



National Audit Office

## Measuring Up

### **How good are the Government's data systems for monitoring performance against Public Service Agreements?**

PSA 27: 'To lead the global effort to avoid dangerous climate change for the Spending Review 2008 - 2011 period'

A review of the data systems underpinning the Public Service Agreement led by the Department for Environment Food and Rural Affairs under the Comprehensive Spending Review 2007

# REPORT BY THE NATIONAL AUDIT OFFICE

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### For further information please contact:

Maggie McGhee

Director

National Audit Office

151 Buckingham Palace Road,  
Victoria, London, SW1W 9SS

Tel: 020 7798 7000

Email: [margaret.mcghee@nao.gsi.gov.uk](mailto:margaret.mcghee@nao.gsi.gov.uk)

## Validation of the data systems for the Department for Environment Food and Rural Affairs Public Service Agreement (PSA) 27, Spending Review Period 2007-2011

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## **Executive Summary**

### **Introduction**

- 1.1. This report summarises the results of our examination of the data systems used by the Government in 2008 to monitor and report on progress against PSA 27.

### **The PSA and the Departments**

- 1.2. PSAs are at the centre of Government's performance measurement system. They are usually three year agreements, set during the spending review process and negotiated between Departments and the Treasury. They set the objectives for the priority areas of Government's work.
- 1.3. This PSA is led by the Department for Environment, Food and Rural Affairs (Defra) with data provided by the Office of National Statistics and a range of other internationally recognised sources. Each PSA has a Senior Responsible Officer (SRO) who is responsible for maintaining a sound system of control across Departmental boundaries that support the achievement of the PSA. The underlying data systems are an important element in this framework of control. The most recent public statement provided by Defra on progress against this PSA was in the 2008 Autumn Performance Report (APR) and an update was provided in Department of Energy and Climate Change's (DECC) Annual Report in July 2009.

### **The purpose and scope of this review**

- 1.4. The Government invited the Comptroller and Auditor General to validate the data systems used by Government to monitor and report its performance. During the period September 2008 to January 2009 the National Audit Office (NAO) carried out an examination of the data systems for all the indicators used to report performance against this PSA. This involved a detailed review of the processes and controls governing:
  - The match between the indicators selected to measure performance and the PSA. The indicators should address all key elements of performance referred to in the PSA.
  - The match between indicators and their data systems. The data system should produce data that allows Defra to accurately measure the relevant element of performance.
  - For each indicator, the selection, collection, processing and analysis of data. Control procedures should mitigate all known significant risks to

data reliability. In addition, system processes and controls should be adequately documented to support consistent application over time.

- The reporting of results. Outturn data should be presented fairly for all key aspects of performance referred to in the target. Any significant limitations should be disclosed and the implications for interpreting progress explained.

1.5. Our conclusions are summarised in the form of traffic lights (see figure 1). The ratings are based on the extent to which Defra has:

- (i) Put in place and operated internal controls over the data systems that are effective and proportionate to the risks involved.
- (ii) Explained clearly any limitations in the quality of its data systems to Parliament and the public.

1.6. The remaining sections of this report provide an overview of the results of our assessment, followed by a brief description of the findings and conclusions for each individual data system. Our assessment does not provide a conclusion on the accuracy of the outturn figures included in Defra’s public performance statements. This is because the existence of sound data systems reduces but does not eliminate the possibility of error in reported data.

**Figure 1: Key to traffic light ratings**

<b>Rating</b>	<b>Meaning ...</b>
<b>GREEN (fit for purpose)</b>	The data system is fit for the purpose of measuring and reporting performance against the indicator.
<b>GREEN (disclosure)</b>	The data system is appropriate for the indicator and the Department have explained fully the implications of limitations that cannot be cost-effectively controlled.
<b>AMBER (Systems)</b>	Broadly appropriate, but needs strengthening to ensure that remaining risks are adequately controlled.
<b>AMBER (Disclosure)</b>	Broadly appropriate, but includes limitations that cannot be cost-effectively controlled; the Department should explain the implications of these.
<b>RED</b>	The data system does not permit reliable measurement and reporting of

<b>(Systems)</b>	performance against the indicator.
<b>RED (Not established)</b>	The Department has not yet put in place a system to measure performance against the indicator.

