National Audit Office

THE CARBON TRUST

Accelerating the move to a low carbon economy

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 7 Session 2007-2008 | 22 November 2007

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SUMMARY

1 The Carbon Trust has an important role in meeting the Government's target to reduce carbon dioxide emissions by 20 per cent from 592 million tonnes a year in 1990 to 474 million tonnes a year in 2010.[1] Businesses and other organisations account for a large proportion of the United Kingdom's carbon dioxide emissions.[2] Fiscal and economic measures, such as the Climate Change Levy and Climate Change Agreements[3], may provide an incentive for organisations to reduce carbon dioxide emissions, but businesses and public sector organisations often need help to achieve them. The Carbon Trust was set up to take the lead on low carbon technology and innovation in the United Kingdom.[4] Its aim is to accelerate the transition to a low carbon economy by helping organisations reduce their current carbon dioxide emissions and developing commercial low carbon technologies. Examples of the Carbon Trust's work include providing advice to the John Lewis Partnership which has prompted it to begin a programme of energy efficiency measures including replacing its refrigeration and lighting systems to reduce its energy costs by five to nine per cent, and encouraging the development of wave power technology by supporting and funding small scale prototype models to demonstrate their potential.

2 The Carbon Trust was established in 2001 as a private company with a remit covering the whole of the United Kingdom[5] and part of its role included taking over most of the Energy Efficiency Best Practice Programme previously managed by the predecessor to the Department for Environment, Food and Rural Affairs.

The Carbon Trust was set up as a private company, along the same lines as the Energy Saving Trust and the Waste and Resources Action Programme, to allow it operational flexibility and to enable it to adopt a business focus. The submission to ministers about the proposed Carbon Trust did not set out a full cost appraisal of the two potential models (those of a company limited by guarantee and of a non departmental public body); the value of the grant funding would have been the same under both approaches.

3 The Carbon Trust used £77.1 million in funding from the Department for Environment, Food and Rural Affairs in 2006-07, plus £23.1 million from the Department for Business, Enterprise and Regulatory Reform and the devolved administrations. In 2006-07, the advice and financial support for measures to reduce carbon dioxide provided by the Carbon Trust resulted in an estimated reduction in carbon dioxide emissions by its customers of between 1.2 million and 2.0 million tonnes, equivalent to a projected net financial saving of between £222 million and £359 million in future reduced energy costs. In addition the Carbon Trust estimates that its work supporting the development of low carbon technology up to March 2007 could lead to an annual reduction of between 13.7 million and 20.7 million tonnes of carbon dioxide by 2050.

4 The Carbon Trust had five subsidiary companies at 31 March 2007 to invest in low carbon technology companies, to advise on its investment portfolio, and to develop low carbon businesses, and had contracted out a large part of its administrative functions and the management of its 330[6] accredited energy consultants. Setting up a private company to design, develop and deliver programmes in order to meet objectives and targets agreed with central government is relatively unusual, and this report is the first substantive review of the Carbon Trust's performance. Our examination focused on the cost-effectiveness of the advice offered to businesses and the public sector and its programme to encourage the development of low carbon technologies.

Overall conclusion

5 In the last five years, the Carbon Trust has substantially revised and improved the earlier Energy Efficiency Best Practice Programme run by the predecessor to the Department for Environment, Food and Rural Affairs. On the basis of its estimated impact, it has secured a reduction in carbon dioxide emissions from businesses and the public sector which indicates it is likely to meet the expectation set out by the Department for Environment, Food and Rural Affairs in the Climate Change Programme 2006 that its actions will result in an annual reduction of 4.4 million tonnes[7] of carbon dioxide emissions by 2010 on levels in 1990. In financial terms the reduction in carbon dioxide emissions it achieved in 2006-07 has generated projected savings of over twice the amount of the costs incurred.[8] The Carbon Trust's support to commercialise emerging low carbon technologies could lead to further sizeable carbon dioxide emissions reductions in the future. While it remains very early to estimate the actual impact of these emerging technologies, the Carbon Trust's support of such enterprises has encouraged the private sector to invest £2 for every £1 it has committed to its Innovation Programme and £10 for every £1 committed to its venture capital investments. On this basis the Carbon Trust's advice to businesses has proved value for money and its Innovation Programme appears to be on course to do likewise.

6 The Carbon Trust has worked with a relatively small proportion of businesses and wider market penetration could generate greater reductions in carbon dioxide emissions. The Carbon Trust has worked with at least 12 per cent of companies with energy bills of over £50,000 a year. As a private sector organisation, the Carbon Trust's business-led approach has helped it to build a strong brand and market position, and encouraged innovation amongst its staff to adapt to changing market conditions and develop services to meet customer demand. Its funding from central government, however, has restricted its ability to target specific organisations because of European Union rules on state aid. Any step change in take up without a corresponding increase in government funding depends upon companies being willing to pay for advice. One option might be to explore how the Carbon Trust might franchise certain services for accredited third parties to market competitively. This could also lead to a greater ability to target those organisations where the greatest emission reductions are possible. Any resources freed up could potentially be used to lever further private sector investment in emerging low carbon technologies.

Our key findings

7 The Carbon Trust has built up a strong brand image and raised awareness in the business community and the public sector of the need to reduce carbon dioxide emissions. Market researchers commissioned by the Carbon Trust established that some 53 per cent of people in business were spontaneously[9] aware of the Carbon Trust in 2006 and its role in helping to reduce carbon dioxide emissions.

8 The Carbon Trust has drawn on its business experience to develop advice on carbon dioxide reductions that offer a financial benefit to businesses, and to lever private sector investment in low carbon technology. The Carbon Trust has developed the services previously provided by the predecessor to the Department for Environment, Food and Rural Affairs and has created new ones in order to better meet customer requirements. In most cases these services are provided free of charge.[10] Over 80 per cent of organisations were satisfied with the service they received.[11] The Carbon Trust estimates that all its services offer a net financial benefit to organisations over time, although the changes made by organisations can take longer to accrue financial benefits than investing in business development. The company has also secured £2 from the private sector for every £1 it has committed to its Innovation Programme and £10 for every £1 committed to its venture capital investments.

9 The credibility of the Carbon Trust depends on the business experience of its staff. To attract and retain suitably experienced staff the Carbon Trust pays salaries which are broadly similar to corporate and energy company rates for comparable staff posts. The average salary cost is currently £50,000. However, 80 per cent of staff in the Carbon Trust operate at a managerial or more senior level as most operational and administrative work is done by contractors. Staff at a managerial or more senior level within the Carbon Trust currently receive an average salary of £56,000[12] which is the same amount as the average salary received by staff within the Department for Environment, Food and Rural Affairs working at Grade 7 and above in 2006-07.[13] This does not take account of the performance related bonus paid to Carbon Trust staff or the impact of the non-contributory final salary pension scheme which is provided for staff at the Department for Environment, Food and Rural Affairs but not for staff at the Carbon Trust. The remuneration package of the two venture capital employees of the investment advisory subsidiary includes an incentive element in line with venture capital industry practice.

10 The Carbon Trust has significantly developed its methodology for measuring its impact. In 2006-07 it sought independent assurance under International Standard on Assurance Engagements (ISAE) 3000 over the processes in place for reporting its impacts. To its knowledge it is the only public body which has sought independent assurance under such an international standard. In 2006-07 KPMG provided assurance that, with the exception of two qualifications, the Carbon Trust was calculating its impact for directly delivered advice and interest free loans and the additional carbon dioxide savings for 2010, 2020 and 2050 from the Carbon Trust's Innovations, Enterprises and Investments activities in accordance with its methodology. This work included a review of the methodology, including challenge to the assumptions and limitations.

11 The Carbon Trust estimates that it helped its customers reduce carbon dioxide emissions by up to two million tonnes in 2006-07. Drawing upon the advice it had offered and confirmation of actions subsequently taken, the Carbon Trust estimated that organisations had reduced their carbon dioxide emissions by between 1.2 million and 2.0 million tonnes in 2006-07 alone as a result of its support. Seventy six per cent of respondents to our census confirmed that they would not have implemented the same level of carbon savings without the Carbon Trust. However 68 per cent responded that they would have implemented some of the changes to a lesser extent although it is possible that, without the Carbon Trust's intervention, some of these organisations would not have prioritised those changes which would be most effective at reducing their carbon dioxide emissions.

12 Organisations could achieve much greater reductions in carbon dioxide emissions, as less than 40 per cent of the carbon savings identified by the Carbon Trust between 2003 and 2006 have so far been realised. The Carbon Trust does not anticipate every recommendation being implemented in the short term: some advice is deliberately more challenging in order to encourage organisations to undertake ambitious energy saving projects. Our census found that 60 per cent of organisations had only implemented up to five recommendations, however, compared to an average of 11 recommendations made to a typical client. The main reasons for not implementing recommendations were competing investment priorities, and difficulties in securing senior management commitment in some organisations.

13 Only a relatively small proportion of businesses have sought specific advice from the Carbon Trust on how to reduce carbon dioxide emissions. In 2006-07 the Carbon Trust worked directly with nearly 4,000 organisations to reduce carbon dioxide emissions, a further 35,000 sought the Carbon Trust's advice through its telephone advice service and support was provided to a further 9,000 organisations through the Carbon Trust website. In the last five years it has worked with at least 12 per cent of organisations in the UK with an energy bill of over £50,000 a year,[14] 30 per cent of local authorities, 40 per cent of universities and 12 per cent of hospital trusts. The Carbon Trust has a rolling programme of work with public sector bodies and at the current rate covering them all would take several years. The Carbon Trust runs an Energy Efficiency Accreditation Scheme to enable organisations to demonstrate that they are tackling climate change. However, the scheme is not currently widely publicised to Carbon Trust customers as a potential mechanism for gaining some business benefit in terms of demonstrating their efforts to become more energy efficient to their own customers.

14 As demand has increased for energy advice, the Carbon Trust has been able to reduce its funded support for advice to companies using larger amounts of energy and it keeps the market under review to ensure that public funding is still required. However, it has not developed quantitative measures to determine the impact of reduced funding support to other organisations. The Carbon Trust has been able to reduce the funded proportion of its 'Carbon Management' service for larger energy users to 30 per cent in 2007-08, from 50 per cent in 2006-07 and 100 per cent in 2005-06. The 'Standard Site Survey' remains fully funded by the Carbon Trust as it believes that charging a fee could deter many organisations, and particularly public sector and small organisations, from taking up the service. However, standard surveys do encourage expenditure on carbon saving measures by the customers that receive them and in 2006-07 the amount spent by standard survey customers on putting in place such measures was just under twice the amount spent by the Carbon Trust delivering the surveys. Until the Carbon Trust undertakes market research to explore the potential impact on demand if it required organisations to contribute towards the cost, however, it is difficult to quantify the potential costs and benefits of such an approach.

15 The demand for site surveys from the Carbon Trust increased by 83 per cent between 2003-04 and 2006-07, but much larger scale interest from businesses in reducing carbon dioxide emissions is partly dependent on the growth of the paid-for energy efficiency consultancy market. It is not clear to what extent businesses would be willing to pay for advice and the Carbon Trust remained a significant source of income for many energy efficiency consultancy firms in 2006-07.[15] The Carbon Trust is constrained by the funding it receives on the extent to which it can offer site surveys to organisations. It therefore focuses its funding on overcoming the barriers which inhibit market take up of energy efficiency advice by providing for free services which it hopes will stimulate organisations' interest in the business benefits of energy efficiency. Encouraging organisations to seek fee-based advice depends upon the credibility, quality and consistency of the advice available compared to the cost. The Carbon Trust has not yet fully explored the feasibility of enabling accredited third parties to use the Carbon Trust brand name and associated services to generate business.

16 To date, the Carbon Trust's support of emerging low carbon technologies appears to have helped overcome many of the barriers that researchers typically face and has levered private sector investment to develop the commercial potential of such work. The Carbon Trust's focus on the commercialisation of such technologies differentiates it from other sources of funding, such as the Research Councils, and has enabled it to lever in £2 of private investment for every £1 it has committed. The Carbon Trust estimates that investments made to date could lead to a reduction of between 13.7 and 20.7 million tonnes of carbon dioxide a year by 2050. Although these estimates remain very uncertain, these savings appear to be significantly higher than those achieved from its advice to organisations by March 2007. However, the Carbon Trust believes that, in order to maximise the chance of realising future carbon savings, it is necessary for it to achieve a balance between its work supporting emerging low carbon technologies and its work encouraging organisations to reduce their current carbon dioxide emissions. The Carbon Trust's existing focus has been on development work within the United Kingdom and it has made few attempts to actively scout for promising intellectual property overseas to bring to the UK because it believes that this would not be a cost effective use of limited resources.

