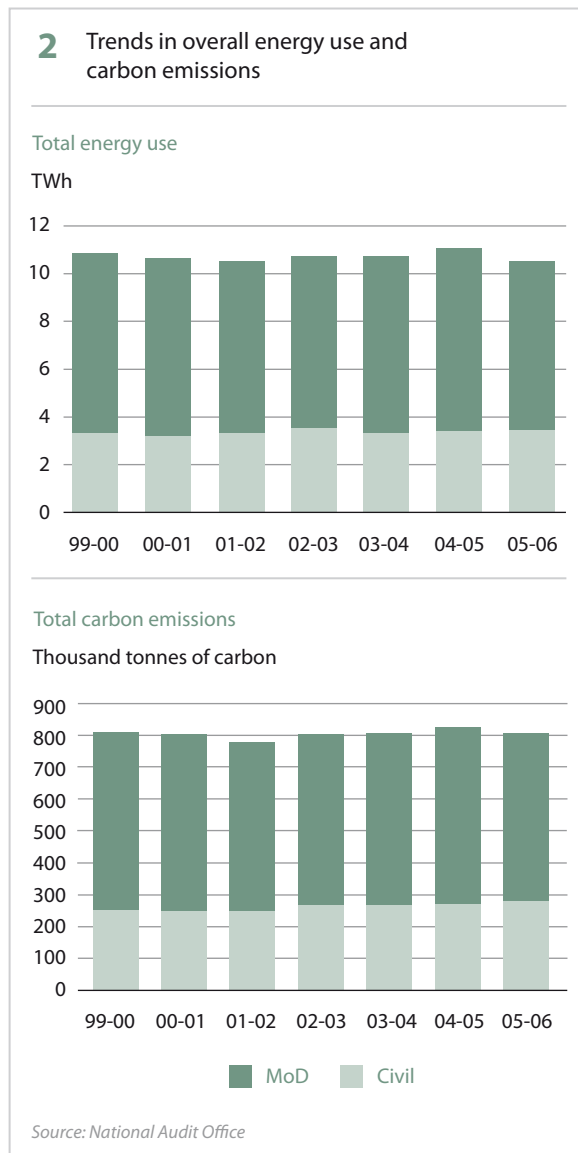
1 Under the SOGE initiative, the scope of these targets (ie that they relate only to carbon emissions from offices rather than from the total estate) has been clarified. A separate SOGE/Framework target has been set for staff-related transport emissions.

2 The renewables and CHP targets were not included in the main list of SOGE targets but were listed in the separate section entitled 'Government to Mandate' as 'existing Sustainable Operational Commitments (to continue until completion)'.

The performance of the central government estate

2.1 In this part of the review, we examine the performance of central government as a whole in terms of the key targets set for energy use and carbon emissions under the Framework initiative. We also identify various key factors which influence performance, some of which are discussed further in Part 4 of this review.

2.2 One important characteristic of the central government estate is the disparity between the Ministry of Defence (MoD) and civil departments in terms of energy use. Indeed the MoD consumes more energy than the entire civil estate² (see **Figure 2**). Apart from its sheer scale, the defence estate is unique in terms of its character as it contrasts strikingly with the largely office-based nature of many civil departments. In addition, there are a number of factors relevant to its performance, such as the effect of estate changes, which might have a disproportionately large impact on energy and carbon statistics. For these reasons, in many of the analyses below we have disaggregated the data in order to present separately the performance of the military and civil estates.



2. In this review, the term 'civil estate' is used (in lower case) to refer to the total estate of civil departments as reported on in the SDiG annual report and published datasets. It is important to note that the latter have always included the prison estate in overall Home Office figures and in total statistics for civil departments. In this respect, therefore, the use of the phrase should be clearly distinguished from 'the Civil Estate' (in upper case), the definition of which does not include the prison estate.

3. UK carbon emissions in 2005-06 were 151 MtC (see DTI, Energy Trends, March 2007, p22). See also part 4 below for a discussion of the electricity carbon factors used and the extent to which they may understate emissions.

Energy consumption and carbon emissions have declined slightly, but only because of changes within the Defence estate

2.3 In 2005-06, the central government departments consumed 10.5 TWh of energy and were responsible for 0.81 MtC emissions. The latter amounts to just over 0.5 per cent of total UK figures for carbon emissions in 2005-06.³

2.4 The combined energy use of the central government estate (including both civil departments and the MoD) has declined by 3.2 per cent since 1999-00 (Figure 2). This was mainly due to a sharp fall in consumption in 2005-06, and there is no clear overall downward trend since the baseline year. The relatively small decline in total energy use also masks contrasting trends in civil departments and the MoD. Energy consumption in civil departments has increased by five per cent from 1999-2000 to 2005-06, but this has been counterbalanced by a reduction of seven per cent in the MoD.

2.5 Target E1 of the 2004 Framework required central government departments to reduce carbon emissions by 12.5 per cent by 2010-11, relative to the 1999-2000 baseline; and it has been retained under the ‘Sustainable Operations on the Government Estate’ initiative. The target amounts to a one per cent per annum reduction on the basis of a straight line trajectory, and departments might therefore be expected to have achieved a six per cent reduction by 2005-06. However, the actual reduction achieved across the central government estate amounted only to 0.5 per cent, and even this figure again masks very different trends in the civil and military estates. Carbon emissions from civil departments increased by 12 per cent against the baseline, but this was offset by a reduction of six per cent in the MoD.

2.6 The above trends in both energy consumption and carbon emissions are summarised in **Figure 3**. The performance of the civil and military estates differ significantly, and estate changes – in particular, the privatisation of Qinetiq – account for almost all the reductions in energy and carbon within the MoD. This issue is discussed further in Part 4 of this review, but the impact is highly significant: if the carbon emissions associated with Qinetiq were excluded from the analysis, the carbon savings attributable to the MoD would fall from -6 per cent to only -1 per cent, while emissions for the central government estate as a whole would rise from -0.5 per cent to +2 per cent.

3 Changes in energy consumption and carbon emissions			
Percentage increase or decrease against baseline	Civil	MoD	Total
Energy consumption	+5%	-7%	-3.2%
Carbon emissions	+12%	-6%	-0.5%

Source: National Audit Office

2.7 The figures also show that, in percentage terms, carbon emissions have fallen less than energy consumption – and indeed in the case of civil departments have risen far more. This is due to changes in the mix of fuels which departments use – in particular, the marked increase in electricity consumption in civil departments. The following section discusses this in greater depth.

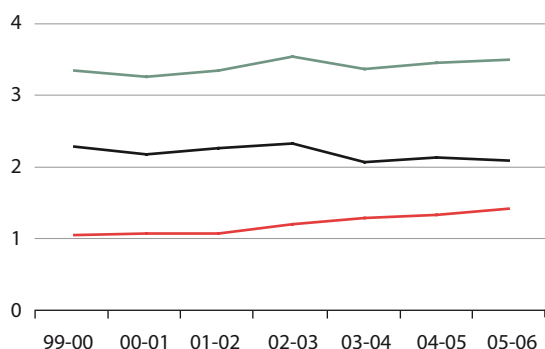
Gas consumption has fallen but there have been large increases in electricity consumption

2.8 The slight reduction of 3.2 per cent in total energy consumption hides markedly different trends in electricity and gas (**Figure 4**). While gas consumption across the entire estate has declined by 9.5 per cent since the baseline year, electricity consumption has increased by over 12 per cent. This trend is particularly marked in civil departments where there has been an increase of 34 per cent in electricity use.

4 Trends in energy use in civil departments and MoD from 1999-2006

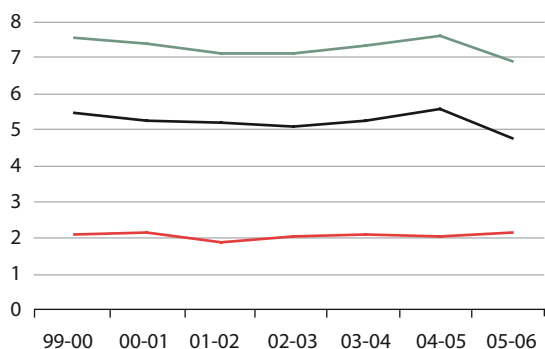
Civil Departments

TWh



MoD

TWh



Legend: Total energy (green), Fossil fuel (black), Electricity (red)

Source: National Audit Office

2.9 These results are explained by the fact that departments have succeeded in making significant reductions in terms of traditional space heating for which gas is the dominant fuel.⁴ However, there has been a large increase in IT usage caused by the need to ensure that all staff – and, in some cases, members of the public⁵ – have access to computers. This has resulted in additional electricity consumption which has counterbalanced the gains made in space heating.

2.10 The overall change in fuel mix since the baseline year accounts for the variation between the changes in energy consumption and carbon

emissions. Although total energy use has fallen slightly, the percentage share accounted for by electricity consumption has risen. As electricity is more carbon intensive than gas, carbon emissions have therefore fallen by less than the fall in total energy consumption; while in the case of the civil estate – where energy consumption has increased – there has been a disproportionately large rise in carbon emissions.