## Overview

- 1.7. The aim of this PSA is to measure Defra’s policies to lead the global effort to avoid global climate change. Progress towards delivering this PSA is monitored using six key indicators. These indicators are shown in figure 2 below. For this PSA we have concluded that the indicators selected to measure progress are consistent with the scope of the PSA and afford a reasonable view of progress. However, we have limitations with some indicators which are identified below. We have concerns on two key areas; whether the indicators can measure Defra or wider UK government performance in pursuing policy goals, and limitations in Defra’s internal data management processes and documentation, which, if addressed would add to the control of broadly appropriate data systems.
- 1.8. Under the recent Machinery of Government changes the responsibility for this PSA has transferred to the Department of Energy & Climate Change (DECC). Future reporting on progress on PSA 27 will therefore be under the remit of DECC.
- 1.9. Figure 2 summarises our assessment of the data systems.

**Figure 2: Summary of assessments for indicator data systems**

Indicator		Rating
27.1	Global CO <sub>2</sub> emissions to 2050	<b>Amber</b> <b>(Systems)</b>
27.2	Proportion of areas with sustainable abstraction of water	<b>Amber</b> <b>(Systems)</b>
27.3	Size of global carbon markets	<b>Amber</b> <b>(Systems)</b>
27.4	Total UK greenhouse gas and CO <sub>2</sub> emissions	<b>Amber</b>

Indicator		Rating
		(Systems)
27.5	Greenhouse gas and CO <sub>2</sub> intensity of the UK economy	Amber (Systems)
27.6	Proportion of emissions reductions from new policies below the Shadow Price of Carbon	Amber (Systems)

**Findings**

- 1.10. Overall, of the 50 DSO indicators, we found that 11 were fit for purpose (green), 19 were broadly appropriate (amber), 4 where the system did not permit reliable reporting (red systems) and 16 where the systems still had to be developed (red not established). The review was confirming whether the indicators were suitable and the data systems were in place to support this. It was not a review of the data quality itself.
- 1.11. Defra has a hierarchical management structure in place in terms of performance management. At the highest level Defra’s Management Board meets on a quarterly basis to review DSO and Public Service Agreement (PSA) performance, as well as progress on Board Programmes and a number of cross-cutting measures. More urgent issues can be brought to the Management Board’s attention at any of their monthly meetings, particularly via Performance Alerts from the SROs (Senior Responsible Owners) of the Board Programmes, or escalated immediately if need be.
- 1.12. The Corporate Portfolio and Performance Team (CPPT) co-ordinates the quarterly reporting. These reports highlight progress made in meeting the Defra’s DSOs, PSAs and associated Intermediate Outcomes (IOs) using a Red, Amber, Green (RAG) rating. These RAG ratings may not be consistent with our assessment of the indicators as we are rating the system in place, not the performance of the DSO. In addition, reports provide a high-level commentary for each of its DSOs, PSAs and associated IOs. Defra has a number of Policy Officers and Data Quality Advisors who support and provide detailed information to the SRO.
- 1.13. Defra (and now DECC) has a number of difficult areas to measure and it is noted that as a result a number of indicators are currently under development or review. Our main findings on Defra’s overall arrangements with respect to the DSOs and the indicators that it encompasses are as follows:

- The role and remit of the Data Quality Advisors and Policy Officers is not clearly defined and no formal training has been provided to these officers. Formalising training and clearly defining the role will help to ensure a much more consistent and robust approach to the development, calculation and collation of Defra's indicators. In addition, Defra does not have a formal agreed policy or strategy in respect of data quality.
- Defra has a detailed risk management framework in place at the corporate level. However, we found this has not always been cascaded down to the operational level. In particular, we found Defra does not have a comprehensive mechanism in place for the identification and assessment of risks at the indicator level.
- For some of the PSA 27 indicators, Defra relies on third parties to provide the data to enable it to calculate the indicators. Where Defra is obtaining data from external sources, it needs to more fully demonstrate it has appropriate checks, for example, where they do not already exist, agreeing Service Level Agreements with third parties setting out Defra's data quality assurance arrangements. These should be at an appropriate level proportionate to the risk to provide the necessary assurances and should provide assurance that the data is robust for the purposes for which they are using it for. Defra are confident they are getting robust data from expert providers running quality assured systems many of whom are part of Defra or wider government. The NAO are discussing with Defra what the right level of strategic assurance should be in these cases taking account of trust, where the expertise lies and the relevant priorities.
- Defra does not, in many cases, have detailed written procedure notes in place, explaining how each indicator is to be calculated and how any outliers or missing data are to be addressed. While this does not have an impact on the validity of the data systems or streams, it may make it difficult for Defra to ensure the comparability of data over time, particularly if responsibility for the calculation of performance against a given indicator is passed to a different member of staff.