17 The Carbon Trust's Research and Technology Accelerators appear to be particularly well designed to fill what could otherwise be a barrier in the development of commercially viable low carbon technologies. Our consultants noted that the Carbon Trust's coordination of businesses and researchers to collaborate on these accelerator projects appeared to be unique and that the Carbon Trust's focus on applied research and commercial development rather than on pure research and academic achievement meant it supported a different range of projects from other sources of grants.

Recommendations

18 To achieve a higher implementation rate for its recommendations, to encourage the expansion of the energy advice market, and to ensure that the public funding which the Carbon Trust receives can be used to reach a wider range of organisations, the Carbon Trust should:

a Develop and expand its Energy Efficiency Accreditation Scheme to enable organisations to demonstrate that they are taking climate change seriously. This would involve:

- Using future marketing campaigns to raise public awareness that the accreditation scheme demonstrates businesses' commitment to reducing carbon dioxide emissions.
- Linking the accreditation scheme to implementation of the recommendations made by the Carbon Trust, while still offering the scheme as a stand alone service to non Carbon Trust customers.
- On this basis further encouraging accredited organisations to display the logo and to utilise it in their future marketing campaigns which could allow them to generate commercial benefits from being able to demonstrate they are reducing their carbon dioxide emissions.

b Undertake market research to assess the impact on the take up of the Standard Site Survey if customers were required to fund part of the cost.

c Based on the findings of the market research conducted in (b), explore the potential for developing a franchise model which will maintain or increase existing demand for energy advice but will enable accredited third parties to offer organisations advice which:

- Retains the credibility of the Carbon Trust brand and expertise.
- Builds on the new consultant accreditation system to allow accredited third parties to build up expertise in and market themselves to specific business sectors.
- Will allow the Carbon Trust to focus its public funding on other areas, possibly to lever further investment into low carbon technologies.

Any business case for the development of a franchise model would also need to weigh up the cost and benefits of alternative methods for achieving the above aims. The model would also need to retain the benefits of the Carbon Trust's quality assurance procedures and ability to track carbon savings whilst taking a less prescriptive approach to the management of consultants' day to day work.

d Continue to explore the feasibility of using private sector funding to increase the availability of interest free loans to small and medium sized enterprises otherwise reluctant to provide the upfront cash injection required to implement energy saving measures. The extra funding could also be used to offer a loan to small companies wanting to implement capital projects recommended by one of the Carbon Trust's surveys.

19 To further accelerate the development of new technologies that could both save carbon and be of benefit to the UK the Carbon Trust should:

a Build stronger links with overseas organisations to collate better information on international progress in developing low carbon technologies that could be used to improve support to work being done in the United Kingdom, or to bring into the UK viable projects lacking overseas support.

b Use any additional resources freed up from organisations paying for energy services to lever additional private sector investment in emerging low carbon technologies.

PART ONE

Introduction

The Carbon Trust forms a key part of the Government's Climate Change Programme

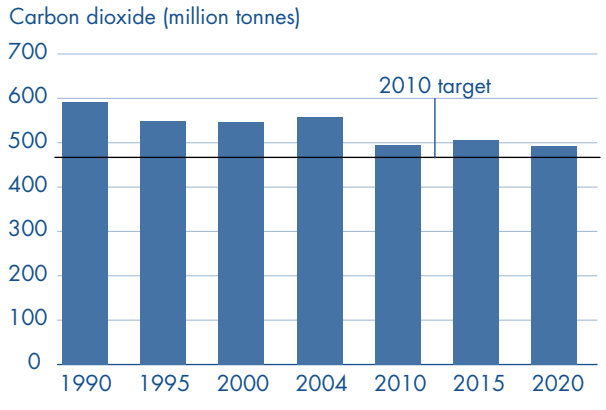
1.1 There is increased evidence of climate change caused by the activities of man. The Stern Review[16], published in 2006, concluded that climate change presented very serious global risks, and that the costs of action to cut emissions would probably be greatly exceeded by the costs of inaction. The Fourth Assessment Report from the Intergovernmental Panel on Climate Change[17], published in 2007, concluded that there was over 90 per cent certainty that the climate is warming and that this was largely due to greenhouse gases generated by human society. Carbon dioxide accounted for approximately 85 per cent of the United Kingdom's man-made greenhouse gas emissions in 2004.[18]

1.2 The Government put in place a Climate Change Programme in 2000 to address concerns over greenhouse gas emissions and set a target to cut United Kingdom carbon dioxide emissions by 20 per cent by 2010 from a baseline in 1990 of 592 million tonnes (a reduction of 118 million tonnes), and by 60 per cent by 2050 (a reduction of 355 million tonnes).[18] In 2006, the Department for Environment, Food and Rural Affairs published figures on future carbon dioxide emissions which estimated that the United Kingdom would only achieve a reduction of 10.6 per cent on 1990 emission levels by 2010. As a consequence, the Department provided additional funding to support the measures in the Climate Change Programme which it estimates could enable the United Kingdom to reduce carbon dioxide emissions by between 15 and 18 per cent by 2010 **(Figure 1)**.

1.3 According to the updated Climate Change Programme, businesses were the source of an estimated 222 million tonnes of carbon dioxide emissions in 2004 and the public sector a further 21 million tonnes. The measures in the Climate Change Programme are predicted to achieve a reduction of 32 million tonnes of carbon dioxide emissions from business in 2010, 27 per cent of the total reduction required from the United Kingdom as a whole. As **Figure 2 overleaf** demonstrates, the Carbon Trust is expected to contribute a reduction of 4.4 million tonnes a year by that date, which the Department for Environment, Food and Rural Affairs estimates will generate a net benefit of £33 for every tonne of carbon dioxide saved.[19]

1 The Government is unlikely to meet its target to cut carbon dioxide emissions by 20 per cent from levels at 1990 by 2010

Projected carbon dioxide emissions from 1990 to 2020 as at 2006



Source: NAO analysis of data from the 2006 UK Climate Change Programme and the Defra Synthesis of Climate Policy Appraisals

2 The Carbon Trust is expected to achieve a reduction of 4.4 million tonnes of carbon dioxide and other greenhouse gases a year on 1990 levels by 2010

Expected outputs from the parts of the UK Climate Change Programme affecting business

Policy	Projected annual emissions savings in 2010 (million tonnes of carbon dioxide equivalent)	Cost effectiveness of policy (net benefit per tonne of carbon dioxide saved)
Climate Change Levy – A tax on the use of energy by industry, commerce and the public sector	13.6	£27.3
Climate Change Agreements – Agreements allowing energy intensive businesses an 80 per cent discount on the Climate Change Levy in return for emissions cuts	10.6	£24.5
Carbon Trust – A government funded company set up to work towards a low carbon economy with businesses and the public sector	4.4[1]	£32.7
Building Regulations – Minimum legal standards for buildings, including energy efficiency. Last updated in 2006	2.2	£16.4
UK Emissions Trading Scheme – Businesses trade emission credits in order to meet carbon dioxide emission targets. Ended in 2006, but savings are ongoing	1.1	£38.2
Measures to assist SMEs to take up energy savings opportunities – Details of new initiatives still under discussion	0.4	No data available yet
Total	**32.3**	**Not applicable**

Source: NAO summary of data in the 2006 UK Climate Change Programme

NOTE

1 This includes an additional saving of 0.367 million tonnes of carbon dioxide emissions which arises from additional measures in the UK Climate Change Programme 2006 to enable the Carbon Trust to provide additional support for investment in energy efficiency in small and medium sized enterprises.

The Carbon Trust is a private company funded by a range of government organisations

1.4 The Carbon Trust was set up in 2001 as a private company limited by guarantee so that it could act more independently of government and work with businesses on an equal footing.[20] The Carbon Trust's Board includes two executive directors, alongside representatives from each of the funding bodies and ten representatives from the private sector and other relevant stakeholders. The company is funded largely by government departments, of which the Department for Environment, Food and Rural Affairs is the main contributor **(Figure 3)**. The Carbon Trusts's income has increased from £2.9 million in 2001-02 to £103 million in 2006-07. The Carbon Trust Group reported a profit before tax of £481,000 in its published accounts in 2006-07. However, this profit is a product of the way in which the Carbon Trust is required under accounting rules to show its income and expenditure, and does not indicate a cash surplus.[21]

1.5 When the Carbon Trust was being set up the priority for the predecessor to the Department for Environment, Food and Rural Affairs was to establish an organisation which was business focussed. The Advisory Committee on Business and the Environment Climate Change Working Group[22], who considered potential structures for the Carbon Trust, put forward two options to the predecessor to the Department for Environment, Food and Rural Affairs, those of a company limited by guarantee and of a non departmental public body. Departmental advice given to ministers at the time, and subsequent advice from the Advisory Committee on Business and the Environment, both recommended that the Carbon Trust be set up as a private company limited by guarantee, along the same lines as the Energy Saving Trust, which was already in operation and which the Department's predecessor judged to be operating effectively, to allow operational flexibility and ensure business focus. The advice recognised that proper checks and balances would need to be applied and that the Carbon Trust would need to be free from undue market influence. It also stated it was important to involve a wide range of stakeholders and there should be clear

lines of accountability to the Carbon Trust's funders. The submission to ministers did not set out a full cost appraisal of the two potential models; the value of the grant funding would have been the same under both approaches. The Department's predecessor's primary concern was to create the right delivery mechanism for the business sector, to maximise the effectiveness of initiatives to reduce carbon dioxide emissions.

1.6 In 2002 the Carbon Trust took over the management of most of the Energy Efficiency Best Practice Programme, a scheme that had previously been run by the predecessor to the Department for Environment, Food and Rural Affairs to provide advice to businesses and the public sector on how to cut their carbon dioxide emissions. The Carbon Trust took forward those elements which it considered had potential, revising them to make them more focussed on customer need and on carbon dioxide reduction. It also expanded its capacity to deliver support to customers and developed many new different work areas such as the Investments, Enterprises and Innovations activities (see below).

1.7 The Carbon Trust's aim is to accelerate the transition to a low carbon economy. It had three main areas of work in 2006-07:

- **Carbon Trust Solutions.** This involves working with business and the public sector to identify carbon dioxide emissions and support their reduction through the use of energy and carbon management surveys, provision of advice through publications, the website and the telephone helpline and financial support (£66 million[23] of funding used in 2006-07).
- **Carbon Trust Innovations, Enterprises and Investments.** This involves providing support to the development of commercially promising low carbon technologies through partnerships, funding, expert advice and large-scale demonstrations of the impact of new technology (£20 million in 2006-07). This work also aims to demonstrate the commercial potential of the low carbon technology sector to possible investors, and to create and manage new low carbon businesses with the aim of accelerating the development of low carbon markets.
- **Carbon Trust Insights.** This involves raising awareness of and explaining the issues and opportunities surrounding climate change and carbon reduction and promoting action by business and the public sector. It also involves developing low carbon strategies that engage government and business (£6 million in 2006-07).[24]

1.8 The Carbon Trust has contracted out a significant proportion of its delivery work. **Figure 4** shows that of the Carbon Trust's net expenditure of £95 million in 2006-07, 43 per cent was spent through external providers. The reliance on external providers has enabled the Carbon Trust to draw upon a wide range of skills and expertise whilst maintaining a relatively flexible workforce which can meet changes in demand for its services and respond to rapidly changing market conditions.

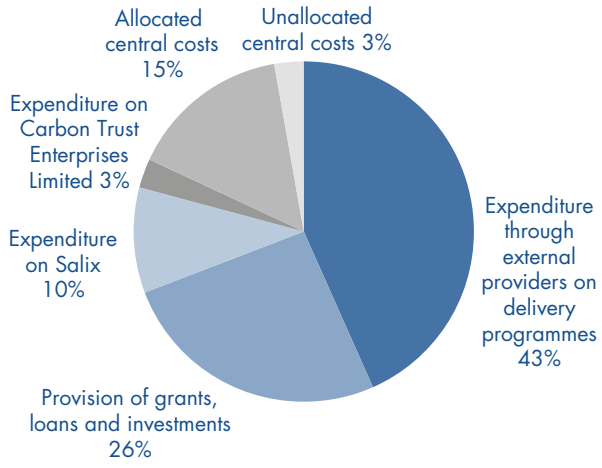
3 The Department for Environment, Food and Rural Affairs provided 75 per cent of the funding for the Carbon Trust's activities in 2006-07

Level of funding for Carbon Trust's activities by organisation

Provider of funds	Amount of funding for Carbon Trust's activities in 2006-07 (£ million)
Department for Environment, Food and Rural Affairs	77.1
Department for Business, Enterprise and Regulatory Reform (formerly the Department for Trade and Industry)	9.6
Scottish Executive	4.9
Welsh Assembly Government	4.2
Invest Northern Ireland	4.4
Other income from loan repayments and investment return	3.0
Total	**103.2**

Source: National Audit Office analysis of Carbon Trust data

4 43 per cent of the Carbon Trust's net expenditure was through external providers



Source: NAO analysis of Carbon Trust data

NOTE

Salix is an independent company which provides finance to public sector bodies – see paragraph 1.15.