There has been little improvement in energy efficiency, but this measure is difficult to interpret when assessing performance

2.11 Target E2 of the 2004 Framework relates to energy efficiency and requires departments to reduce the use of fossil fuels and electricity per square metre by 15 per cent by 2010-11 relative to the 1999-2000 baseline. This target has been retained under the SOGE initiative, and a further energy efficiency target of 30 per cent by 2020 has been added. It is not possible to provide reliable statistics for the performance of the MoD against this target, as estate area data for the baseline year is not considered reliable (see Part 4). The analysis below therefore only reflects performance on the civil estate.

2.12 Civil departments achieved a 2.1 per cent improvement in energy efficiency in 2005-06 against the baseline. As in the case of overall energy consumption and for similar reasons, this figure masks contrasting trends. Fossil fuel use per square metre has declined by approximately 15 per cent over that period, while electricity use has increased by more than 25 per cent. However, some care is required in interpreting these statistics and assessing their implications in terms of performance. An improvement in energy efficiency (i.e. a reduction in energy per square metre of floor area) can result from either a reduction in total energy consumption or from an increase in the floor area. Hence, a department might appear to have become more efficient even if total energy use has increased, if the total floor area has increased by a greater amount.

4. The FCO and MoD make significant use of oil.
5. DWP, for example, provide significant IT facilities for members of the public seeking training and employment.

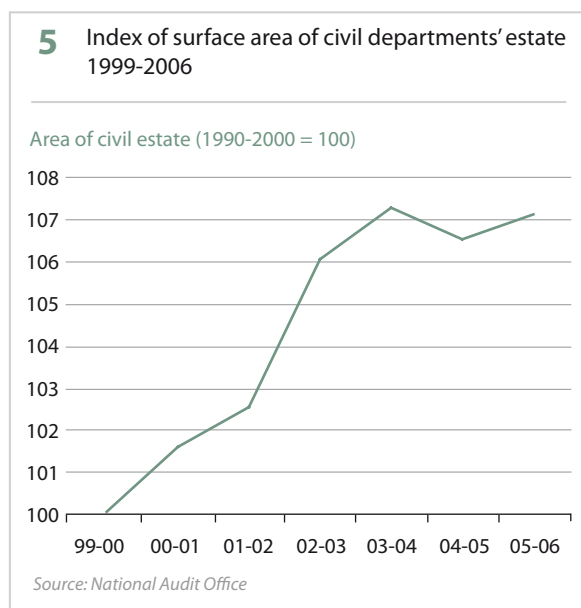
6. In commenting on this review, the CPS pointed out that the increase in floor area is due not to an increase in the size of the estate but to the fact that it has been able to report on a larger proportion of the buildings in its estate.

7. The MoD was given until 2010 to achieve this target.

8. The target was first achieved, in aggregate terms, in 2003-04 even before the Framework targets were published.

2.13 This effect can be seen in both individual departments and at an aggregate level. For example, in 2005-06 the Crown Prosecution Service improved its energy efficiency by 14 per cent relative to 1999-00 despite an overall increase in its energy consumption of 28 per cent. This can be explained by the 49 per cent increase in floor area over the same period.⁶ Similarly, at an aggregate level, the area of the civil estate has increased by 7.5 per cent since 1999-2000, as shown in the following diagram (**Figure 5**). Energy consumption on the civil estate increased by less than this (five per cent), and it is this which therefore accounts for the slight overall improvement of two per cent in energy efficiency. In other words, despite an efficiency improvement of two per cent, actual consumption rose because floor area increased by a larger amount.

2.14 The expansion in estate area since 1999 is mainly due to a 14 per cent increase in the prison estate (Home Office) and an eight per cent increase in the Department for Work and Pensions. As prisons alone account for nearly a third of the entire civil departmental estate, such an increase has a significant impact on aggregate statistics. While other smaller departments have recorded marked changes in their estate areas – both positive and negative – some of these may be explained by departmental restructurings and the transference of some operational functions from one organisation to another. These issues are discussed further in Parts 3 and 4.



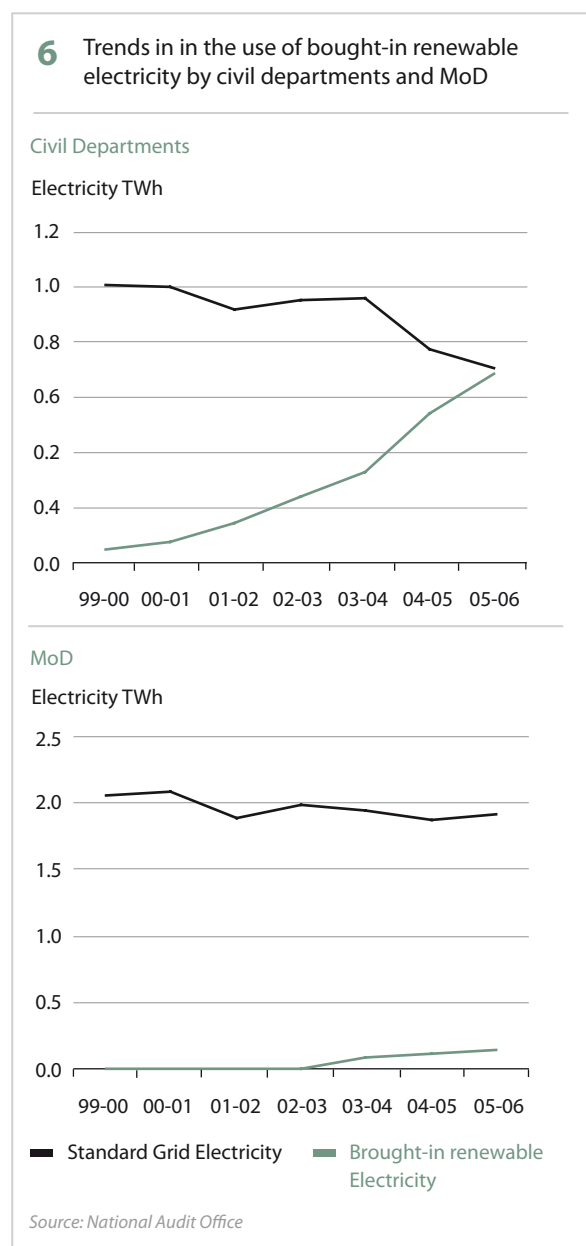
2.15 Defra explained that the energy efficiency indicator was originally introduced in the 1990s in order to give credit where floor areas had increased due to increased workloads, and to stop departments claiming credit for energy reductions which were only as a result of reduced area. However, they acknowledged the problem of interpreting energy efficiency statistics, given the increase in the use of IT and in staffing densities as a result of open-plan working and major estate rationalisations; and staff in some departments expressed the view that the energy efficiency indicator now served no useful purpose.

Departments are purchasing more 'green' electricity, but no allowance is made for this in calculating carbon emissions

2.16 Target E3 in the 2004 Framework specified that all departments should source at least 10 per cent of their electricity from renewables by 2008.⁷ This target has been carried forward within the new SOGE initiative, but there is currently no commitment to extend or increase it (see Part 4).

2.17 Many departments have achieved the target by purchasing 'green' electricity from electricity suppliers, and the percentage bought in this way across the central government estate has increased from one per cent of total electricity consumption in 1999-00 to 24 per cent in 2005-06 – easily exceeding the 2008 target of 10 per cent.⁸ Over the same period, the use of standard grid electricity declined by 14 per cent – rather less than the increase in renewables due to the fact that total electricity consumption has increased. However, the amount of 'self-generated' renewable electricity – i.e. electricity generated on the central government estate itself through the use of photo-voltaics, wind turbines, or biomass power plants – is negligible, constituting only 0.0004 per cent of total electricity consumption.

2.18 Once again, there are marked differences between the civil and defence estates, with civil departments recording an increase in bought-in renewable energy from four per cent in 1999-2000 to 46 per cent in 2005-06. This contrasts with an increase from 0 per cent to seven per cent in the MoD. The following graphs illustrate progress on buying in renewable energy in both the civil and defence estates (**Figure 6**).



2.19 The large increase in the percentage of renewable electricity purchased by civil departments is difficult to reconcile with an increase of 12 per cent in their carbon emissions over the same period. Indeed, it was the apparent contradiction between these two trends which originally prompted the EAC to ask for NAO assistance. The explanation lies in the way in which bought-in renewable electricity is treated for the purpose of calculating carbon emissions. Government policy in this respect is to assign exactly the same emissions factor to it as to standard grid electricity – i.e. to treat electricity purchased on green tariffs as giving rise to exactly the same amount of carbon emissions as ordinary electricity. Only renewable electricity which is generated on site is considered to be carbon-free. No account is therefore taken of the percentage of renewable electricity purchased by a department, and carbon emissions are calculated simply on the basis of total electricity consumption.

2.20 The overall impact of such an approach is significant in terms of assessing performance against target E1 of the Framework (paragraph 2.5 above). If bought-in renewable electricity were to be treated as carbon-free, emissions from the central government estate would have fallen by 12 per cent in 2005-06 instead of only 0.5 per cent. The impact on the civil estate by 2005-06 is still more dramatic: instead of a rise of 12 per cent, emissions would have fallen by 18 per cent.