1.14. There is scope for Defra to strengthen its overall approach to data quality. These findings may indicate specific weaknesses in individual data systems. Where these findings do have implications for individual indicators, we have explored them further in the next section of this report.

## Assessment of indicator set

1.15. In undertaking the validation we read the documentation associated with the PSA, including the Delivery Agreement and considered whether the indicators selected to measure progress are consistent with the scope of this PSA:

- *Indicator 1 Global CO<sub>2</sub> emissions to 2050* – This indicator is useful in understanding the UK's contribution to global emissions, and in monitoring global emissions changes. The headline indicator is supported by a narrative and by policy milestones (DSO 1) and illustrates how the UK is acting to influence international negotiations. However, it is questionable how much influence Defra's policies can have on this indicator and, as such, how useful it is as a measure of Defra's effectiveness.
- *Indicator 3 Size of global carbon markets* – Defra also has a very limited control over this system, and therefore it is difficult to use as measure of their effectiveness in this area.

1.16. We concluded that there may be opportunities to develop further indicators that show how the UK is demonstrating best practice and encouraging other countries to follow (eg first climate change bill, first auction of EU Emission Trading Scheme (EUETS) allowances, first carbon budgets).



## FINDINGS AND CONCLUSIONS FOR INDIVIDUAL DATA SYSTEMS

The following sections summarise the results of the NAO's examination of each data system.

### **Indicator 27.1: Global CO<sub>2</sub> emissions to 2050**

#### **Conclusion: Amber (Systems)**

1.17. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that the remaining risks are adequately controlled.

#### **Characteristics of the data system**

1.18. The data system for this indicator uses data from the Energy Technology Perspectives: Scenarios and Strategies to 2050, which is a comprehensive 2008 publication which demonstrates that a more sustainable energy future is within our reach, and that technology is key. This details the level of global CO<sub>2</sub> emissions that have been projected to exist in 2050 given the current policies that have been adopted by governments across the globe. This is an annual report. No checks are made by Defra on the validity of the data provided by Energy Technology Perspectives.

1.19. The indicator collates the data from the International Energy Agency (IEA) report. The indicator looks at the projected global CO<sub>2</sub> emissions from fuel combustion only to 2050 as a proxy measure. Fuel combustion is a man-made source of CO<sub>2</sub> emissions which governments can influence. It measures the most recent IEA projections relative to the projection produced in 2006, which is the baseline dataset.

#### **Findings**

1.20. This indicator is also indicator 1.1.1 within Department Strategic Objective 1. Defra is in the process of updating the measurement annex for this indicator to reflect that the figures for forecast emissions are produced biennially and that those for actual emissions are produced annually. In addition the section on minimum movement required for performance appraisal needs to be changed to not applicable as there is no quantifiable commitment within the Comprehensive Spending Review (CSR) period as the indicator is a projection to 2050.

1.21. A measurement annex is in place to support the operation of the system. However, the guidance is not sufficiently detailed and does not detail Defra's

responsibility in respect of the processing and analysis of the data. The indicator is a useful measure of global performance in reducing carbon emissions. However, it is questionable how much influence Defra policies can have on this indicator.

## **Indicator 27.2: Proportion of areas with sustainable abstraction of water**

### **Conclusion: Amber (Systems)**

- 2.1. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that the remaining risks are adequately controlled.

### **Characteristics of the data system**

- 2.2. The indicator measures the availability of water across England and Wales. Abstraction licenses are granted to water companies and other businesses and denote the maximum levels of water that they can extract from water reserves. If abstraction licenses are not managed sustainably then this could have implications for the availability of water to meet the needs of the environment, business and domestic users.
- 2.3. Sustainable abstraction (removal from surface or ground water) is abstraction of water (whether for public water supply, agriculture, industry, electricity supply etc) that meets the needs of the economy and society with acceptable impacts on the environment. Unsustainable abstraction doesn't have acceptable impacts. The source of the data for this indicator is the Environment Agency's (EA) Catchment Abstraction Management Strategies (CAMS). CAMS are EA strategies developed in consultation with local people, designed to help EA's licensing of abstractions. The CAMS are intended to inform the public on water resources and licensing practice, provide a consistent approach to local water resources management, help to balance the needs of water users and the environment and involve the public in managing the water resources in their area. CAMS were introduced in 2002 and have been produced on a rolling basis with reviews every six years. Each year EA report the data for England and Wales to Defra, including the updated information. The report shows the volume of water that could be abstracted from water sources if all licenses were fully used and assess this against the actual volume of water available and the needs of the environment. No checks are made by Defra on the validity of the data provided by EA.
- 2.4. There are 129 CAMS within England and Wales and each of these is split into catchment units. There are 927 catchment units and these are assessed as falling into one of the four following categories:
- Water available as defined by EA: Water is likely to be available at all flows.
  - No water available as defined by EA: No water is available for further licensing at low flows but some may be available at higher flows.