1.9 The costs incurred centrally by the Carbon Trust relate to the cost of its own staff and administrative expenditure **(Figure 5)**. Total central costs in 2006-07 were £16.1 million. Out of this amount, £13.3 million was allocated to operations leaving £2.8 million of management and administration expenditure (three per cent of net expenditure) unallocated. The majority of central costs related to staffing in 2006-07 (51 per cent of total central costs) and IT (27 per cent). Salary costs have increased as the Carbon Trust has expanded its staff numbers from an average of 61 in 2003-04 to 127 in 2006-07. IT costs increased significantly in 2005-06 and in 2006-07 due to the development of the Customer Offer project to provide better information and more tailored support to customers of Carbon Trust Solutions. Central costs divided by the average number of staff in the Carbon Trust across the period increased from £116,000 in 2004-05 to £132,000 in 2005-06, largely as result of the expenditure on IT, but decreased to £127,000 in 2006-07.

5 The Carbon Trust's central costs as a proportion of total net expenditure have fluctuated

The Carbon Trust's central costs between 2003-04 and 2006-07

	2003-04 £000s	2004-05 £000s	2005-06 £000s	2006-07 £000s
Staff costs				
■ Wages and salaries	2,872	3,897	5,503	7,107
■ Social security costs	331	452	638	688
■ Pension costs	174	262	296	413
Total staff costs	**3,377**	**4,611**	**6,437**	**8,208**
IT	2,444	2,060	4,409	4,296
Marketing	469	622	783	1,136
HR related costs[1]	553	713	1,144	998
Accommodation[2]	528	548	744	820
Professional	167	276	227	391
Other[1,3]	190	251	330	244
Total administrative costs	**4,350**	**4,470**	**7,636**	**7,883**
Total central costs	**7,727**	**9,081**	**14,073**	**16,091**
Central costs as a percentage of net expenditure	14%	15%	20%	17%
Unallocated central costs as a percentage of net expenditure[4]	3%	2%	2%	3%

Source: National Audit Analysis of Carbon Trust data

NOTES

1 The increase in costs largely reflects the changes in staff employed by the Carbon Trust over the period. Average staff numbers increased from 61 in 2003-04, to 78 in 2004-05, 107 in 2005-06 and 127 in 2006-07.

2 Costs increased from 2005-06 as the Carbon Trust took on an additional floor at their London premises in November 2005 to increase square footage by 33 per cent.

3 Other costs include recruitment, training, equipment hire and stationery.

4 Where the numbers do not sum exactly to the totals this is due to rounding.

CASE EXAMPLE 1

Connective Energy

Carbon Trust Enterprises Ltd is a wholly owned trading subsidiary of the Carbon Trust which creates and manages new low carbon businesses with the aim of accelerating the development of low carbon markets. The subsidiary generates business ideas and may seek co-funding from private sector investors to develop potential ventures. Connective Energy is one of five launched so far, and is a joint venture established in 2006 between the Carbon Trust, Doosan Babcock and Triodos Renewables. Connective Energy intends to charge for piping waste heat from one party to another, in the process displacing heat generated using fossil fuels.

1.10 The private sector status of the Carbon Trust has allowed the management team to build close relationships with potential investors, to recruit staff with business expertise who are experienced in taking forward business proposals (Case example 3), and to respond quickly and flexibly to changes in market conditions. Furthermore, the Carbon Trust's arm's length relationship with government has enabled it to take the opportunity to explore different options for reducing carbon dioxide emissions. Our interviews with key staff in the Carbon Trust established that they believed that customers and investors were more willing to share information and commit their money when they recognised that the Carbon Trust would not pass confidential business data to central government. One drawback of the company's commercial activities, however, is that it can be perceived by some businesses as a potential competitor. Some of the organisations our consultants interviewed as part of their review of the Carbon Trust's Innovations, Enterprises and Investment activities expressed concern about the potential for perceived conflicts between the Carbon Trust's intelligence gathering and commercial work. Similarly, the Energy Services and Technology Association noted that some of their members were unwilling to share commercial information with the Carbon Trust as they viewed elements of the Carbon Trust as a potential competitor.

1.11 The business sector appears to regard the Carbon Trust's arms-length relationship with the Department for Environment, Food and Rural Affairs as positive evidence of their independence and, therefore, that their advice is likely to be more objective. The Confederation of British Industry confirmed to us that they welcomed the fact that the Carbon Trust did not have to pursue a specific political agenda. A quarter of the customers in our census of the Carbon Trust's customers who rated the Carbon Trust as providing better energy advice than others explained that this was because they were independent and did not have to promote particular services.

1.12 The Carbon Trust's staff remuneration costs reflect the fact that it has needed to recruit staff with significant private sector expertise to allow it to engage effectively with business, to develop business proposals and to run the investment side of its business. Total salary costs per person range from under £15,000 a year to £155,000 and average £50,000 a year. Eighty per cent of staff in the Carbon Trust operate at a managerial or more senior level as most operational and administrative work is done by contractors. Staff at a managerial or more senior level within the Carbon Trust receive an average salary of £56,000[12] which was the same amount as the average salary received by staff within the Department for Environment, Food and Rural Affairs working at Grade seven and above in 2006-07.[13] This does not take account of the performance related bonus paid to Carbon Trust staff or the impact of the non-contributory final salary pension scheme which is provided for staff at the Department but not for staff at the Carbon Trust. Average salaries in the Carbon Trust increased by nine per cent between 2003-04 and 2005-06, the same rate of increase as the Department for Environment, Food and Rural Affairs.

1.13 Staff remuneration costs in the Carbon Trust appear to be broadly similar to those in comparable roles within the private sector. According to a benchmarking exercise conducted by Towers Perrin HR Services in 2005, 94 per cent of Carbon Trust employees fell within the benchmark range of comparable roles within divisions of large corporate companies, small corporate companies and energy companies. The average remuneration also reflects the fact that the majority of Carbon Trust staff operate at a managerial equivalent or more senior level as the majority of administrative and operational work is done by external providers.

Scope of our examination

1.14 The Carbon Trust is a parent company, which had five subsidiaries at 31 March 2007 (see Appendix 2). The subsidiaries are all part of the Innovations, Investments and Enterprises activities and were set up from 2003 on the advice of the Carbon Trust's auditors (Deloitte) to improve governance and increase the transparency of tax treatment by separating out each part of the business with the potential to make a profit and to allow the subsidiaries to have a visible commercial focus. The Chief Executive and the Finance Director of the Carbon Trust are directors of all wholly owned subsidiaries and on the Management Committee of the investment advisory partnership, CT Investment Partners LLP. The National Audit Office has statutory audit access rights to conduct value for money examinations of the Carbon Trust itself, but not its subsidiaries. As a private company, the financial audit of the Carbon Trust's accounts is undertaken

by private sector auditors. Nevertheless, the Carbon Trust's management team provided the National Audit Office with full audit access to any papers or individuals within the subsidiary companies in order to undertake this examination.

1.15 Our study has focused on the function of the Carbon Trust and the cost effectiveness of its work. In particular the study has set out to answer the following two questions:

- Is the Carbon Trust providing cost-effective support to help individual businesses and public sector organisations to cut their carbon dioxide emissions?
- Does the Carbon Trust have a cost-effective programme to encourage the development of new low carbon technologies?

We have excluded three activities funded by the Carbon Trust from the scope of our study: Carbon Trust Insights because it mainly relates to the provision of advice to government as well as to businesses; Salix, a company which provides finance to public sector bodies to implement energy efficiency projects; and Enhanced Capital Allowances, policy responsibility for which lies with HM Revenue & Customs, the Department for Environment, Food and Rural Affairs and HM Treasury. The Carbon Trust operates across England, Scotland, Wales and Northern Ireland and we have therefore included within the scope of our investigation its activities throughout the United Kingdom. The methods we used to undertake our study are set out in detail at Appendix 1 and in **Figure 6**.

6 A summary of our study methodology

Method	Purpose
A census of all Carbon Trust customers who received a survey from April 2005 to March 2006.	To understand the impact of the Carbon Trust's work helping organisations to reduce their carbon dioxide emissions from the point of view of customers receiving surveys.
A census of all energy consultants used by the Carbon Trust to deliver surveys.	To understand the impact of the Carbon Trust's work helping organisations to reduce their carbon dioxide emissions from the point of view of consultants delivering surveys.
Case studies of nine organisations which had received Carbon Trust surveys.	To follow up in more detail results from the customer census and to investigate barriers preventing organisations from reducing emissions.
A review of the Carbon Trust's Innovation, Investment and Enterprise activities.	To assess how effectively the Carbon Trust is using its funding in supporting the development of commercial low carbon technologies.
Interviews with stakeholders.	To obtain the views of interested parties on how effectively the Carbon Trust is working to reduce emissions.
File review of documents at the Carbon Trust.	To obtain supporting evidence for our conclusions.
Use of expert advice.	To provide input in relation to our understanding of climate change and the commercialisation of new technology.

PART TWO

Advice and guidance to businesses and the public sector

The Carbon Trust has developed a range of credible services which offer objective advice to businesses and the public sector on how to reduce carbon dioxide emissions

2.1 In 2002 the Carbon Trust took over the management of most of the Energy Efficiency Best Practice Programme, the forerunner of the Carbon Trust's work helping organisations reduce their current carbon dioxide emissions. The Carbon Trust has taken the programme forward and developed it into Carbon Trust Solutions by undertaking research into customer needs, revising the services available by making them more focussed, introducing new services such as support for the implementation of recommendations and interest free energy efficiency loans, introducing account managers to provide a more tailored service to customers, developing a new and more rigorous accreditation system for consultants, developing a reporting system to quantify carbon savings, and achieving assurance over the carbon savings achieved. The main categories of service which the Carbon Trust provides are:

- **Carbon Management** for larger energy use organisations, such as manufacturing businesses and multi-site companies with energy costs of over £3 million per annum and for public bodies such as local authorities and NHS Trusts. The service involves energy experts working with organisations to undertake a strategic review of their carbon dioxide emissions and energy consumption. The relationship typically lasts for one to three years and requires co-funding from those recipients in the private sector. This service costs the Carbon Trust on average £22,000 per customer and leads to an estimated average saving of 7,600 tonnes of carbon dioxide emissions **(case example 2)**.
- **Standard Surveys** are for organisations with energy bills over £50,000 per annum. All organisations are allocated an account manager[25] who assesses the client's needs and recommends the appropriate survey services. Companies receiving a standard survey are allocated a Carbon Trust accredited consultant who undertakes one or more site visits in order to prepare a report with costed recommendations on how the recipient organisation might reduce carbon dioxide emissions and energy consumption. In addition to the initial surveys, which are intended to be a first step towards identifying practical potential carbon savings, the work can include a range of other services such as staff awareness training and technical advice on

CASE EXAMPLE 2

The Carbon Management Service

The **John Lewis Partnership** has a turnover of approximately £6 billion and comprises 68,000 staff who own and operate a range of businesses including 26 John Lewis department stores and 183 Waitrose supermarkets. John Lewis began to work with the Carbon Trust as a Carbon Management customer in 2005. They have had energy efficiency surveys of four department stores and four supermarkets of a variety of ages, sizes and locations. They intend to communicate transferable recommendations to the other stores through issuing good practice guidance and the Carbon Trust has helped the Partnership write an Energy Manual which will help them to do this. Examples of energy saving measures which John Lewis are in the process of implementing as a result of the Carbon Trust's involvement include replacing refrigeration and lighting systems with more energy efficient versions, investing in variable speed drives in ventilation systems, and investigating the possibility of building a wind turbine to power one of its production sites. John Lewis estimates it has made energy savings of five to nine per cent and carbon savings of one to four per cent since beginning to work with the Carbon Trust.

the detailed design and implementation of more complex projects. This service costs the Carbon Trust on average £3,600 and results in an estimated average saving of 670 tonnes of carbon dioxide emissions **(case example 3)**.