2.21 In discussions with departments, we found that the treatment of renewable energy was a contentious issue. Some departments purchase large amounts of electricity on green tariffs and argued strongly that they should receive credit for doing so. However, Defra officials told us that there were a number of reasons for adopting such a policy. Firstly, they wished to avoid double-counting emission reductions at the level of the national accounts: electricity suppliers were already claiming emission reductions for the green electricity they generate, and to allow departments also to claim reductions for the same electricity would therefore be inappropriate.

9. This target has statutory force.

10. In 2005-06, total central government investment in expanding its CHP capacity amounted to less than £3 million.

Secondly, they pointed out that the main objective of the targets was to reduce carbon via improved efficiency, and that using green tariffs was therefore not an appropriate response. And thirdly, they were concerned that the adoption of green tariffs did not increase the supply of renewable electricity.

2.22 While the problem of double-counting might not in itself seem an insuperable barrier to overcome, there are also significant concerns about the additionality of green tariffs – the extent to which they contribute to a real increase in the supply of renewable energy – which are discussed further in Part 4. Given these concerns, there are strong grounds for supporting the government’s current approach to the treatment of renewable energy when assessing performance against the E1 Framework target.

Departments are failing to meet the CHP target

2.23 Target E4 requires departments to source at least 15 per cent of electricity from good quality Combined Heat and Power (CHP) by 2010.⁹ This target is included in the new SOGE initiative. However, the use of CHP remains negligible and it contributes only approximately two per cent of total electricity demand. Moreover, the majority of the CHP electricity used by the government is generated outside the government estate, and there is relatively little investment in expanding CHP capacity within it.¹⁰ Given the timescales for such investment to impact on performance, government departments are therefore likely to fall very far short of achieving the CHP target for 2010.

Other Framework targets have been abandoned

2.24 The 2004 Framework for energy also contained two other targets:

- Target E5 required the government to develop, by March 2006, a long-term strategy up to 2020 for sourcing renewable energy on the Government Estate; and
- Target E6 required all departments to include clauses to ensure opportunities are identified and measures taken for reducing carbon emissions and collecting energy data (by fuel type), as far as practical, in all estate management contracts initiated from August 2004.

Neither of these targets has been retained under the SOGE initiative and to this extent they have effectively been abandoned.

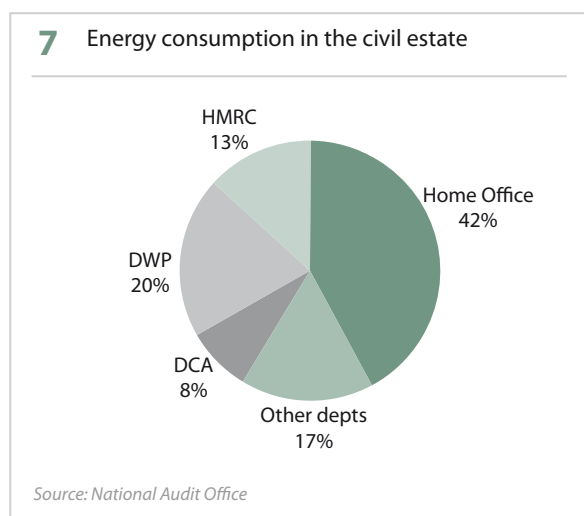
2.25 With regard to E5, the government has never developed a long-term strategy for renewable energy on the government estate. The absence of such a strategy may reduce the scope for developing a collective approach to purchasing renewable energy in a way which guarantees additionality, and to developing on-site renewable energy to a far greater extent within the central government estate.

2.26 With regard to target E6, progress cannot be assessed as there is no formal monitoring process in place. Moreover, the target is of marginal relevance to a number of departments such as DWP and HMRC which had already negotiated long-term contracts for selling and leasing back their estates. In our discussions with these departments, we found that there was a varying degree of success in incorporating retrospectively additional agreements on energy monitoring and savings. In particular, it was clear that DWP had developed a good working relationship with its estate provider and that this had resulted in an active policy of investing in ‘spend to save’ initiatives.

Performance of individual departments

3.1 In this part of the review, we summarise the performance of individual departments over time against the Framework targets for energy. We have also analysed the data to explore in greater depth the extent of variation between departments in terms of energy consumption and carbon emissions.

3.2 The performance of the MoD has already been considered in Part 2 because of its disproportionate impact on aggregate statistics. This part of the review, therefore, focuses mainly on the civil estate. But the character of the civil estate itself is not homogeneous. The four largest departments – the Home Office, DWP, HMRC, and DCA – dominate the statistics, comprising 84 per cent of the total area of the civil estate, 83 per cent of its energy use, and 81 per cent of its carbon emissions (see Figure 7).



3.3 The disparity in size of departments reflects the individual nature of their estates, and care therefore needs to be taken in assessing performance. The Home Office is in a unique position because of the inclusion within it of prisons; while DWP, HMRC, and DCA have large networks of local offices and courts. It is worth noting in this context that the wider education and health sectors are not included within the definition of the central government estate, and that this is an issue which the Environmental Audit Committee and the Sustainable Development Commission have both commented on previously.

The performance of departments against the Framework targets varies widely

3.4 Figure 8 overleaf sets out the performance of departments against the Framework targets.

3.5 In terms of performance against targets:

- Only five out of 21 civil departments have met, or are making progress against, the carbon reduction target – though four of these five have done so only because of significant reductions in their estate area. The remaining 16 civil departments, including all the largest, have recorded increases in emissions.
- Only five departments have met, or are on track to meet, the energy efficiency targets, and only one has done so while reducing overall emissions. Analysis also shows that electricity consumption per square metre increased in all departments except the FSA and MoD.

11. The only department to report any renewable electricity generated on site is the DTI, and the amount is insignificant.

- Sixteen departments have met the renewable target by buying in green electricity.¹¹ Indeed, they are purchasing so much as to render the 10 per cent target redundant.
- Performance on CHP is generally poor but a few departments are approaching the 15 per cent target – mainly by purchasing CHP-sourced electricity from suppliers in a manner similar to the procurement of renewable electricity.
- With the exception of the Food Standards Agency, no department has met or is on track to meet all targets.

8 The performance of civil departments and the MoD against energy targets

Department	Target E1: Carbon reduction %	Target E2: Energy efficiency %	Target E3: Renewable electricity %	Target E4: CHP %
Cabinet Office	7	22	57	–
Department for Constitutional Affairs	66	19	13	–
Department for Culture, Media and Sport	12	–9	85	–
Department for Education and Skills	–6	5	9	–
Department for the Environment, Food and Rural Affairs	10	11	56	12
Department of Health	–15	7	100	–
Department for International Development	88	34	–	–
Department for Trade and Industry	–17	8	34	14
Department for Transport	50	29	66	10
Department for Work and Pensions	14	–6	53	9
Export Credit Guarantee Department	57	98	8	–
Foreign and Commonwealth Office	12	5	39	–
Forestry Commission	191	93	–	–
Food Standards Agency	–15	–18	100	–
Her Majesty's Revenue & Customs	16	23	87	–
Her Majesty's Treasury	–19	27	100	–
Home Office	2	–15	17	0
Law Officers Department	52	–8	61	7
Office of the Deputy Prime Minister	9	7	78	–
Office of Government Commerce	–	–	26	–
Office for National Statistics	16	–1	8	–
Civil Departments (total)	12	–2	46	3.6
Ministry of Defence	–6	n/a	6	1.2
Total	–1	n/a	23	2.2

Source: National Audit Office

NOTE

1 Departments which have already met the targets or are on track to do so are highlighted in black. Figures for 2006-07 may change significantly in the case of certain departments as a result of recent departmental restructurings. See also paragraphs 4.12 to 4.15 below.

3.6 A feature of the table which stands out is the extent of variation in departmental performance. Outturn figures for carbon emissions range from a reduction of 19 per cent to an increase of 191 per cent, while those for energy efficiency range from –19 per cent to +98 per cent; and in both cases there is a wide spread of figures between these two extremes. This might be due to a variety of reasons – including poor data, statistical errors or anomalies, or the impact of departmental restructurings and estate changes. Defra officials considered that further analysis – for example, of the energy efficiency targets – might help to explain them and demonstrate greater uniformity. The extent of these variations nevertheless remains large, and are explored further below.

3.7 It is also worth noting that the CHP target is not considered applicable where departments procure 100 per cent of their electricity from renewable sources.¹² This leads to small anomalies in the case of some departments which utilize the Whitehall District Heating System. In the case of the Treasury, for example, performance against the CHP target is not recorded on the grounds that it already procures 100 per cent renewable electricity. Furthermore, its heat is provided by the Whitehall District Heating System, which itself is powered by a CHP plant and for which the Treasury does not receive credit. More generally, the fact that the target is expressed solely in terms of electricity – thus allowing departments simply to buy in CHP electricity – would seem to undermine the potential efficiencies offered by CHP in terms of providing heat along with electricity.

There are unexplained variations in consumption in some departments

3.8 Given the extreme range of departmental performance in 2005-06 against the baseline and the Framework targets, we analysed each department's performance over time. Our aim was to explore the extent to which there were substantial fluctuations in energy consumption and carbon emissions from one year to the next. Such fluctuations might result from errors in measurements, incomplete data, or major changes in the structure and size of estates; but their impact on performance in terms of trends in energy consumption and carbon emissions can be substantial. In our analysis, we examined three aspects of the data: significant changes in electricity and gas consumption, discrepancies between fossil fuel use for heating and estate area trends, and discrepancies between changes in energy consumption and carbon emissions.