- Over-licensed: Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions.
  - Over-abstracted: Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions.
- 2.5. Sustainable abstraction for the purposes of this indicator is taken to be those catchment units which fall into the 'water available' category. Data is collected and analysed by EA and forwarded to Defra on an annual basis. The data provided by EA includes the number and percentage of CAMS which have been assessed as demonstrating sustainable abstraction. CAMS are assessed on a six year rolling programme, with approximately an equal number being reviewed each year. The latest set of available data is for the period ended 31 March 2008, with new data expected in June 2009. No analysis or manipulation on the data provided by EA is required by Defra.

## **Findings**

- 2.6. The baseline data for this indicator is from March 2008, when 297 catchment units were found to have sustainable abstraction. Basic outturn checks and reasonableness checks will be made on the outturn data provided by EA, however no detailed analysis will be undertaken. Progress for this indicator is reported quarterly to Defra's Management Board and is reported externally through the APR.
- 2.7. Defra's 2008 APR does not clearly describe the source of the data or the data quality arrangements and no reference is made to other relevant publicly available documents. Amending the next departmental report to this effect would be beneficial as it would enable the reader to put the information about the indicator into context.
- 2.8. The data collection procedures and controls in place at EA have not been reviewed by Defra and no steps are taken to ensure that EA's controls are operating effectively. However, from our discussions with staff at Defra it was clear that they had an understanding of the data collection methods and had a close working relationship with their contacts at EA. Undertaking an assessment of the processes and controls that EA has in place would allow Defra to identify any potential weaknesses that need addressing and this would provide additional assurances about the reliability of the data that is reported against the PSA.

## **Indicator 27.3: Size of the global carbon markets**

### **Conclusion: Amber (Systems)**

- 3.1. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that the remaining risks are adequately controlled.

### **Characteristics of the data system**

- 3.2. This indicator reviews the progress towards a viable international carbon trading system, which is a vital component towards the development of a global low carbon economy.
- 3.3. The data system for this indicator uses the data from a World Bank Report, 'State and Trends of the Global Carbon Market', on the volume of CO<sub>2</sub> emissions traded, expressed in terms of tonnes CO<sub>2</sub> equivalent.

### **Findings**

- 3.4. We note that Defra's measurement annex for this indicator is being amended. This paper highlighted that the data provider should be amended as it was incorrectly stated in the annex, and that the baseline should be changed.
- 3.5. A measurement annex is in place to support the operation of the system. However, the guidance is not sufficiently detailed and does not detail Defra's responsibility in respect of the processing and analysis of the data. It would be beneficial if officers detailed in written procedures the ways in which they collate, process, analyse and report the data and identify at each stage of this the key risks that the data system is exposed to.
- 3.6. It would be beneficial for readers if there was a cross reference to other publicly available documentation in the next departmental report and it explained in more depth why performance on this indicator has improved. It was recognised during our work that this indicator is under review and that officers are currently looking to develop more contextual measurements for this indicator.

## **Indicator 27.4: Total UK greenhouse gas and CO2 emissions**

### **Conclusion: Amber (Systems)**

- 4.1. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that the remaining risks are adequately controlled.

### **Characteristics of the data system**

- 4.2. This indicator measures the UK Greenhouse Gas and Carbon Dioxide emissions (net of land use change and forestry) with an allowance for UK emissions traded on the EUETS. The data system for this indicator uses the data from the UK Greenhouse Gas Inventory for UK emissions and EUETS verified emissions for traded volumes. The Greenhouse Gas Inventory is a complete set of UK Greenhouse gas emissions compiled using the methodologies provided by the Intergovernmental Panel on Climate Change (IPCC). This data set has been produced and quality checked by AEA Energy and Environment under contract to Defra. EUETS verified emissions data is collated by EA. This is reported annually in February.