- **General Advice** is provided through publications, the website, and a telephone helpline. The service is available to all business and public sector organisations, but is typically used by smaller organisations with energy costs of less than £50,000 per annum. Although the Carbon Trust measures the total impact of the General Advice service in terms of an estimated reduction in carbon dioxide emissions it does not estimate the average unit cost or related carbon dioxide saving per unit in relation to General Advice as it cannot be split into individual units in the same way as the other services.
- **Energy Efficiency Loans** are provided to small and medium sized enterprises in England and Wales and also to larger companies in Northern Ireland to replace or upgrade existing equipment to improve energy efficiency on an interest free basis with a four year repayment period. The loans are up to £100,000 for organisations in England and Wales and up to £400,000 in Northern Ireland. Funding is provided by the Department for Environment, Food and Rural Affairs and by the Department for Business Enterprise and Regulatory Reform. In addition, the Welsh Assembly Government and Invest Northern Ireland have provided further funds for loans in Wales and Northern Ireland. The Scottish Executive independently provides funding for a loans scheme in Scotland and the Carbon Trust does not actively promote its own scheme to avoid confusion among customers in Scotland. Loans cost the Carbon Trust on average £4,500[26] and result in an estimated average saving of 730 tonnes of carbon dioxide emissions.

The Carbon Trust estimates that it helped its customers reduce carbon dioxide emissions by up to two million tonnes in 2006-07 against a backdrop of significant barriers to implementing carbon saving recommendations

2.2 The Carbon Trust estimates on an annual basis the contribution that it makes to the carbon dioxide savings achieved by its customers by recording the recommendations that its customers have implemented and analysing the amount of carbon dioxide saved from these recommendations. Measuring impact in carbon terms is a relatively new area of expertise, robust methodologies for which are still being developed. The Carbon Trust has significantly developed its methodology for measuring its impact and in 2006-07 sought independent assurance under the International Standard on Assurance Engagements (ISAE) 3000 over the processes in place for reporting its impacts. To its knowledge it is the only public body which has sought independent assurance under such an international standard. In 2006-07 KPMG provided assurance that, with the exception of two qualifications, the Carbon Trust was calculating its impact for directly delivered advice and interest free loans in accordance with its methodology. This work included a review of the methodology, including challenge to the assumptions and limitations (Appendix 3).

2.3 In 2006-07 the advice and support from the Carbon Trust resulted in an estimated reduction in carbon dioxide emissions of between 1.2 million and 2.0 million tonnes, against a target of between 0.9 million and 1.4 million tonnes. The Carbon Trust also prepares estimates for the Department for Environment, Food and Rural Affairs of its impact in 2010 which take into account consideration of what organisations might have been expected to do without the intervention of the Carbon Trust and the impact of other climate change policies. The Carbon Trust's report to the Department for Environment, Food and Rural Affairs shows that it is likely to meet the expectation set out in the Climate Change Programme Review (2006) of a reduction of 4.4 million tonnes a year on levels in 1990 by 2010, assuming that current funding levels are maintained. **Figure 7** shows how the number of services that the Carbon Trust delivers has increased. Over the past three years for which there is comparable data, the estimated lifetime cost to the Carbon Trust per tonne of carbon dioxide saved through the provision of energy advice has fallen from between £5 to £8 in 2004-05 to between £4 and £7 in 2006-07 **(Figure 8)**.[27]

CASE EXAMPLE 3

The Standard Survey

The **Northern Lincolnshire and Goole Hospitals NHS Trust** operates three hospitals across Scunthorpe, Grimsby and Goole. The Hospital Trust had a standard site survey in January 2005 which resulted in 19 recommendations of which 13 have been implemented. The consultant who carried out the survey on behalf of the Carbon Trust estimated that the total cost of implementing all the recommendations would be £300,000 and the total annual benefit in terms of reduced energy costs would be £130,000. The Hospital Trust did not feel that the survey had identified many new opportunities for energy saving of which they were not already aware but they did feel that having the Carbon Trust's authority behind the recommendations was very helpful in encouraging senior management to get behind the initiative. Since the survey was carried out the Hospital Trust has invested £335,000 on 21 energy saving projects, 13 of which were given good impetus by the Carbon Trust's recommendations.

7 There has been an increase in uptake of Carbon Trust services

The number of services delivered from 2002-03 to 2006-07

Service	2002-03	2003-04	2004-05	2005-06	2006-07
Carbon Management	n/a	217	218	206	436
Site Surveys	n/a	1,943	2,376	2,900	3,556
Calls to helpline	16,300	25,500	17,500	20,000	35,000
Use of website advice by unique companies[1]	Not known	Not known	3,773	4,227	9,334
Loans	n/a	121	163	253	480

Source: National Audit Office summary of Carbon Trust data

NOTE

1 These figures are the total number of additional carbon saving organisations using the website who have not used other Carbon Trust services. The estimate excludes: companies counted in other numbers above, companies with less than 10 employees, and consultancy firms. In total there were over 400,000 unique users of the website.

8 The estimated cost for each tonne of carbon dioxide saved as a result of intervention by the Carbon Trust has fallen between 2004-05 and 2006-07

The cost of saving a tonne of carbon dioxide from 2004-05 to 2006-07

Measure	2004-05	2005-06	2006-07
Estimated reduction in carbon dioxide emissions during the year as a result of interventions by the Carbon Trust (million tonnes of CO_2)	0.7 – 1.2	1.1 – 1.6	1.2 – 2.0
Estimated lifetime reduction in carbon dioxide emissions as a result of the interventions by the Carbon Trust (million tonnes of CO_2)	3.1 – 5.6	4.2 – 6.7	4.7 – 8.8
Expenditure by the Carbon Trust on initiatives to provide advice and guidance to organisations on how to reduce carbon dioxide emissions			
■ Direct expenditure on Solutions activity excluding loans and Enhanced Capital Allowances	£22.6 million	£25.6 million	£27 million
■ Indirect expenditure (staff, IT, loans cost of capital and administrative costs apportioned on the basis of the proportion of direct net expenditure on this aspect of the Carbon Trust's activities)	£5.2 million	£7.8 million	£9.6 million
■ Total expenditure	£27.8 million	£33.4 million	£36.6 million
Cost effectiveness of work providing advice to organisations to reduce current emissions (£ per tonne of lifetime carbon dioxide saved)	**£5 – £8**	**£5 – £7**	**£4 – £7**

Source: National Audit Office analysis of Carbon Trust data

NOTE

All expenditure is net of VAT. The indirect expenditure line includes the cost of capital associated with loans.

2.4 Customers are generally satisfied with Carbon Trust services. Our census of all Carbon Trust customers who received specific guidance or advice between April 2005 and March 2006 established that over 80 per cent were satisfied with the service received and that 45 per cent were very or extremely satisfied. Over three quarters of respondents (77 per cent) considered that they had received sufficient advice to reduce their carbon dioxide emissions. Seventy six per cent of respondents said that they would not have implemented the same level of energy or carbon savings without the intervention of the Carbon Trust, compared to 20 per cent who said they would have made the same changes anyway. Sixty eight per cent of respondents noted, however, that they would have implemented change to a lesser degree without the intervention of the Carbon Trust, although it is possible that these organisations would have prioritised changes which would not have led to significant reductions in carbon dioxide emissions without the Carbon Trust's intervention.

2.5 However, not all customers felt that the services had met their expectations. The site surveys did not meet the expectations of 20 per cent of customers, largely because: the reports contained no new or only small opportunities for energy saving; the report contained poor cost or savings estimates; or the consultants had not demonstrated adequate understanding of their business requirements. Whilst 69 per cent of respondents who had received a Carbon Management service said that it had met or exceeded their expectations, 28 per cent (nine respondents) said that it had failed to meet their expectations. The main reason was disappointment with the consultant delivering the service, either in getting senior management buy in to the activities, or in terms of the perceived poor quality of their contribution.[28] This is one of the reasons the Carbon Trust has been tightening up its consultant accreditation criteria (see paragraph 2.15).

2.6 The Carbon Trust's recommendations to businesses and the public sector fall into three main categories:

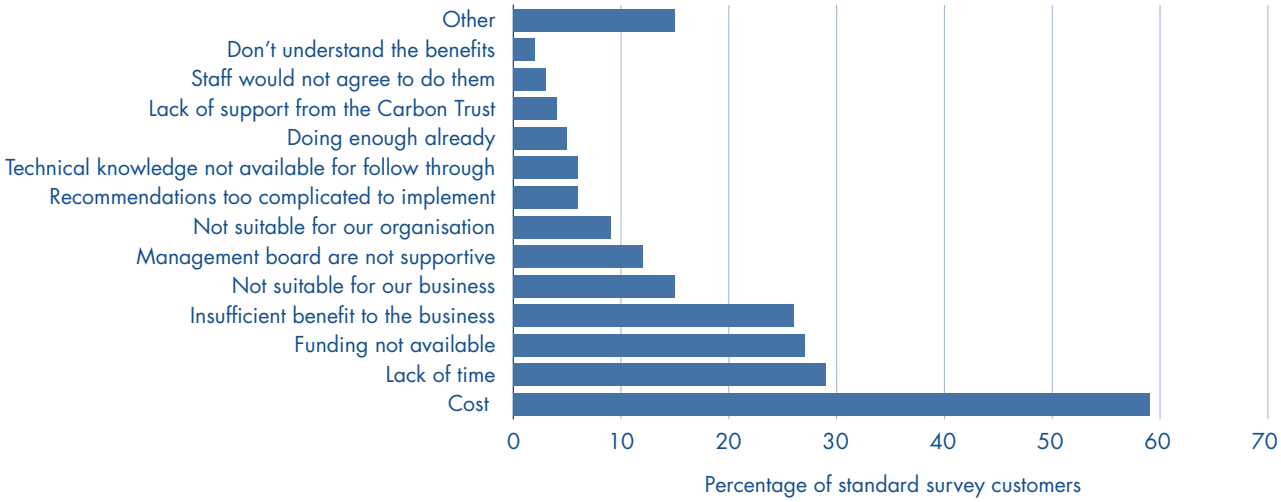
- **Changing human behaviour.** Recommendations include encouraging staff to switch off computers and unnecessary lights when not required.
- **Improved maintenance regimes.** The recommendations can include more regular and organised maintenance of equipment to improve energy efficiency and a clearer policy on asset lifecycles and replacement strategies.
- **Capital works.** The procurement of more energy efficient equipment.

2.7 Although many of the recommendations may appear to be common sense it can be a challenge to persuade senior managers to recognise that these issues are important to their businesses' efficiency and merit implementing properly. According to our census of the Carbon Trust's customers, the Site Survey reports included, on average, 11 recommendations on how to improve energy efficiency, but respondents noted that they had only implemented an average of 4.8 recommendations.[29] In its 2006-07 impact assessment the Carbon Trust established that its services provided in that year had identified a potential reduction of between 4.6 and 5.4 million tonnes of carbon dioxide in 2006-07. In that year an estimated reduction of between 1.2 and 2.0 million tonnes was achieved.[30] It can take customers several years to implement recommendations if, for example, significant capital investment is required. The ratio of carbon dioxide savings identified in 2006-07 from Carbon Management and Standard Survey services compared to carbon dioxide savings implemented was 1:0.22. However, this figure rises to 1:0.385 when comparing carbon dioxide savings identified over the period 2003-06 which had been implemented by 2006-07. Sixty one per cent of respondents said that their energy use at site level had fallen since dealing with the Carbon Trust but it was notable that 21 per cent did not know the impact on their energy use.

2.8 Increasing the proportion of recommendations implemented depends upon the financial return and payback period of such initiatives and bringing the issue to the attention of senior staff in the organisation. Although 32 per cent of respondents said that they intended to implement some of their outstanding recommendations in the near future, past practice suggests that many organisations are less likely to do so unless momentum is maintained. The Carbon Trust introduced Account Managers to help maintain this momentum. We asked customers who had received the standard survey what the main barriers were to them implementing recommendations **(Figure 9)**. Cost or lack of funding, lack of time, and insufficient benefit to the business featured highly **(case example 4)**. The reasons varied between different types of recommendation **(Figure 10)**: respondents said that maintenance recommendations had proved the easiest to implement and those requiring changes in staff behaviour the most difficult.