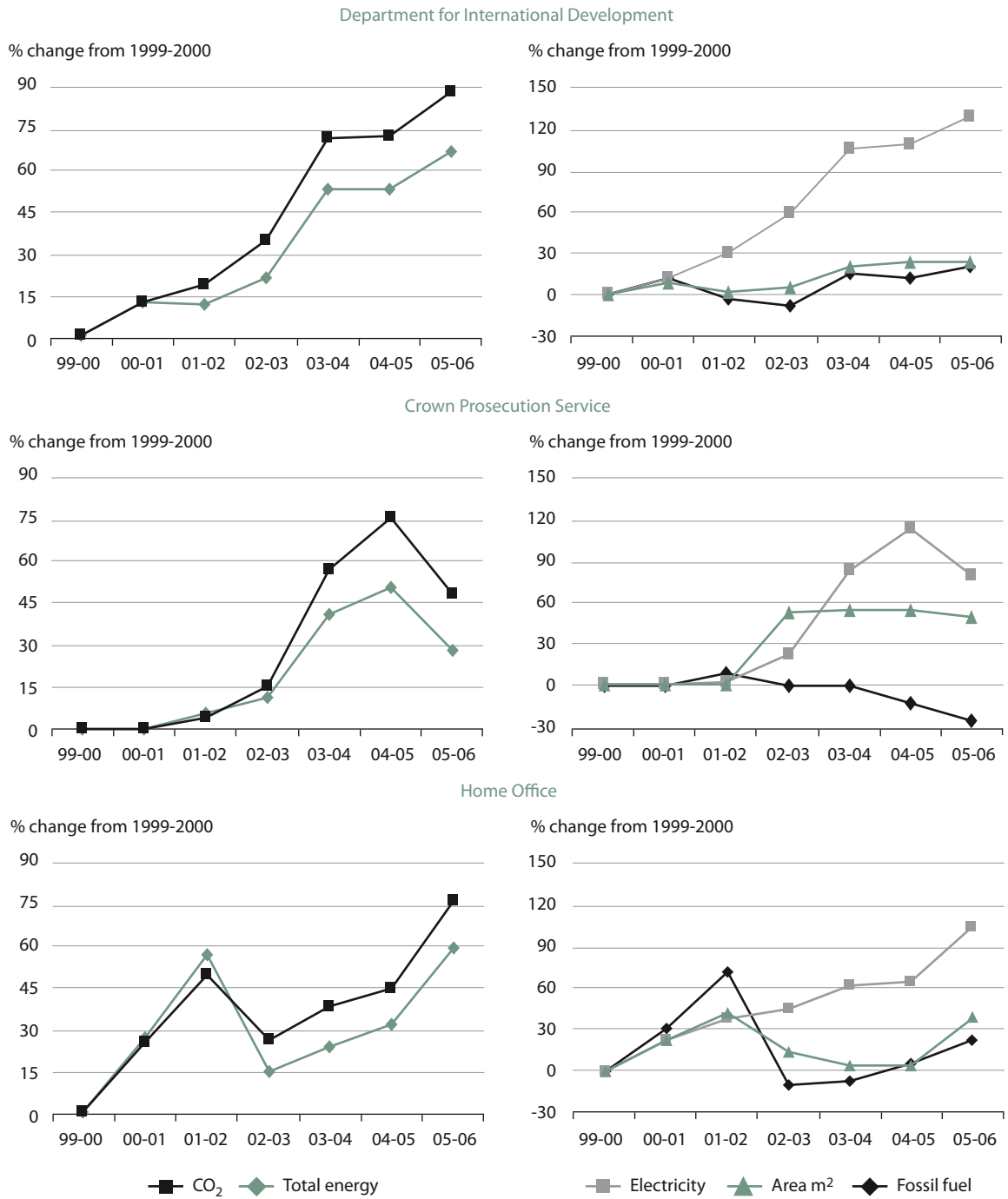
3.9 Some of the most dramatic figures in Figure 8 above can be relatively easily explained. The very large percentage increase of 191 per cent in carbon emissions in the Forestry Commission, for example, must be seen in the context of the fact that its emissions are very low (around 120 tonnes of carbon a year) and that it only moved into permanent accommodation in 2002-03. At the other end of the scale, the increase of 66 per cent in DCA emission figures reflects the doubling of its estate at the end of 2005-06 through the incorporation of magistrates courts (which were previously managed by local authorities) – and therefore does not accurately reflect on performance for the whole of the period. In the case of ECGD, the large increase in emissions is explained by data problems in the first year of reporting which caused them to be under-reported.

3.10 In other cases, however, we found significant anomalies in the data which departments had not adequately explained. To illustrate this, we set out below key trends in three departments – DfID, CPS,¹³ and the Home Office (**Figure 9 overleaf**).

12. Sustainable Development in Government, Fifth Annual Report 2006, Sustainable Development Commission, p79.

13. The CPS accounts for the vast majority of energy consumption within the Law Officers Department (LOD). In this part of our review, we analysed its performance separately.

9 Major changes in energy trends in DfID, CPS and the Home Office¹



Source: National Audit Office

NOTE

1 In the case of DfID and CPS, the use of fossil fuels relates entirely to natural gas; whereas for the Home Office, it comprises 80 per cent natural gas and 20 per cent oil.

3.11 Key points arising from this analysis are that:

- In all three departments electricity use has increased by over 80 per cent over the period since the baseline (1999-2000) and by as much as 60 per cent in consecutive years.
- There are large differences between electricity and heating trends. In DfID, electricity consumption increased by 129 per cent against an increase of less than 30 per cent in fossil fuel use. The contrast is even more striking in the case of CPS, with an 80 per cent increase in electricity and a 23 per cent reduction in fossil fuel use. In the Home Office, the variance was rather less but was still marked.
- In the Home Office, fossil fuel use for heating soared by 72 per cent in 2001-02, fell sharply to -10 per cent in the following year, but has since been rising steadily to +23 per cent in 2005-06.
- In the case of CPS, changes in the area of the estate do not appear to correlate with changes in fossil fuel use. Fossil fuel use for heating has gradually declined by 23 per cent since 1999-2000, while the surface area of the estate increased by 49 per cent in 2002-03 and thereafter remained almost unchanged.
- Changes in CO₂ emissions in both DfID and CPS are 21 per cent higher than the changes in energy consumption, primarily because the increased proportion of energy from electricity has resulted in a more carbon intensive energy mix.

3.12 The energy notes provided by these departments and published in the SDiG annual report do not fully explain these trends. The CPS acknowledges, for example, that it is reporting on 50 per cent more sites than it did in the baseline year, but this does nothing to explain the steady fall in fossil fuel use.¹⁴ DfID suggests that the impact of a major new office in 2001 and subsequent refurbishments means that data prior to 2003-04 is not comparable. It also points to large increases in staffing and IT as explanations for the recent rise in consumption and emissions. The Home Office comments relate only

to recent trends and contain no explanation for the large changes – both positive and negative – in fossil fuel use since the baseline year, though it is likely that they reflect changes in heating demand within the Prison estate.

There are large variations between departments in energy efficiency and in the relative demand for electricity and gas

3.13 We also analysed data for 2005-06 to compare departments in terms of the actual levels of energy efficiency they had achieved. This will vary depending on the nature of individual departments, their activities, and the character of their estates. The main factors influencing electricity use are the extent of air conditioning, staff density, and the number of computer terminals; while fossil fuel use is mainly dependent on the number, volume, and quality of the buildings and their occupancy rates.