### **Findings**

- 4.3. We note that Defra's measurement annex for this indicator is to be amended to incorporate appropriate targets in line with Koyoto targets, the climate change bill, a change in the data provider and the alteration of the baseline figures.
- 4.4. High level guidance is in place in the form of a measurement annex to support the operation of the system. However, no data analysis methodologies are available on how the indicator is compiled. There has also been no specification risk assessment which considers and addresses the key risks that the data system is exposed to.
- 4.5. Defra has robust quality control procedures in place surrounding the greenhouse gases data stream. However, the controls over the EUETS data stream are not documented and have not been tested by Defra personnel.
- 4.6. The data collection procedures and controls in place at EA have not been reviewed by the statistician at Defra and no steps are taken to ensure that EA's controls are operating effectively. However, from our discussions with staff at Defra it was clear that they have an understanding of the data collection methods.

4.7. The APR details what is measured within the scope of the indicator and developments that Defra have made in this area.

## **Indicator 27.5: Greenhouse gas and CO2 intensity of the UK economy**

### **Conclusion: Amber (Systems)**

- 5.1. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that the remaining risks are adequately controlled.

### **Characteristics of the data system**

- 5.2. This indicator measures the UK Greenhouse Gas and Carbon Dioxide emissions (net of land use change and forestry, but no allowance for emissions trading) per unit of Gross Domestic Product (GDP) presented as an indexed series (1990 = 100).
- 5.3. The data system for this indicator uses data streams from the UK Greenhouse Gas Inventory for emissions and GDP based on market prices. These data streams are National Statistic quality assured streams.
- 5.4. The Greenhouse Gas Inventory is a complete set of UK Greenhouse gas emissions compiled using the methodologies provided by the Intergovernmental Panel on Climate Change (IPCC). This data set has been produced and quality checked by AEA Energy and Environment under contract to Defra. The GDP data system stream is from the Office of National Statistics website.

### **Findings**

- 5.5. A measurement annex is in place to support the operation of the system. We noted that Defra's measurement annex for this indicator needs to be amended to reflect the correct data provider and baseline. In addition, the guidance is not sufficiently detailed and does not detail Defra's responsibility with respect of the processing and analysis of the data. Defra has not undertaken a risk assessment identifying the key risks that the data system is exposed to.
- 5.6. Within the APR there are no cross references to other publicly available documentation. However, the APR does explain how performance on this indicator is improving.



## **Indicator 27.6: Proportion of emissions reductions from new policies below the Shadow Price of Carbon**

### **Conclusion: AMBER (Systems)**

- 6.1. We have concluded that the data system underlying this indicator is broadly appropriate, but needs strengthening to ensure that remaining risks are adequately controlled. We have been informed that the indicator methodology was revised in July 2009.

### **Characteristics of the data system**

- 6.2. The indicator shows the proportion of emissions reductions from new Government policies below the Shadow Price of Carbon (SPC).
- 6.3. The SPC captures the damage costs of climate change caused by each additional tonne of greenhouse gas emitted, expressed as carbon dioxide equivalent (CO<sub>2</sub>e) for ease of comparison. It is used to value the increase or decrease in emissions of greenhouse gas emissions resulting from a proposed policy.
- 6.4. The indicator expresses the proportion of tonnes saved, the cost of which falls below the SPC. This cost will be calculated as average incremental cost (net of other costs and benefits) per tonne of CO<sub>2</sub> equivalent saved by policies (weighted by the lifetime number of tonnes saved).
- 6.5. The information which is used to measure performance against this indicator will be collected from impact assessments which have been completed and published on BERR's website. BERR is responsible for collating all Government policy impact assessments. Impact assessments are completed by all Government departments for all Government policies which have a greenhouse gas saving above a Defra defined de-minimis level. Once the impact assessments have been completed they are approved by the Chief Economist and Minister responsible for the policy. No further validation work on the impact assessments is performed by Defra.

### **Findings**

- 6.6. There is a measurement annex in place for this indicator. It includes who the data provider is, frequency of reporting and the assigned data quality officer. The measurement annex also includes a definition of the key terms used. High level guidance is also in place to support the operation of the system. However, the guidance is not sufficiently detailed and does not detail Defra's responsibility in respect of the processing and analysis of the data. Defra has not formally undertaken and documented a risk assessment for the indicator (including the data system and the data stream). Carrying out a risk assessment will ensure that

all risks are identified, documented, and plans are put in place to mitigate the risks. There is also the opportunity for Defra to work with BERR to raise the profile of this indicator and develop the guidance further.

- 6.7. This indicator was introduced in the current CSR period. As the annual reporting window has not been reached the first opportunity for Defra to report performance against this indicator is April 2009. Defra's 2008 APR reflects this, and states that the indicator has not yet been assessed.