2.9 Using cost data collected by the Carbon Trust, each of the services provided by the Carbon Trust appear to generate a net benefit to the UK in time **(Figure 11 on page 20)**. The Carbon Trust estimates that the net present value of the reduction in energy costs associated with the carbon dioxide saving recommendations implemented in 2006-07 will be between £410 million and £655 million over the lifetime of the savings in comparison to the cost to customers of implementing the recommendations of between £188 million and £296 million. In practice, however, implementing recommendations often requires an up front cash injection, and our discussions with a selection of the Carbon Trust's customers confirmed that some can usually achieve a positive net present value more quickly by investing their money in commercial activities than by investing in energy saving measures. This can act as a barrier to the implementation of recommendations even where they would result in a net benefit to the organisation.

9 Cost is the main barrier to implementing recommendations



Source: National Audit Office

2.10 The Carbon Trust's interest free loan scheme seeks to address funding restrictions for small and medium sized enterprises (and larger companies in Northern Ireland) as it is a cost effective way to provide support to these organisations. In 2006-07 the Carbon Trust offered 482 loans worth around £18 million. Our review confirmed that the Carbon Trust had adequate controls in place to ensure that loans were spent on energy saving equipment and subsequently repaid. The default rate on the loans is less than one per cent of the amount loaned. We asked respondents to our census who had taken up a loan whether they would have purchased the energy saving equipment if the loan had not been available: four per cent said yes; 32 per cent said no; and 58 per cent said they would have purchased the equipment but at a later date.

2.11 To further encourage businesses to act on carbon saving recommendations and to demonstrate the potential commercial benefit that can be obtained from taking action against climate change the Carbon Trust also runs an Energy Efficiency Accreditation Scheme to encourage energy saving in business. The Carbon Trust purchased the scheme in 2005 from the National Energy Foundation which continues to administer the scheme. The Energy Institute remains the accrediting body for organisations who can demonstrate management commitment to energy saving and investment in energy efficiency measures. Around 200 organisations are accredited, and re-accreditation is required every three years. The scheme is run on a paid for basis through Carbon Trust Enterprises, making a loss of £70,000 in 2005-06 and a profit of £13,000 in 2006-07.

CASE EXAMPLE 4

Examples of the difficulties in persuading organisations to implement carbon saving recommendations

Northern Lincolnshire and Goole NHS Trust did not alter the layout of heat pipes because it would have required the partial closure of a hospital. Some of its other recommendations were not implemented because the consultant who conducted the survey had underestimated the cost of the capital work required. **Huntsman Quarries** did not implement a recommendation on converting to biofuel because they could not find a supplier able to supply the quantity required.

10 Barriers vary between different types of recommendation

The top three barriers for each type of Site Survey recommendation

Type of recommendation	First barrier	Second barrier	Third barrier
Behavioural changes	Lack of staff support (66%)	Lack of time (34%)	Lack of senior management support (23%)
Improved maintenance regimes	Lack of time (59%)	Cost (58%)	Technical knowledge not available (19%)
Capital works	Cost (84%)	Lack of time (38%)	Lack of senior management support (16%)

Source: National Audit Office

11 Carbon Management is the most expensive service but generates the greatest carbon dioxide savings

A comparison between the net benefits of three services in 2006-07

Service	Average cost to the Carbon Trust per service	Average spend by customer on the implementation of recommendations	Net benefit from service excluding avoidance of the social cost of carbon	Net benefit from service including avoidance of the social cost of carbon[1]
Carbon Management	£22,000	£187,000	£306,000	£466,000
Standard Survey	£4,000	£20,000	£41,000	£56,000
Loan	£4,000[2]	£68,000	£23,000	£37,000

Source: National Audit Office analysis of data from the Carbon Trust

NOTES

1 The social cost of carbon is the cost of the physical impact of climate change such as the impact on agriculture, ecosystems, the effect of sea level rise, species loss and health effects such as malaria. There are a variety of estimates of the social cost per tonne of carbon dioxide and the amount used by the UK government is £23.45 per tonne (using 2006 central value at 2005 prices of £86 per tonne of carbon).

2 The average cost comprises the cost of capital (at 3.5 per cent per annum), plus administrative and central overheads. The figure excludes the monthly loan repayments.

Funding limitations restrict the proportion of businesses and public sector organisations with which the Carbon Trust is able to work and encouraging wider uptake depends upon the growth of a fee paying energy services market

2.12 The Carbon Trust undertakes general marketing campaigns to promote its work and encourage uptake of its services. In 2006-07 the Carbon Trust spent £9 million on marketing. In 2006-07 the Carbon Trust spent £3.9 million on awareness raising relying primarily on print (in national business newspapers) and outdoor posters, plus some television and direct marketing. Subsequent evaluations of these campaigns by BPRI, found that 53 per cent of businesses were spontaneously[9] aware of the Carbon Trust and its role in helping businesses reduce carbon dioxide emissions and mitigate climate change.

2.13 Although uptake of the different services provided by the Carbon Trust has increased between 2002-03 and 2006-07, market penetration remains relatively small compared to the number of businesses and public sector organisations operating within the United Kingdom. The Carbon Trust estimates that since 2001 it has worked with at least 12 per cent of companies in the United Kingdom with energy bills of more than £50,000 a year and at least 24 per cent of corporate groups.[31] However, only a small percentage of businesses with energy bills of £50,000 or less have used the Carbon Trust's General Advice services: the Carbon Trust dealt with 35,000 enquiries through its telephone advice services and provided support to a further 9,000 organisations through the Carbon Trust website, although there were over 400,000 unique users of the website. By the end of 2006-07 the Carbon Trust had worked with approximately 30 per cent of local authorities, 40 per cent of universities and 12 per cent of hospital trusts through its Carbon Management services and had undertaken Standard Surveys on a range of public sector sites. The Carbon Trust has a rolling programme of work with public sector bodies and at the current rate covering them all would take several years.

2.14 The Carbon Trust's ability to achieve greater market penetration and carbon dioxide savings is restricted by its capacity to fund such advice and by the extent to which it can target particular sectors or businesses due to the European Union's rules on state aid (see Appendix 4). It has to provide its energy advice services to all types and sizes of organisation and avoid targeting its marketing activities at specific businesses in order for those services to be treated as a general measure and not state aid under European Union rules.

2.15 Our analysis of the Carbon Trust's records confirmed that it relied on around 330 consultants in 2006-07, to deliver much of the advice and support it provides to organisations. Organisations contacting the Carbon Trust to request a Standard Survey are allocated a consultant. From November 2006, the Carbon Trust launched its own consultant accreditation scheme – prior to this, it had used consultants accredited by the Energy Institute.[32] The scheme recognises consultants' expertise in delivering Carbon Trust surveys and should enable the Carbon Trust to identify and fill gaps in expertise more effectively and provide training and recruitment. It will also allow consultants to build up and develop specialisms in

particular sectors. The Carbon Trust pays the consultant an average of around £435 a day for standard site survey work, £500 a day for more technically complex site survey work and £700 for Carbon Management services. Eighty seven per cent of our census respondents who had received a Standard Survey in 2006-07 were satisfied with the work provided by their consultant.

2.16 The Carbon Trust focuses its funding on overcoming the barriers which inhibit market take up of energy efficiency advice. It had anticipated that its provision of basic energy advice to organisations would contribute to triggering a wider expansion in demand for paid-for follow on services. However, it has primarily been only large companies that have engaged with third party energy consultancies on a fee paying basis. Research by the Carbon Trust estimated that the energy advice market is growing at a rate of 20 per cent[33] per year, but that there have been few new entrants to the market.[34] Some of this growth is likely to partly reflect the Carbon Trust's own market position and increased workload. Our census found that energy consultancies with less than five employees said that the Carbon Trust accounted for around half of their work on average whilst consultancies with between 10 and 49 employees said it accounted for 33 per cent and those with more than 50 employees said 19 per cent.

2.17 The Carbon Trust requires co-funding of its Carbon Management service from organisations in order to encourage their commitment to change and to offset some of the costs involved. The Carbon Trust has been able to reduce the funded proportion of the Carbon Management service to 30 per cent in 2007-08, from 50 per cent in 2006-07 and 100 per cent in 2005-06. The Standard Site Survey, however, is fully funded by the Carbon Trust as it believes that charging smaller businesses for this service would deter many organisations from taking up the service. Standard surveys do however encourage expenditure on carbon saving measures by the customers that receive them and in 2006-07 the amount spent by standard survey customers on putting in place such measures was just under twice the amount spent by the Carbon Trust delivering the surveys.

2.18 In the absence of market research data on the impact of requiring an element of co-funding, it is difficult to quantify what the potential impact might be. Customers are, however, expected to make a contribution to any follow up work to support the implementation of recommendations and for some services, such as combined heat and power advice, are expected to pay in full. Whilst 44 per cent of respondents to our census of the Carbon Trust's customers noted that they would not have been willing to pay for further energy reduction advice, 26 per cent noted that they would have done so, and a further 30 per cent were unsure. These results are indicative and any decision on how much to charge customers for services would need to be properly market tested.

2.19 Progress in developing a fee-paying market for energy advice depends upon customer demand and having consultants with the necessary skills and tools to generate savings who can demonstrate their credibility to the market. The Carbon Trust has helped to develop the market by equipping consultants with the expertise to deliver carbon dioxide saving services and by developing new services, such as carbon labelling of products, which independent energy consultancies deliver on a commercial basis on the Carbon Trust's behalf. However, it is likely that to expand without additional Government funding the Carbon Trust will need to develop in the future a new business model for the delivery of its consultancy work which will more explicitly encourage customer demand for paid-for energy advice and will harness the business benefit to customers of being seen to be environmentally friendly. Both the Energy Services and Technology Association and the Energy Institute believed that the Carbon Trust had not engaged adequately with them or other players to maximise the potential growth of the market and they reported some frustration and concern amongst existing consultants about the potential for future fee-earning work. However, the Carbon Trust believes that it consults widely with its stakeholders and take their views into account when planning future work.

2.20 Overall consultants were satisfied with the Carbon Trust's ability to deliver carbon dioxide savings. Sixty-nine per cent were satisfied or very satisfied with the Carbon Trust overall and 79 per cent believed the Carbon Trust's services were effective in helping their clients to reduce carbon dioxide emissions. However, there were some significant areas of dissatisfaction amongst consultants. Forty-seven per cent of the consultants who replied to our census stated that they were dissatisfied with the inflexibility of the report templates and other materials provided by the Carbon Trust for each Standard Survey although the Carbon Trust believes that the standardised templates are essential to maintain the high quality of the service. Thirty nine per cent expressed dissatisfaction with the Carbon Trust's willingness to listen to their ideas and 33 per cent were dissatisfied with how efficiently the Carbon Trust operates. The Energy Services and Technology Association reported concern amongst its members about the standardisation of reports, which in their view limits the usefulness of report content. The Carbon Trust has recently been through a process of re-accrediting its consultants and tightening up consultant accreditation and expects a degree of dissatisfaction from some of its consultants as a result of this.

PART THREE

Encouraging the development of new technologies to reduce energy consumption and carbon dioxide emissions

The Carbon Trust estimates that its support of emerging low carbon technologies could reduce carbon dioxide emissions by over 13.7 million tonnes a year by 2050

3.1 Meeting the United Kingdom's 2050 target to reduce carbon dioxide emissions by 60 per cent on levels in 1990 will depend, in part, upon the development of new technology. It can be difficult for small organisations to obtain adequate support and financial resources for emerging technologies, however, and the former Department of Trade and Industry has noted a shortage of early stage risk capital in the United Kingdom.[35] The Carbon Trust's Innovations, Investments and Enterprises activities seek to maximise carbon savings over the medium and long term by supporting the development and deployment of low carbon technologies through grants, investments and technical support, and by developing commercially viable low carbon businesses. They accounted for £20 million (21 per cent) of the Carbon Trust's net expenditure in 2006-07.

3.2 The Carbon Trust has developed a range of interventions to support the development of new low carbon technologies from the early stages of initial research through to bringing new commercial products to market **(Figure 12)**. In 2004 the Carbon Trust commissioned a Low Carbon Technology Assessment (see Appendix 3) which enables it to determine which technologies have the greatest potential for carbon saving, and where funding from the Carbon Trust can generate the greatest impact. More recently, the Carbon Trust carried out a strategic review that combined the carbon saving potential of different technologies with the economic value of those new technologies to the UK. This is used alongside the Low Carbon Technology Assessment to inform decisions on projects initiated in-house, such as the Accelerators, with the aim of favouring technologies in which the UK has a competitive advantage. The interventions aim to unite commercial and technical expertise, overcome uncertainty arising from lack of knowledge of this sector, and to provide financial support to research organisations. **Case examples 5 and 6** demonstrate how the support from the Carbon Trust has been used and **Figure 13 on page 24** lists the types of technology to which the Carbon Trust has committed funds.