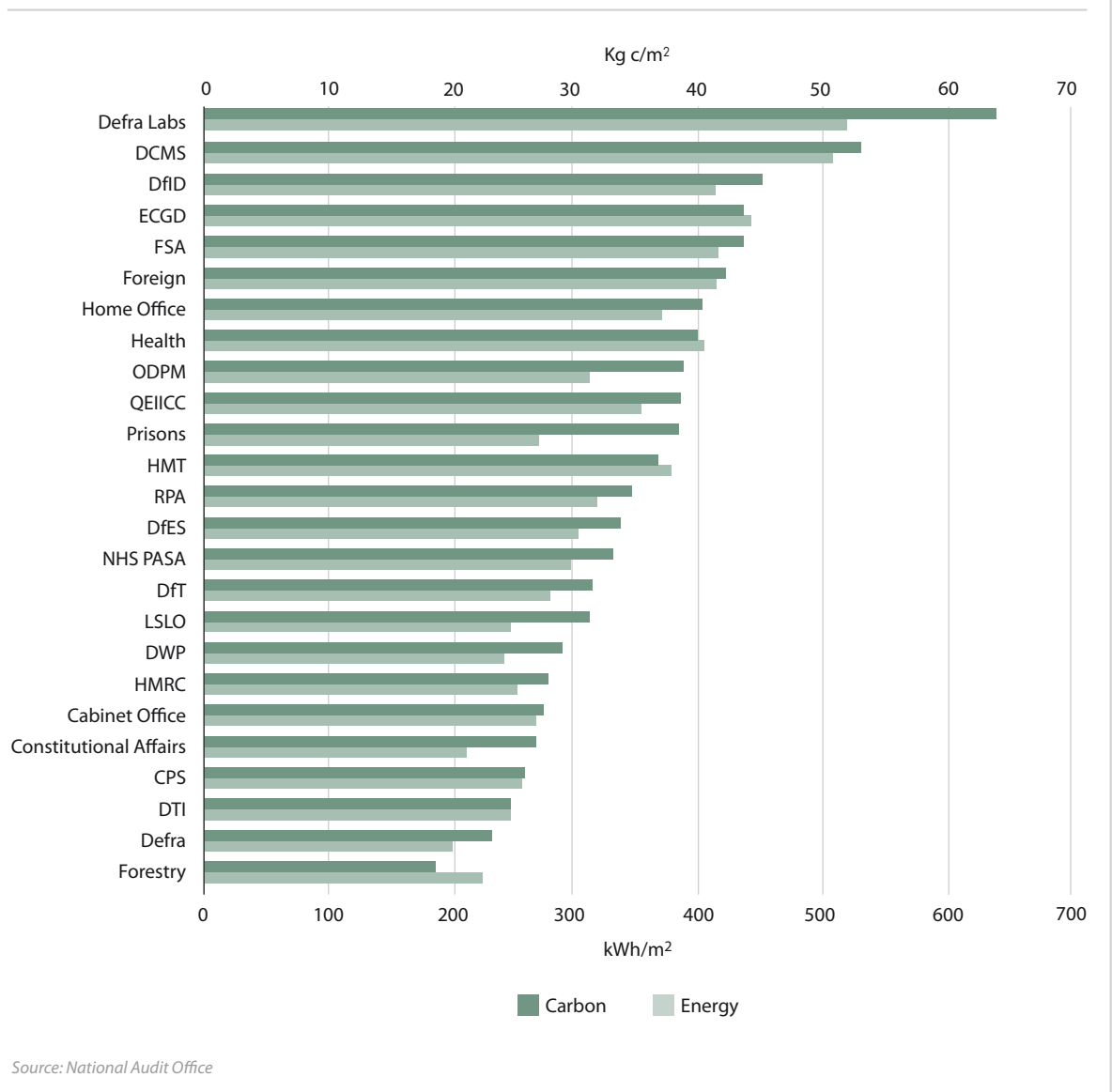
3.14 We found that the most energy intensive departments relative to their size were the Defra laboratories¹⁵ and DCMS, with a consumption of over 500 kWh per m² (**Figure 10 overleaf**). In contrast, the Forestry Commission and DEFRA, at around 200 kWh per m², consumed the least amount of energy relative to their area.

3.15 As one would expect, these variations are reflected in significant differences between departments in the amounts of carbon emissions relative to their estate size. In 2005-06, Defra Laboratories and DCMS were the most carbon intensive departments, with emissions of 52 and 51 kg CO₂ per square metre. The least polluting department was Defra with average emissions of only 21 kg CO₂ per square metre. Although the Forestry Commission was the least energy intensive department, in terms of carbon intensity it was not the lowest because of its heavy reliance on electricity.

14. In commenting on this review prior to publication, the CPS explained that the fall in gas/fossil fuel use reflected property changes within the estate resulting in a switch to buildings using electricity rather than gas. They also pointed out that much of the extra electricity consumed was procured from renewable sources. The extent to which such sources can be considered carbon-free is discussed in paragraphs 2.16 to 2.22 above.

15. In view of their totally different operational nature, we have analysed separately the Defra laboratories and the main Defra office estate.

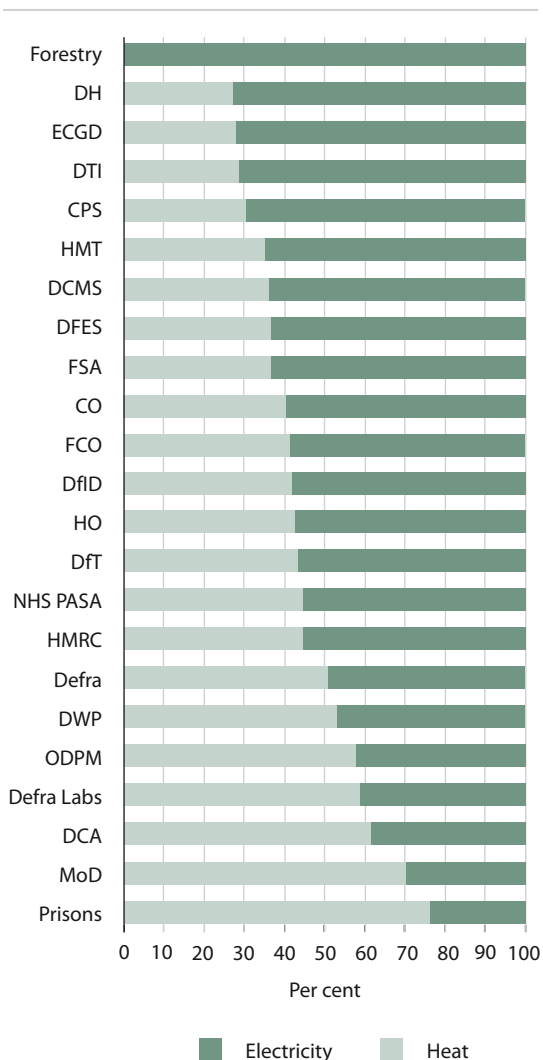
10 Energy consumption and CO₂ emissions per m² surface area used by civil departments during 2005-06



3.16 Our analysis also revealed that there were considerable differences in the relative amounts of electricity and fossil fuels they use (**Figure 11**). Fossil fuel use constitutes between 35 per cent and 45 per cent of total energy demand in eleven departments, but in the remaining 10 departments the relative proportion ranges widely – even in the

case of those departments where one might expect performance to be similar. The proportion of fossil fuel use in the Department of Health at less than 30 per cent, for example, contrasts markedly with the figure of nearly 60 per cent for the ODPM. These marked differences between departments are not correlated to their size.

11 Energy used for heating relative to electricity during 2005-06



Source: National Audit Office

3.17 Defra officials pointed out that the number of buildings within a departmental estate may be a significant factor, as many larger buildings are air conditioned whereas most small buildings are not. The average consumption per square metre is therefore affected by the mix of buildings as well as by their individual intensities, with air-conditioned buildings typically using twice as much electricity as naturally ventilated ones.

There is little analysis of cost data, but preliminary results suggest significant variations in the price paid for energy

3.18 Total expenditure on energy by Government departments in 2005-06 amounted to £150 million. In gathering data from departments, BRE collect information on total expenditure by fuel type. It uses this only to identify gross data errors, and the information is not analysed or published in the SDiG report. In preparing this review, we examined the cost data in relation to the amounts of fuel purchased, and found that there was a surprising degree of variation between departments in the prices paid for electricity and gas. For example:

- In 2005-06, DfT paid 4.3 p/kWh heat generated from fossil fuels, a figure 66 per cent higher than the average price of all civil departments.
- For grid electricity, DCA paid on average 10.1 p/kWh electricity or 36 per cent more than the average governmental price. In contrast, HMRC paid only five p/kWh or 32 per cent less than the average.

The DfT informed us that the high figure for the cost of fossil fuels was due to errors in the data submitted to BRE, the full extent of which only came to light in commenting on this review prior to publication; and that the corrected figure should be 2.3p per kWh. The next highest departmental figure was 3.5p per kWh.

3.19 The analysis revealed no consistent difference between departments – large departments did not pay on average less than smaller departments.¹⁶ Our results are set out in **Figure 12 overleaf**.

16. Regression analysis: $R^2=0.01$, $p>0.1$.

3.20 A further assessment and analysis of the key factors that influence this variation could result in substantial financial savings for the government. If those civil departments paying more for their energy could reduce their costs to the current average, cost savings of four per cent and 10 per cent might be achieved for electricity and gas, amounting to a total saving of nearly £6 million a year. The scope for financial savings might actually be much greater than this if all departments adopt more sophisticated energy procurement strategies. Indeed, OGC has been pursuing such an initiative as part of its role in helping departments achieve the efficiency savings resulting from the Gershon efficiency review and set out in the 2005 Spending Review (see Part 4).

Conclusion

3.21 The above analyses suggest that departments could do a lot more to explain annual variations in energy data. However, it was also apparent that there were a number of underlying issues affecting any assessment of performance at a departmental level, including:

- the lack of robust data for earlier years;
- the impact of major departmental restructurings;
- changes in the coverage and nature of departmental estates; and
- the impact of all these factors in terms of the basis against which performance can be assessed.

These issues are discussed further in Part 4.

12 Average prices of heat, grid electricity and bought renewable electricity paid by selected departments for energy used in 2005-06 (pence per kWh)

Source	Mean	Least cost effective	Most cost effective
Fossil fuels ¹	2.6	4.3 (66%): DfT (see para 3.18)	1.8 (-31%) ODPM
Grid electricity	7.4	10.1 (36%) DCA	5.0 (-32%) HMRC
Bought renewable electricity	6.8	8.8 (30%) CO	4.6 (-31%) DCA

Source: National Audit Office

NOTE

1 Natural gas for heating constitutes the main fossil fuel in all civil departments.

Underlying data issues

4.1 In this section we examine a number of common issues relevant to the preceding analysis of energy consumption in government departments. This includes the role of BRE in analysing departmental data, and the robustness and accuracy of that analysis. We also consider more fundamental issues which may help to explain the wide variations in data trends already highlighted in Parts 2 and 3 – in particular, the accuracy of departmental data and the difficulty of analysing performance given the extent of major structural changes in the central government estate.

The data analysis carried out by the BRE is robust, but there are minor anomalies in weather correction and emission conversion factors

4.2 The Building Research Establishment (BRE) has been responsible for collecting and analysing departmental energy data on behalf of Defra since the early 1990s. It continues to perform this role despite the development since 1999 of the Sustainable Development in Government initiative, which involves a separate process for gathering data from departments through an annual questionnaire on aspects of environmental performance. The Sustainable Development Commission are now responsible for the SDiG process¹⁷ and annual report, and the BRE are responsible for contributing to this by providing a standard set of tables analysing departmental energy performance against the

Framework targets. This arrangement appears justified in view of the complexity of energy data and the need to maintain an historical database.

4.3 We found that summary data collected and collated by BRE for the SDiG report was comprehensive for later years.¹⁸ BRE carry out extensive cross-checking on the data submitted in order to identify gross errors. But it is important to note that BRE is not responsible for auditing the data provided by departments, and there is currently no requirement for the energy returns to be externally audited or verified.

4.4 We did not find any errors in the calculations within the complex spreadsheet which BRE uses to provide performance data for the SDiG annual report. However, we did find apparent anomalies with regard to the weather correction and emission factors used in the technical analysis of data. These are discussed below.

4.5 The use of weather correction factors based on 'degree days' is an established technique to provide a more meaningful basis on which to analyse consumption trends. It involves adjusting energy consumption for heating to take account of variations in temperature on a national or regional basis and over different time periods, by reference to long-term average statistics. Data sets for degree days and weather correction factors are available from a number of sources including the Carbon Trust. BRE use different weather correction factors for each organisation depending on the location of its estate,¹⁹ and the corrected fossil fuel use is calculated by

17. Now the Sustainable Operations on the Government Estate (SOGE) initiative, following its relaunch in June 2006.

18. The issue of baseline data is discussed below.

19. BRE collect and process data separately from various entities within certain departments. In the case of the MoD, for example, information is gathered from nine different agencies and functional groups. In the case of Defra, the scientific laboratories and the RPA are separately analysed.

20. e.g. the Prison Service, Defra, and parts of the MoD.

multiplying the total reported figure by the relevant factor. Thus a factor above one would increase, and a factor below one decrease, total energy consumption. For example, the weather correction factor for DFID (part of which is based in West Scotland) was 1.061 in 2005-06, and its corrected fossil fuel figure is therefore nearly four per cent higher than if the average figure for England and Wales of 1.023 were used. Since the baseline year (1999-2000), national and regional weather correction factors have been greater than one due to the fact that annual average temperatures have been higher than the long-term average.

4.6 We found that there was a substantial variation in weather correction factors of up to 27 per cent within the same year between different organisations, though the variance fall sharply in 2005-06 (**Figure 13**). The extent of these differences appears to go well beyond natural variations in weather patterns across the country and is explored further below.

4.7 The analysis revealed particular anomalies relating to certain organisations. In the case of OGC, for example, the same weather correction factor of 1.032 had been used by BRE every year. Similarly, a factor of 1.161 had been used for ECGD from the baseline until 2005-06; 1.167 for DCMS until 2003-04; 1.102 for DfT until 2003-04; and 1.128 for DFID until 2004-05. We also noted surprisingly large changes in the factors used for the Defence Science and Technology Laboratories (DSTL), with a marked increase from 1.102 (2002-03) to 1.265 (2004-05) before falling by 26 per cent to 1.005 (2005-06). Moreover, while several large organisations carry out their own adjustments and supply weather corrected data to BRE,²⁰ it was not always clear that this was the case in all cases where BRE were using a factor of 1.000. Some of these anomalies (e.g. in relation to OGC and ECGD) can be explained by the lack of data for 1999-2000. In such circumstances, BRE use the earliest available data and extrapolate it backwards to provide a baseline.

13 Variation in weather correction factors

Year	E&W average factor	Departmental weather correction factors		Difference (%)
		Minimum (see note)	Maximum	
99-00	1.147	1.000 (DCA, DWP, Forestry, PJHQ, Army Overseas)	1.182 (HMT, CO, FCO)	18
00-01	1.018	1.000 (DCA, DWP, Forestry, PJHQ, Army Overseas)	1.175 (FSA)	18
01-02	1.126	1.000 (DCA, DWP, Forestry, PJHQ, Army Overseas)	1.175 (HMT, CO, FSA)	18
02-03	1.100	1.000 (DCA, PJHQ, Army Overseas)	1.167 (HMT, DCMS, FSA)	17
03-04	1.109	1.000 (DCA, Prisons, Forestry, PJHQ, Army Overseas)	1.208 (DSTL)	21
04-05	1.146	1.000 (Prisons, Forestry, PJHQ, Army Overseas, RAF)	1.265 (DSTL)	27
05-06	1.023	0.999 (Defence Procurement Agency)	1.070 (Forestry)	7

Source: National Audit Office

NOTE

1 in all instances where a factor of 1.000 is used by BRE, this is because the data supplied by departments has already been weather corrected.

2 E&W refers to England and Wales.

4.8 The overall impact of the weather correction adjustments carried out by BRE itself is limited. For 2005-06, it resulted in an increase in energy consumption of 1.2 per cent.²¹ However, there is no guidance on the use of weather correction factors, including the basis on which they are calculated and chosen for individual departments, the fuel types to which they should apply, and the respective roles and responsibilities of BRE and individual departments for carrying out the necessary adjustments. The provision of formal guidance would help to ensure that a consistent approach is being applied. More generally, we also noted that the established approach to weather correction which is being used takes no account of the impact of unusually hot weather on consumption through increased demand for air conditioning. Methodologies for doing so do exist but would be more complex to apply.

4.9 A second area in which we found some inconsistency relates to the emission factors used for converting energy (kWh) into carbon (kgC). These factors are provided by the DTI (now BERR) for each type of fuel or energy source. We have already pointed out that bought-in renewable energy is assigned an emission factor equal to that of standard grid electricity, and this issue raises wider concerns which are discussed in Part 5.

4.10 However, there is a more general issue relating to the factor used for calculating carbon emissions from electricity consumption. In 1999, Defra and DTI agreed to use a factor of 0.12kgC/kWh for calculating the carbon savings in the Climate Change Programme arising from energy efficiency improvements. This was because it was expected to reflect the average factor for the carbon intensity of future electricity generation from 2000 onwards. Moreover, in relation to the performance of the government estate, Defra wished to use a constant factor over the target period so that the amount of savings made by departments would be immediately transparent. In practice, however, the average carbon intensity factor for electricity

has turned out to be consistently higher, at around 0.15kgC/kWh or more. As a result, Defra estimate that emissions from the central government estate are understated by around 12 per cent (equivalent to 0.1MtC).²² We note that officials in Defra are currently considering how best to address this issue, but we support the overall approach they have adopted as a means of assessing departmental performance more transparently.

4.11 We also found that electricity generated from the Whitehall District Heating System was assigned an emission factor of 0.146 kgC/kWh – higher than the emissions factor used for standard grid electricity (0.12 kgC/kWh). In view of the fact that CHP provides greater efficiency than conventional electricity generation (due to the utilisation of waste heat), this may seem somewhat anomalous but was due to the way in which emissions from fuel inputs were allocated between heat and electricity according to Defra reporting guidelines.

Reliable baseline data does not exist for many departments and performance against the 1999-2000 baseline cannot therefore be assessed

4.12 Our analysis revealed a rather more fundamental problem with the energy data relating to the base year against which performance is assessed. In 12 departments, or constituent parts of departments, the first year for which there is reliable data on energy consumption is later than the 1999-2000 baseline year against which progress is assessed (**Figure 14 overleaf**). This is due mainly to historical problems – in particular, the lack of robust systems for collecting energy data – but it is also due to major estate changes and the impact of departmental reorganisations and restructurings.

21. The overall figure is likely to be larger than 1.2 per cent because some organisations supply adjusted data.

22. As this discrepancy relates only to electricity consumption, its overall impact on carbon emissions is proportionately less.

14 Causes of variation in baseline year, and the first reliable year of data

Lack of data / Did not exist	Poor quality of data	Estate changes
RPA-02/03	DCMS-02/03	DFID-03/04
DfT-02/03	HMRC-00/01	HMT-03/04
ECGD-04/05	DLO-01/02	Army-01/02
FSA-01/02		
FC-02/03		
LSLO-00/01		
ODPM-02/03		
Army Overseas-00/01		
Central MOD-01/02		
PJHQ-04/05		

Source: National Audit Office

4.13 Six of the 21 civil departments included in the latest SDiG Annual Report analysis did not exist in the baseline year but have been subsequently created through departmental restructurings. While the BRE make every effort to adjust data retrospectively to account for these changes, it can nonetheless be difficult to do so consistently. As illustrated in Part 3, we found unexplained variations in estate areas and other statistics which may partly be accounted for in this way. The extent of such variations therefore limit the scope for inter-departmental comparisons – though in aggregate terms the redistribution of functions between different departments would have no overall effect on performance against targets.