CASE EXAMPLE 5

Wave Power Technology

The Carbon Trust funded development of a novel wave power device through to testing of a one tenth scale prototype at the NaREC wave tank facility. Testing of this prototype allowed the team to test the device in more realistic outdoor conditions and provide an improved estimate for the cost of electricity from a full scale device. This project built on previously funded work that took the device from concept to laboratory scale model. After the initial project the team used the results generated to increase the level of engagement of their industrial partners in the development of the technology. The final project closure report noted that it had met all its objectives, producing data on the performance of the device and an outline specification for the design of a full scale model.

CASE EXAMPLE 6

Advanced Metering

The Carbon Trust provided £1.2m in funding to this project through its Technology Accelerator initiative between 2003 and 2007. The research consisted of a series of field trials to determine the extent to which advanced metering helps small businesses to cut their energy use. 582 sites across the UK were provided with advanced metering technology, giving more information about the factors underpinning their energy use. On average, 12 per cent carbon savings were identified from advanced metering, of which five per cent were implemented (over seven per cent by those also receiving email advice on energy saving). The project evaluation concluded that advanced metering can be cost effective for most small businesses. The project influenced the recommendation in the 2007 Energy White Paper to make advanced metering compulsory for more businesses.

12 The Carbon Trust has developed a range of activities to support the research, demonstration and commercialisation of low carbon technologies

The different elements of the Carbon Trust's work to support the development of commercial low carbon technologies

Research → **Demonstration** → **Commercialisation** →

Carbon Vision

This initiative is coordinated with the Research Councils to encourage research into low carbon technologies, especially industrial and buildings opportunities. Direct expenditure in 2006-07 was £1.3 million.

Investments

The Carbon Trust has invested £7 million in nine early stage technology companies since 2002. The aim of the investments is to show that returns can be made from investing in low carbon companies and to encourage other finance institutions to invest in start up companies developing low carbon technologies. Direct expenditure in 2006-07 was £506,000.

Open Call

The Carbon Trust provides grants of up to 60 per cent of the estimated project cost, up to a maximum of £250,000, to accelerate commercially viable and innovative low carbon research. Direct expenditure in 2006-07 was £3.4 million, and the Carbon Trust received 147 proposals, of which 16 received funding.

Incubators

This activity is to provide strategic and business development advice to new low carbon businesses, and to position them so that they can raise finance in the open market. The Carbon Trust has provided support to 45 organisations since 2004. Thirty three projects have now come to an end, of which 20 raised private sector investment. Direct expenditure in 2006-07 was £920,000.

Research Accelerators

These aim to overcome technological barriers in high potential low carbon technologies that are currently pre-commercial. They will do this by funding targeted research in partnership with industry and academia. Direct expenditure in 2006-07 was £98,000 on scoping the first accelerator.

Technology Accelerators

Technology acceleration provides support to industry, in order to overcome barriers to the development and deployment of technologies towards commercialisation. Activities include field trials, technical advice, market analysis and the communication of data and results to business and government. Direct expenditure in 2006-07 was £4 million.

Carbon Trust Enterprises Limited

Creates, develops and manages new low carbon businesses with the aim of accelerating the development of low carbon markets. Currently has five subsidiary companies and is developing several other business ventures. Direct expenditure in 2006-07 was £2.5 million.

Source: National Audit Office analysis of Carbon Trust data

13 The Carbon Trust has provided funding for a variety of technology types

Technology types supported by the Carbon Trust

Type of technology	Number of projects
Industrial equipment	44
Building technology	33
Tidal/wave generation	27
Fuel cells	19
Biofuel/biomass	12
Combined heat and power	9
Hydrogen production and storage	8
Solar and thermal energy	8
Wind generation	6
Solar photovoltaics	6
Electricity – network technologies	5
Other	9

Source: National Audit Office summary of Carbon Trust data

3.3 Predicting the potential impact of these interventions is difficult when the emerging technologies have yet to be proven. Using the Low Carbon Technology Assessment the Carbon Trust has designed a Future Impact Estimation tool to estimate the technical potential for future carbon dioxide savings related to specific technologies and the market potential with and without the Carbon Trust's intervention (Appendix 3). KPMG has reviewed and provided an assurance statement under the International Standards on Assurance Engagements (ISAE) 3000 on the Carbon Trust's application of this methodology to calculate the potential annual carbon dioxide emission reductions. The Carbon Trust has estimated that its support given to emerging technologies up to March 2007 could reduce emissions by between 13.7 million tonnes and 20.7 million tonnes a year by 2050 at a cost of between £3 and £5 a tonne (**Figure 14**). (Cost per tonne was not within the scope of KPMG's assurance). While the uncertain nature of the data means that comparisons between the different activities should be made with caution, the high cost of the Carbon Vision initiative is notable. This partly reflects the difficulty in attributing carbon savings to technologies that are a long way from market deployment. The Carbon Trust has committed £7 million to this venture, but does not anticipate providing further funding until the impact of the initial funding becomes clearer.

3.4 As estimates of future carbon savings are uncertain, the Carbon Trust also measures its performance using current financial and technology based outputs. The company's investment portfolio has outperformed the wider market since it was established in 2002.[36] Performance against 2006-07 internal target indicators was mixed: it failed to launch a private clean technology fund but met its overall target in terms of leverage of funds, bringing in £32.6 million of private sector funds against a target of between £10 million to £65 million.[37] It also accepted 11 new companies for incubation against a target of between four and eight and launched one joint venture against a target of between zero and three. Eleven per cent of completed Applied Research projects have secured patents, and eight per cent external investment.

Using a suite of initiatives to support emerging technologies has enabled the Carbon Trust to overcome many of the gaps and barriers that researchers can face

3.5 We commissioned Morgan Harris Burrows to review the suite of initiatives developed by the Carbon Trust to determine whether they were effective in supporting the development of emerging low carbon technologies, and whether the interventions were sufficiently coordinated with other public sector sources of funding.

3.6 There are other organisations involved in developing low carbon technologies within the United Kingdom, such as universities, Research Councils and private sector venture capital firms, but our consultants were not aware of any organisation which spanned the whole process from early stage research through to the commercial development of a product. This has helped the Carbon Trust to develop a strong expertise in this sector and many of the organisations we contacted noted that they associated strong investment appraisal and thorough knowledge of low carbon technology with the Carbon Trust brand. This reputation has proved beneficial in encouraging other organisations to invest in low carbon technologies. The Carbon Trust has raised around £2 for every £1 it has committed to its Innovation Programme, and around £10 for every £1 it committed to its venture capital investments.

14 The support of emerging low carbon technologies since 2001 could result in annual carbon dioxide savings of over 13.7 million tonnes by 2050

Activity	Predicted yearly CO_2 savings in 2020 (million tonnes)	Predicted yearly CO_2 savings in 2050 (million tonnes)	Cost effectiveness in £ per tonne of CO_2 saved in 2050
Open Call	1.7 to 2.5	8.5 to 12.5	£1.2 to £1.7
Carbon Vision	Minimal	Minimal	£985 to £1,925
Research Accelerators	No estimate as first accelerator not yet launched	No estimate	No estimate
Technology Accelerators	1.0 to 1.6	3.5 to 4.9	£3.7 to £5.2
Incubators	0.1 to 0.2	0.4 to 0.6	£2.3 to £3.9
Investments	0.3	0.3 to 0.4	£15.6 to £20.2
Enterprises	0.1 to 0.3	1.0 to 2.1	£6.3 to £13.5
Total	**3.2 to 5.0**	**13.7 to 20.7**	
Overall cost effectiveness			**£2.9 to £4.4**

Source: National Audit Office analysis of Carbon Trust data

NOTE

Where numbers do not sum to totals this is due to rounding.

3.7 Our consultants noted that the Carbon Trust's Research and Technology Accelerators were particularly well designed to fill what could otherwise be a barrier in the development of commercially viable low carbon technologies. The Carbon Trust's co-ordination of businesses and researchers to collaborate on these accelerator projects appeared to be unique **(Figure 15 overleaf)**. While there is a potential risk that the Carbon Trust's Open Call grants could displace grants that would otherwise be available from Research Councils and the Department for Business, Enterprise and Regulatory Reform, our consultants confirmed that the Carbon Trust's focus on applied research and commercial development rather than on pure research and academic achievement meant that it supported a different range of projects from other sources of grants.

3.8 Much of the potential impact from the Carbon Trust's support for emerging low carbon technologies depends upon the information it collects in this sector and thus the expertise it can provide. The Carbon Trust gathers intelligence about the commercial and carbon potential of leading edge technologies which it feeds into the selection process for future innovation activities **(Figure 16 on page 27)**. Much of this information has come from the Incubator and Accelerator activities. On these activities, the Carbon Trust has been able to rely on its project managers to liaise with the researchers and companies and visit sites regularly to monitor progress and collate data, whereas the Carbon Trust's reliance on external consultants to administer its Open Call applied research grants may have restricted data gathering in this area. In addition, the Carbon Trust's existing focus has been on development work within the United Kingdom, and it has made few attempts to actively scout for promising intellectual property overseas to bring to the UK because it believes that this would not be a cost effective use of limited resources.

The Carbon Trust has robust procedures to protect public funds used in its venture capital investments, although care will be needed to ensure its collaboration with Clean Tech Venture Partners does not lead to future conflicts of interest

3.9 In order to encourage investment in emerging low carbon technologies without displacing private sector funding already available, the Carbon Trust aims to use its sector knowledge to invest in early stage companies, to be a co-investor of choice and to encourage co-investment by others in the sector.

15 The Carbon Trust's support co-ordinates with the support available from other organisations

Others involved in developing low carbon technology and how the Carbon Trust is different

Activity	Others competing in the same space	What makes the Carbon Trust different in this field?
Applied research grants	Regional Development Agency grants for small businesses Research Council grants DIUS grants (including some targeted at renewable energy)	■ Strength of Carbon Trust brand – it is viewed as a low carbon expert. ■ Knowledge of the later stages of commercialisation (incubation, investment). ■ Assesses every application to ensure that the Carbon Trust can make a difference. ■ Carbon Trust focuses on market potential rather than academic publication.
Incubator support	Many organisations offer incubator support in the UK, including Regional Development Agencies and Universities	■ No other incubator specialises in carbon saving. ■ Incubator focuses on targeted professional advice, not the provision of office facilities. ■ Incubation enables the Carbon Trust to provide seamless support from the research grant to the venture capital investment stage.
Carbon Vision	The programme is joint with the Research Councils, with EPSRC as the lead council	The Carbon Trust's involvement has had a steering effect on the Research Councils' programmes, increasing the amount of money spent on low carbon research.
Research accelerators	No other body does this	■ The Carbon Trust is bringing together various experts to concentrate on particular areas of technology, which it has identified as offering potential carbon savings, and where it thinks it can make a difference. ■ It acquires expertise on potential technologies in the process of doing this.
Technology accelerators	No other body does this	The Carbon Trust seeks to acquire expertise on particular technology, identify barriers to exploitation, and overcome those barriers by coordinating the work of others. This is unique.
Investment	Private sector venture capital companies, of which a few specialise in low carbon technologies (e.g. Climate Change Capital) Publicly funded RDAs and NESTA also provide venture capital money (without the low carbon focus)	■ The Carbon Trust uses its brand and expertise to attract and reassure other investors, and to leverage investment from others. ■ It has good networks to sources of funding, meaning that it can help new companies to find investors. ■ Carbon Trust Investments operates in very early stage venture capital, where the Treasury has concluded there is a shortage of funds – the "equity gap"[1]

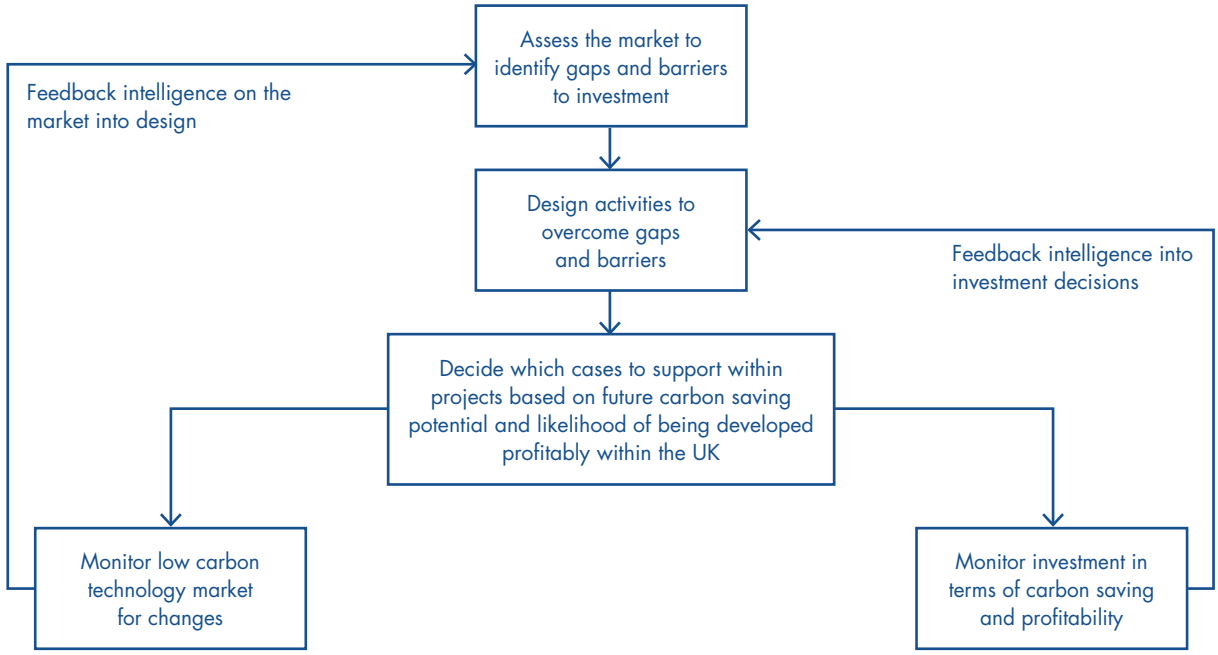
Source: National Audit Office

NOTE

1 *Bridging the Financing Gap*, HM Treasury, December 2003.