4.14 In a few cases (e.g. DfID, HMT), the occupancy of a new headquarters building, or one substantially refurbished, has represented such a fundamental change that – from a departmental perspective – comparisons with energy data for previous years is not particularly informative. But even then it is still valid to assess overall progress over time in reducing energy and carbon emissions, and for this reason the BRE has rightly continued to base its assessment on 1999-2000 baseline figures. Where baseline data is simply not available, the implications are significant as it means that the performance of individual

departments cannot be assessed on a consistent basis, while the progress of central government as a whole may be inaccurately represented. At present, there is no formal guidance under the SOGE initiative on the methodology for assessing performance against targets or on the baseline year to adopt.

4.15 In instances where data is not available for 1999-2000 BRE's preferred approach is to obtain data for the closest possible year to 1999-2000 and substitute this back into the baseline. Where there are buildings or sites which were in existence in the baseline year but which were not reported on, BRE carry out a partial correction to the baseline by substituting data for the earliest available year into the baseline. They consider that this approach provides the most accurate and complete measure of energy use that can be obtained in the circumstances. But such baseline adjustments can have significant impact on departmental performance against targets (Figure 8, page 16), and some departments told us that recent restructurings would radically affect their 2006-07 statistics.

Departmental estate changes can affect energy consumption statistics and distort performance against targets

4.16 Departmental restructurings may create difficulties in analysing the performance of individual organisations since the baseline year, but will not necessarily affect aggregate figures for the central government estate. However, other changes can have a more fundamental impact. In the case of DCA, for example, the absorption of magistrates courts from local authorities at the end of 2005-06 has resulted in the doubling of its size and an overall increase of five per cent in the area of the civil estate. The DCA (now the Ministry of Justice) has acknowledged that the repercussions of this are likely to affect performance statistics in future SDiG reports. BRE propose to undertake a baseline adjustment to take account of the impact on the central government estate of the acquisition of magistrates courts when DCA are able to supply data.

4.17 The most significant example showing how estate changes can distort performance relates to the sale of Qinetiq (part of the MoD) to the private sector in 2001-02. Carbon emissions associated with Qinetiq amounted to around 22,000 tonnes, and the sale therefore produced a windfall reduction in the overall emissions of the MoD. The methodology for assessing performance against energy targets takes no account of this: current emissions (excluding Qinetiq) are simply compared with baseline (including Qinetiq), resulting in emissions reductions being overstated. If Qinetiq's emissions are excluded from the base year, the percentage change in carbon emissions for the MOD estate since the baseline would be only -2 per cent instead of -6 per cent as reported. Furthermore, this would affect the overall figure for the entire government estate, tipping it from a reduction of one per cent in emissions to an increase of two per cent. Defra and BRE have fully analysed the effect of not including Qinetiq in the baseline, and since 2005 they have been including in the data tables alternative data and appropriate footnotes.

4.18 More generally, privatisation and contracting-out of functions previously carried out within departments themselves can have significant impact on departmental activities and the effective coverage of its estate. There have been many such initiatives in the last decade, and they may help to explain some of the variations in the data which we found.²³ But there has been no assessment of the impact of these initiatives in terms of the reduction in energy consumption associated with them. While it is highly likely, therefore, that reductions in energy consumption and emissions are overstated, the amount by which they are overstated is impossible to assess.

23. An early example of this effect which predates the Framework targets is afforded by the Inland Revenue's outsourcing of its computer centres during the 1990s. As this was one of the most carbon intensive parts of its estate, it therefore resulted in a significant windfall improvement in its energy efficiency performance.

The wider picture

5.1 The previous parts of this review have focussed on our analysis of the SDiG data itself. This section discusses a number of wider issues which are relevant to energy consumption in government departments.

Efficiency savings can incentivise reductions in energy use

5.2 Following the review conducted by Sir Peter Gershon on the scope for further public sector efficiency savings, the 2004 Spending Review included agreed targets for each department which would deliver in total annual efficiencies in excess of £20 million by March 2008. The Review also announced that OGC had been given overall responsibility for implementing the Government's efficiency programme and that it would set up an Efficiency Team to coordinate with departments and drive forward this initiative.

5.3 Initial research suggested that some £200 million of the £20 billion savings required could be achieved by the public sector through more efficient use and procurement of energy. As part of the wider project, OGC therefore set up in February 2006 an Energy Stakeholder Forum, comprising energy managers from departments, to share best practice and exert pressure on individual departments to achieve energy savings. One of the key issues highlighted was the scope for many departments to move away from simple annual contracts for procuring energy to more efficient approaches involving flexible purchasing of smaller amounts over time to create a portfolio approach which minimised the risk of exposure to volatile price changes.

5.4 However, discussions with OGC and other departmental staff highlighted a number of issues and potential barriers:

- At a strategic level, while all departments had agreed targets for efficiency savings to be achieved by March 2008, few of them had broken down these targets into component elements. Energy managers were therefore sometimes at a loss as to the scale of savings which they were expected to achieve.
- Some energy managers expressed the view that senior officials accorded a relatively low priority to this agenda because total expenditure on energy generally comprised a very small percentage of overall operating expenditure. Even in the case of DWP, for example, the annual energy costs of about £30 million were dwarfed by the total operating costs of the department, and the scope for potential savings in other aspects of the department's operations might therefore be viewed as far greater.
- Departments which had entered into major PFI contracts governing the ownership and management of their estates had less control over energy management. Experiences varied in their ability to achieve savings: DWP enjoyed a good relationship with LS Trillium and had developed successful partnership arrangements to promote energy efficiency projects and share the resulting financial benefits. By contrast, HMRC had not yet developed the same level of cooperation.

- Lack of data was inhibiting progress in achieving efficiency savings and reducing consumption. While departments were in general able to produce overall figures for the volume and cost of energy purchased, data on individual buildings was poor. Even where there was such data, it was often not available on an hourly metered basis and this reduced the ability of energy managers to identify key problems in managing specific sites.
- Large departments could adopt more sophisticated energy procurement strategies in order to maximise the scope for financial savings by monitoring energy markets and purchasing at optimal rates throughout the year.²⁴ However, this was less of an option for smaller departments. However, aggregating the energy requirements of a number of small departments and then managing this demand through the use of an energy service company could offer a way forward. In addition, OGC were developing common contracts (e.g. for renewable energy) for departments to use.
- Some departments anticipated that substantial energy savings would result from major programmes to rationalise their estates. DWP, for example, told us that they were looking to reduce the number of sites they occupied from around 1,800 to 1,000 over the next decade. Energy performance objectives therefore formed only part of a much larger strategic initiative.
- The lack of technical and engineering expertise among energy managers within departments was also cited as a contributory factor.

5.5 OGC are also developing two other initiatives which are relevant:

- The 'Property Benchmarking Programme' will enable departments to measure the performance of buildings through a range of key performance indicators covering both efficiency and effectiveness (such as cost per square metre and workplace productivity) and environmental indicators (such as annual water consumption per person and energy consumption per square metre). Data in OGC's database of

government buildings (ePIMS) can be analysed and benchmarked against sectoral, national and international comparators.

- 'High Performing Property – a Routemap to asset management excellence' set out a comprehensive approach to integrate property asset management into central government's strategic business delivery. Building operation efficiency benchmarks aim to deliver annual efficiency savings of 20 per cent by 2013, and continuous improvement against sustainability targets.

Recent changes to the role of OGC now mean that it has greater powers to direct departments and ensure compliance, but it remains to be seen to what extent it will be able to use these powers to increase take-up of these initiatives. The effectiveness of the Property Benchmarking Programme, in particular, is currently limited by the current level of coverage (three per cent), though OGC has committed itself to extending this to provide comprehensive coverage within 18 months.²⁵

5.6 More generally, we were concerned that there appeared to be little coordination between the OGC Energy Stakeholder Forum initiative and the various other public sector initiatives to stimulate energy efficiency. The latter include the provision in Budget 2005 of an additional £20 million to the Carbon Trust to kick-start a revolving loans fund for energy efficiency projects in central government, and the requirement in the new SOGE targets for all departments to adopt the Carbon Trust's Carbon Management Programme. Responsibility for the efficiency programme has now been transferred from OGC to the Treasury. However, OGC remains responsible – through the Collaborative Procurement Energy Team and the newly created Energy Collaborative Category Board²⁶ – for coordinating and developing energy procurement in accordance with the Government's strategy announced in January 2007. OGC has also refocused the Energy Stakeholder Forum so as to provide input into this process.

24. In the case of DWP, for example, this is carried out by the private sector contractors.

25. Public Accounts Committee, transcript of oral evidence on 18 June 2007, HC 730-i of Session 2006-07, Q19.

26. The Energy Collaborative Category Board, established by OGC in April 2007 and sponsored by the Ministry of Defence, brings together senior stakeholders representing over 60 per cent of the public sector energy landscape. This group is tasked with developing coordinated recommendations and implementation for energy procurement.

Government buildings will need to display energy performance certificates by 2009

5.7 The Energy Performance of Buildings Directive (EPBD) is an EU Directive aimed at reducing the negative effects of buildings on the environment. The main aim of the Directive is to reduce the environmental impact of buildings by developing methodologies for measuring and reporting on their performance in terms of carbon emissions.