16 The Carbon Trust regularly monitors the low carbon technology sector to determine where its interventions might be most effective

The process by which the Carbon Trust designs and operates Carbon Trust Innovations



Source: National Audit Office

3.10 Our review of the Carbon Trust's investments in emerging technologies confirmed that it had developed appropriate procedures to protect public funds. Our examination of a selection of investments confirmed that its investment decisions were properly documented and had been subject to approval by senior managers. Investments of over £1 million in an organisation had been approved by the Carbon Trust's Investment Committee, a subset of members of the Carbon Trust's Board, while the remainder had been approved by a Preliminary Committee which comprised four senior staff. Our review also confirmed that the Carbon Trust had put in place strict due diligence procedures and suitable arrangements for ongoing monitoring. Should any of the organisations funded by the Carbon Trust run into difficulties, the extent of any potential loss is limited to the amount invested.

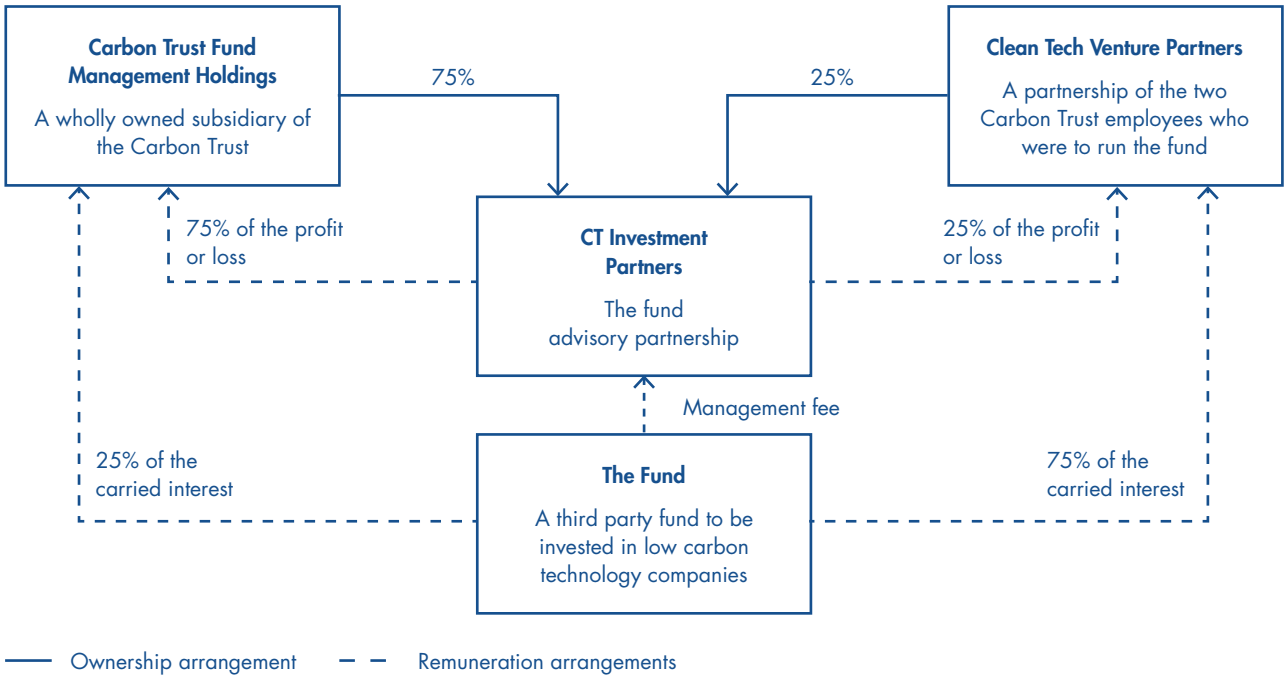
3.11 In 2006 the Carbon Trust sought unsuccessfully to raise further private sector capital by launching a third party low carbon technology fund. The fund would have been managed by the Carbon Trust subsidiary CT Investment Partners LLP on behalf of private investors and listed on the Alternative Investment Market. The aim was to raise an additional £75 million in private sector money, but the Carbon Trust did not succeed in raising the full amount. The Carbon Trust believes it was unsuccessful primarily because of market conditions at the time.

3.12 In order to raise a third party fund, in May 2006 the Carbon Trust transferred its existing fund management advisory team to a new partnership, CT Investment Partners LLP 75 per cent of which is owned by Carbon Trust Fund Management Holdings Limited (which is a wholly owned subsidiary of the Carbon Trust) and 25 per cent by Clean Tech Venture Partners (a partnership owned by two employees of CT Investment Partners). As part of the partnership arrangements, it was agreed that any future carried interest would be split 75 per cent to Clean Tech Venture Partners and 25 per cent to Carbon Trust Fund Management Holdings Limited **(Figure 17)**. Clean Tech Venture Partners paid £50,000 for its interest in CT Investment Partners. Our discussions with leading experts in this area, our review of a report prepared for the Carbon Trust containing details of some public bodies that have set up venture capital investment funds, and our review of the fund advisory partnership valuation prepared by PriceWaterhouseCoopers confirmed that these arrangements accord with usual market practice and that the Carbon Trust acted properly in setting them up.

3.13 Although the fund was not launched, the Carbon Trust uses CT Investment Partners to advise on its own venture capital investments. There is a risk that CT Investment Partners staff could influence publicly funded research and development or incubator support for emerging businesses which they, in time, may back by way of investment and thus from which they may earn carried interest. The Carbon Trust confirmed that it has put "Chinese Walls" in place between the people making the grants and those making the investment decisions, and that it would put in place further safeguards to address this risk if the investment fund is subsequently launched.

17 Carried interest arising from the proposed investment fund would be shared between Carbon Trust Fund Management Holdings and Clean Tech Venture Partners

Ownership structure and remuneration arrangements



Source: National Audit Office

APPENDIX ONE

Methodology

1 This appendix sets out the principal methods we used to collect and analyse information for the study. We set out to answer the following questions:

- Is the Carbon Trust providing effective support to individual businesses and the public sector to enable them to cut carbon in the short and medium term?
- Does the Carbon Trust have an efficient and effective investment programme in place which is encouraging the development of new low carbon technologies?

Census

2 In order to understand to what extent the Carbon Trust's Solutions work was helping organisations to reduce their carbon dioxide emissions, we commissioned GfK NOP to carry out two web based censuses on our behalf. The censuses examined:

- How satisfied customers and consultants were with the Carbon Trust and its work.
- The impact of the Carbon Trust's services on organisations and their emissions.
- What more the Carbon Trust could do to increase take-up of recommendations and to help organisations reduce emissions.
- The barriers organisations face when reducing emissions.

3 The first census was of all Carbon Trust customers who had received a service between 1 April 2005 and 31 March 2006. Using email addresses from the Carbon Trust's database, 3,500 email invitations were sent out. Approximately 18 per cent were returned as incorrect. Out of 2,936 invitations correctly delivered, 580 customers responded, giving a response rate of 20 per cent. The profile of respondents was consistent with the overall population in terms of broad geography and industry sector.

4 The second census was of all energy consultants used by the Carbon Trust. Of 430 email invitations issued, seven per cent were returned as incorrect. Out of 401 invitations received by the correct people, 197 consultants responded, giving a response rate of 49 per cent. Again, the profile of respondents was consistent with the overall population. Fieldwork took place between 27 March and 13 April 2007 for consultants, and 28 March and 13 April 2007 for customers.

Case studies

5 In order to follow up the results of the censuses and to examine some of the findings in more detail, we selected nine customer case studies from those respondents who were willing to be contacted by the NAO after the census (303 out of 580 respondents). We wanted to select a sample which was both broadly representative of the Carbon Trust's client base and was likely to offer opportunities for interesting insights.

6 To select the sample, we first broke the population by which service each customer had received and then by sector, for example private sector, public sector and not for profit, and geographic location. We overlaid other metrics, such as industry, energy intensity, size (based on number of employees), length of time they had worked with the Carbon Trust, and recommendation implementation rate and overall satisfaction with the Carbon Trust compared against the top level results from the census to create a profile for the total population. We selected the case studies to reflect the diversity of the population profile, focussing particularly on regional representation, coverage across Carbon Trust services and size. We interviewed respondents either in person (five case studies) or by telephone (four case studies), depending on location and timing. Each interviewer used a set of standard questions to structure the interview, which comprised some generic questions asked of all case studies and some questions tailored by service received or experience.

Review of Innovation Programme

7 In order to determine whether the Carbon Trust is using its funding to make the maximum possible difference to the development and deployment of new low carbon technology, we commissioned consultants Morgan Harris Burrows, who have extensive experience of commercialising new technologies, to undertake a review of the Carbon Trust's Innovation Programme.

8 This review set out to answer the following questions:

- Does the Carbon Trust have a robust process in place for deciding which technologies and organisations to fund?
- Is the Carbon Trust providing appropriate support to businesses and research projects to encourage the development and commercialisation of new low carbon technologies?
- Is the Carbon Trust filling a gap in the market for which private sector funding would not be available?
- Is the Carbon Trust taking an acceptable level of risk with public funds?
- Is the Carbon Trust taking sufficient risk to encourage the development and commercialisation of new technologies?

9 Morgan Harris Burrows set out to answer these questions by gathering information both from the Carbon Trust and from external sources. Fieldwork took place in March and April 2007. The consultants reviewed documents held at the Carbon Trust, including policy and procedural documents, case files, and consulting reports produced for the Carbon Trust, and by interviewing senior Carbon Trust staff. They also interviewed a variety of external organisations, including bodies receiving various types of support from the Carbon Trust, and other bodies supporting or funding low carbon technology such as venture capital firms, Government departments, Universities, and a comparable organisation in the United States. Finally, they interviewed some of the contractors carrying out work on behalf of the Carbon Trust, including the two of the four organisations delivering incubator services, and AEA Technologies, who monitor the recipients of Applied Research grants.

10 As part of their report, Morgan Harris Burrows produced eight case studies of organisations supported in some way through the Carbon Trust's Innovation Programme. These case studies were selected to illustrate examples of a range of different types of support, types of organisation, and outcomes. However, the selection of case studies and the reporting of information in relation to them was limited to some extent by the need to retain commercial confidentiality of those assisted by the Carbon Trust.

Interviews

11 As well as interviews with key Carbon Trust staff we carried out a programme of interviews with third parties including:

- All Carbon Trust funders to find out about performance monitoring and satisfaction that the Carbon Trust was doing what it should: Department for Environment, Food and Rural Affairs, Department for Business, Enterprise and Regulatory Reform, Welsh Assembly, Scottish Executive, Invest Northern Ireland.
- HM Revenue & Customs regarding the Enhanced Capital Allowance Scheme.
- Experts in the energy/carbon saving field: Energy Institute, Energy Services and Technology Association, UK Business Council for Sustainable Energy.
- Representatives of the Carbon Trust's customers: Confederation of British Industry, Major Energy Users Council.
- The Carbon Trust's primary delivery partner: WS Atkins.
- The Carbon Trust's auditor: Deloitte.