5.8 The Directive includes a number of key requirements:

- All buildings or parts of buildings are to have an energy performance certificate available at the time of sale or rent. This includes commercial buildings and residential property. There are very few exemptions other than industrial process buildings and some heritage buildings.
- New buildings and major refurbishments of larger buildings (over 1,000 m²) must meet specified energy performance standards.
- All larger public buildings (over 1,000 m²) are to permanently display an energy performance certificate. The definition of public is not fully clarified but is likely to be buildings perceived as publicly owned or visited by the public.
- Underpinning these requirements, member states must develop a methodology for assessing the energy performance of buildings.

It also includes various other provisions, such as regular reviews of building performance standards, and compulsory inspections of boiler and air conditioning units involving the provision of advice on possible efficiency improvements.

5.9 The EPBD Directive was published in January 2003 and requires Member States to transpose its requirements into national law by 4 January 2006. However, an extension of up to three years is available for certain aspects (including the certification of buildings and inspections of boiler and air conditioning facilities) – but only if a member state can show it is required to muster sufficient numbers of acceptably qualified surveyors and inspectors.

5.10 Implementation of the Directive in the UK has been subject to some delay. Following a public consultation in 2004 and the creation of an expert advisory panel (DIAG) to provide advice, the then Office of the Deputy Prime Minister (ODPM) decided to implement the Directive mainly through amending Part L of the Building Regulations 2000. In view of the potential importance of these Regulations, the Government had in any case committed itself in the Energy White Paper (2003) to bring forward the review of them to 2005.

5.11 While amendments to the Building Regulations were published in March 2006, these did not cover some aspects of the Directive. In particular, the Department for Communities and Local Government had not resolved a key issue underpinning implementation – whether the energy performance of buildings would be assessed on the basis of their design or on the basis of actual operational performance. In October 2006, the European Commission published a ‘reasoned opinion’ naming the UK as one of nine member states which had failed to provide enough information on progress in implementing the Directive. Since then DCLG has resolved the outstanding issues, and in March 2007 laid legislation which will come into force in a phased manner between June 2007 and January 2009.

5.12 The implementation of the EPBD will have significant impact on central government departments. The requirement for energy performance certificates will be based on an assessment of actual performance and will therefore require departments to be able to report comprehensively on individual buildings. This will thus complement the wider benchmarking initiative which OGC is developing.

Government departments will also be subject to the Carbon Reduction Commitment

5.13 The Carbon Reduction Commitment (CRC) is a new scheme designed to reduce emissions in large non-intensive commercial and public sector organisations which are currently not included in the EU Emissions Trading Scheme.²⁷ This sector is responsible for around 10 per cent of the UK's carbon emissions (roughly 14MtC a year); and government projections indicate that its emissions will increase by 11 per cent over the period 2010 to 2030.

5.14 Key features of the CRC include the following:

- The scheme is mandatory and will apply to all organisations which are subject to half hourly metering and which use more than 6,000MWh of electricity a year. This would generally capture organizations with electricity bills of over £500,000 a year.²⁸ Examples of such organizations include supermarkets, hotel chains, government departments, and large local authority buildings.
- Emissions covered under Climate Change Agreements and direct emissions included in the EU Emissions Trading Scheme will not be covered by the CRC. In addition, firms with more than 25 per cent of their emissions in CCAs will be completely exempt.

- It will be based on a cap and trade approach. The government will cap total emissions by setting a limit on the number of allowances available each year. These allowances will be auctioned, and participants will be required to surrender sufficient allowances to cover their emissions at the end of the year.
- The CRC is designed to be more 'light touch' in terms of administration requirements than the EU ETS, relying on self-certification of emissions (backed up by an independent risk-based audit regime) rather than third party verification.
- In order to ease participants into the regime, and to allow government to establish more accurate data on emissions across the target sector, the CRC will feature an introductory phase, with a simple fixed price sale of allowances.
- The CRC will be broadly revenue neutral to the Exchequer. Action revenue will be recycled to participants by means of a direct annual payment proportional to average annual emissions since the start of the scheme, with a bonus or penalty depending on an organisation's position in a CRC league table.
- Most government departments are expected to meet the eligibility criteria and will therefore be obliged to participate.

5.15 The government recently issued a consultation on the CRC, and the earliest the scheme will come into force is January 2010. Taken together with the provisions of the Energy Performance of Buildings Directive, it is expected to deliver emissions reductions of 1.2MtC a year by 2020 from the target sector.

27. The scheme was formerly known as the Energy Performance Commitment (on which the Government consulted in 2006), but the name has been changed to prevent any confusion with Energy Performance Certificates.

28. While the criterion for eligibility is based only on electricity use, the scheme will cover all emissions of an organisation.

29. See paragraphs 5.19ff below for the extent to which 'green tariffs', including the OGC common contract for renewable electricity, can be considered to be zero-carbon.

30. See NAO memorandum to the Environmental Audit Committee: EAC, The Voluntary Carbon Offset Market, Sixth Report of 2006-07, HC 331, Ev 216.

31. SDC, SDiG Annual Report 2006, March 2007, page 70. Electricity generators are awarded Renewable Obligation Certificates (ROCs) for the eligible renewable electricity they produce. Under the terms of the Renewables Obligation, electricity suppliers are obliged to sell an increasing percentage of renewable electricity and must therefore purchase ROCs from suppliers. Similarly, Levy Exemption Certificates are evidence of eligible renewable electricity which is exempt from the Climate Change Levy.

Carbon neutrality can only be achieved through the use of offsetting

5.16 Our interviews with departmental staff revealed that there had been little objective assessment of the scale of energy savings which might be achievable, either at a site or estate level. However, there was general agreement that the maximum level of savings which might be possible given the existing structure of the estate would not amount to more than 30 per cent of current energy consumption. The objective of achieving carbon neutrality for the central government estate by 2012, set in June 2006, can therefore only be achieved by offsetting the remaining emissions (i.e. by purchasing carbon credits available through a range of schemes), and/or by treating bought-in renewable energy as carbon-free.²⁹

5.17 In March 2007, the Government published its UK Sustainable Procurement Action Plan. This included commitments for the Government office estate to reduce its emissions by around 180,000 tonnes of carbon dioxide by 2020; and to achieve a carbon neutral office estate by 2012 through offsetting between 475,000 and 550,000 tonnes of carbon dioxide per annum. It also stated that, by 2009, around 100,000 tonnes of carbon dioxide per year will be offset through the air travel offsetting scheme.

5.18 In considering the role of offsetting, the Sustainable Development Commission has suggested in its SDiG 2006 report that departments should not adopt a carbon neutrality policy which is based solely on offsetting, and that offsetting is no substitute for a strong carbon management programme. In that context, it has recommended implementing a system of carbon trading between departments as a means of prioritising energy savings. It has also suggested that, if offsetting is pursued, it should be done through investment in CDM projects in Annex 2 countries. The Government has already made a commitment to adopt this approach with regard to ministerial air

travel,³⁰ and such a scheme could easily be extended in order to offset the entire carbon emissions associated with central government departments. Indeed, many private sector companies, including Barclays and HSBC, are adopting similar approaches.

There are concerns about the carbon-free nature of 'green electricity'

5.19 The Sustainable Development Commission has pointed out that existing Defra guidance for business states that 'green electricity' should only be considered carbon-free where the supplier has acquired Levy Exemption Certificates or retired their Renewable Obligation Certificates.³¹ There is little evidence that energy supply companies do in fact carry this out, and a National Consumer Council report published in November 2006 highlighted the issue of 'additionality' – the fact that a decision to purchase green electricity does not necessarily result in the generation of any more renewable energy than that which the supply company would in any case have delivered in order to comply with the Renewables Obligation.

5.20 Further relevant developments have since taken place. In June 2007, OGC announced the development of a common contract through which departments can purchase 'green' electricity. In the same month, Ofgem – in conjunction with the Energy Saving Trust – highlighted the extent of public confusion and mistrust which now surrounded green tariffs and launched a consultation setting out proposals for an independent accreditation scheme with a view to publishing a revised set of guidelines in the autumn.

Department and Agency acronyms

CO	Cabinet Office
CPS	Crown Prosecution Service
DCA	Department for Constitutional Affairs
DCMS	Department for Culture, Media and Sport
DfES	Department for Education and Skills
DEFRA	Department for Environment, Food and Rural Affairs
DEFRA LABS	DEFRA Laboratories
RPA	Department of the Environment, Food and Rural Affairs – Rural Payment Agency
DFID	Department for International Development
DLO	Ministry of Defence – Defence Logistics Organisation
DTI	Department of Trade and Industry
DfT	Department for Transport
DWP	Department for Work and Pensions
ECGD	Export Credits Guarantee Department
FSA	Food Standards Agency
FCO	Foreign and Commonwealth Office
FC	Forestry Commission
DH	Department of Health
NHS PASA	NHS Purchasing and Supply Agency
HO	Home Office
HMRC	HM Revenue & Customs
HMT	HM Treasury
LSLO	Legal Secretariat to the Law Officers
MoD	Ministry of Defence
ODPM	Office of the Deputy Prime Minister
OGC	Office of Government Commerce
ONS	Office of National Statistics
PJHQ	Ministry of Defence Permanent Joint Headquarters
QEII CC	QEII Conference Centre
SFO	Serious Fraud Office
TSD	Treasury Solicitor's Department