File review

12 We reviewed documentation from the Carbon Trust, including:

- Finance spreadsheets giving programme and staff expenditure.
- Cost effectiveness calculation, activity levels, impact assessment methodology, limited assurance audit report.
- Management accounting information on budgets and outturn.
- Accounts for the commercial subsidiaries Carbon Trust Investments Limited and Carbon Trust Enterprises Limited.
- The Carbon Trust's Business Plans and Annual Reports.
- Reports commissioned by the Carbon Trust on different aspects of their business.
- Key Performance Indicators, contracts and performance monitoring reports for the Carbon Trust's main contractor, WS Atkins.
- Grant Offer Letters from Defra and DTI.
- The Carbon Trust's Risk Register.
- The Carbon Trust's customer relationship management databases.

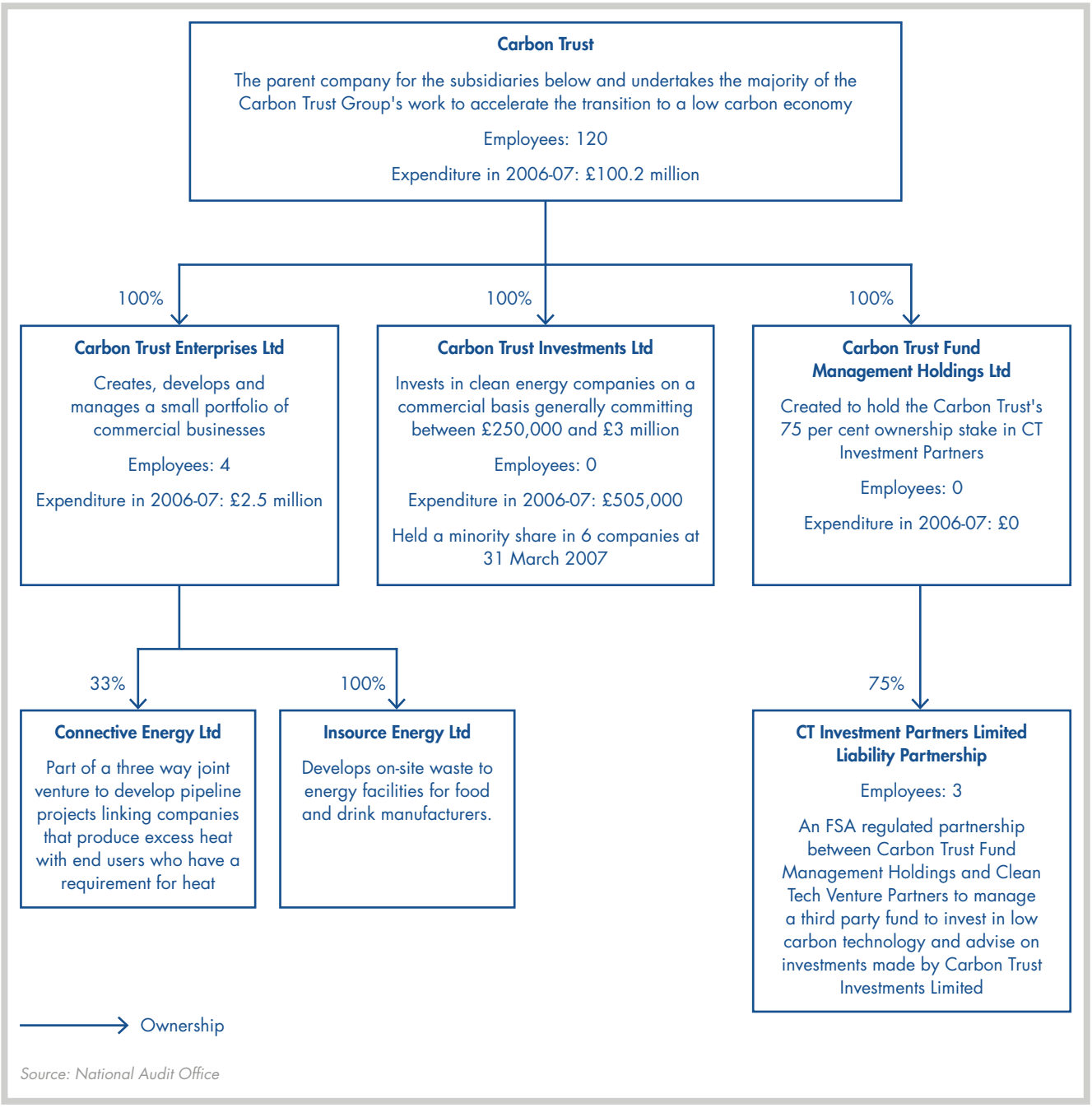
Use of experts

13 We employed two experts on call off contracts to discuss our findings at key stages of our work:

- Professor Jim Skea, Research Director at the UK Energy Research Centre advised on climate change policy and our use of data.
- Christina McComb, Head of Investment at Partnerships UK provided expertise on the Carbon Trust's low carbon technology investment programme, to supplement the expertise of Morgan Harris Burrows.

APPENDIX TWO

The Carbon Trust Group structure as at 31 March 2007



Source: National Audit Office

APPENDIX THREE

Carbon measurement

1 The Carbon Trust's activities aim to reduce carbon dioxide (CO_2) emissions in the short, medium and long term. In order to measure and understand the effect of their work, the Carbon Trust has developed a methodology to calculate, in terms of carbon dioxide saved per pound spent, the result of each of its activities and reports results annually in an Impact Assessment. This Appendix summarises how the Carbon Trust calculates the carbon savings resulting from the activities examined within this report (Carbon Management, Site Surveys, interest free loans, general advice, Investments, Innovations and Enterprises). There are other aspects of the Carbon Trust's work which also contribute to its overall effectiveness which are not included in this appendix. Details of how the Carbon Trust calculates its impact can be found in the Performance Assessment section of the Carbon Trust's 2006-07 annual report and in a separate Performance Assessment Methodology document, both of which can be found on the Carbon Trust's website at www.carbontrust.co.uk.

2 All activities are reported using the following metrics:

- Annualised carbon dioxide emissions (CO_2) saved in million tonnes of CO_2 ($MtCO_2$).
- Annual cost effectiveness (cost of activity/annual CO_2 savings) in £/tCO_2.
- Lifetime cost effectiveness (cost of activity/lifetime CO_2 savings) in £/tCO_2.
- Lifetime cost benefit [(customer capital expenditure + cost of activity – net present value of lifetime savings)/lifetime CO_2 savings] in £, where a negative number indicates an overall saving benefit.

Annual savings are converted to lifetime savings using standard persistence factors. The factor used depends on the type of technology installed, or action taken by, a Carbon Trust customer. These factors were last reviewed by expert consultants in 2005-06.

Carbon savings resulting from Carbon Trust Solutions

3 The Carbon Trust measures carbon savings and cost effectiveness resulting from direct support to businesses and organisations through Carbon Management, Site Surveys, interest free loans and general advice over the telephone, publications or on the internet. Energy consultants are required to include estimates of potential carbon savings against each recommendation given to customers of Carbon Management and Site Survey services which are used to calculate the total carbon savings identified by Carbon Trust services. The Carbon Trust then asks customers which recommendations they have implemented to calculate the actual effect of its work. Actual energy data from the customer is used where available, otherwise the estimates of carbon savings made by the consultants are married up to the actions taken. Customers are also asked for an estimate of capital costs incurred for each recommendation to estimate how much is spent on capital investment.

4 The Carbon Trust's approach to calculating the impact of Site Surveys has evolved. Prior to 2006-07, the Carbon Trust asked a representative sample (493 customers out of 3,043 in 2005-06) of Site Survey customers that had had a service in the last year which recommendations they had implemented. The Carbon Trust then extrapolated the customer responses across all Site Survey customers to give an overall estimate of impact. In addition, the Carbon Trust contracted independent consultants to visit 30 customers to verify responses. However, this methodology meant that the impact assessment was calculated using a different population each year and did not reflect those recommendations, particularly those involving capital works, which can take longer than one year to implement.

5 For 2006-07 the Carbon Trust has reported results based on actual implementation of recommendations only. The Carbon Trust's customer relationship database and Account Management system have enabled it to gather actual implementation rates from 65 per cent of its Site Survey customers who had received a service between 1 October 2005 and 31 March 2007 (1 October being the end point for the 2005-06 assessment process). This year's impact assessment will include this population and all new customers who have received a service between 1 April 2007 and 31 March 2008, enabling the Carbon Trust to reflect the impact of longer term recommendations.

6 The impact assessment for Carbon Management and interest free loans is calculated and reported on a total population, actual implementation basis. The Carbon Trust has a longer term relationship with Carbon Management customers, helping them to understand their energy usage and regularly follows up the impact of recommendations. Interest free loan applicants are required to submit an estimate of the energy/carbon savings from their project, which is verified by energy consultants who calculate the carbon saving expected from the new equipment.

7 To calculate the impact of General Advice delivered through the Carbon Trust's website, telephone helpline and publications, the Carbon Trust filtered all users of general advice to remove duplicates, customers who had received other services, and those who were using the Carbon Trust as a source of information but were not making energy savings themselves. The Carbon Trust then applied a series of 'savings factors' related to industry type and location. These factors were derived with the help of external experts, and are based on energy savings reported by a statistically significant sample of General Service customers, via telephone interviews carried out in 2004-05.

8 In relation to General Advice the Carbon Trust reports a range of savings which represent the difference between high and low estimates of CO_2 savings and cost effectiveness:

- (high method) on a graduated basis where the percentage of savings attributable to the Carbon Trust is based on the customer rating given to the Carbon Trust's services; and
- (low method) on a consulted basis, where savings are attributed if the customer says the Carbon Trust was directly responsible for energy savings measures taken.

The range of savings associated with the General Advice is reflected in the Carbon Trust's reporting of its total savings for Carbon Trust Solutions which are also reported as a range.

Assessing the potential impact of new technologies

9 The Carbon Trust has a set of procedures in place to estimate the potential impact of individual projects on future carbon dioxide emissions. There are two important variables to quantify – the effect of a technology or project on carbon dioxide emissions in the future, and the degree to which the Carbon Trust can accelerate the development of that technology or project.

10 In order to assess the carbon saving potential of different technologies and the extent to which the Carbon Trust could impact on the development of those technologies, the Carbon Trust employed consultants Future Energy Solutions to produce a Low Carbon Technology Assessment. It was originally developed in 2001 and has been regularly updated since – most recently in 2006. The choice of individual projects is informed both by this Assessment and by factors unique to that project, such as the quality of the team and the commercial potential of the technology.

11 The Carbon Trust supplements the technology-based Assessment with a more specific estimation of the carbon savings from each individual project proposal, along with the Carbon Trust's impact on that project, using the Future Impact Estimation tool. The tool was developed in consultation with industry experts e4Tech and produces estimates of future carbon impact for external reporting purposes. It considers the Carbon Trust's likely impact on the development of each and every project supported and the number of units of supported technologies likely to be taken up by the UK and international markets. Using the following methodology, the tool estimates the future carbon impact of these projects in aggregate:

- Calculation of the potential CO_2 saving for the UK as a whole at 2010, 2020 and 2050 by bottom-up estimation (based on project proposals and Carbon Trust project manager knowledge) and validated using a top-down approach (based on estimated carbon saving potential of broad technology categories).
- Calculation of the probability of achieving these potential savings at each of the time periods with and without the Carbon Trust's intervention.
- Calculation of the Carbon Trust's contribution to UK CO_2 savings by comparing the probable carbon savings with the Carbon Trust's intervention with those possible without their intervention.

12 More recently, the Carbon Trust carried out a strategic review that combined the carbon saving potential of different technologies with the economic value of those new technologies to the UK. This is used alongside the Low Carbon Technology Assessment to inform decisions on projects initiated in house, such as the Accelerators, with the aim of favouring technologies in which the UK has a competitive advantage.

The Carbon Trust achieved Assurance under ISAE 3000 over aspects of its Performance Assessment methodology

13 For 2006-07, the Carbon Trust commissioned KPMG to provide assurance over the application of its performance assessment methodology in calculating selected reported data. KPMG's review covered the annualised carbon dioxide savings, cost effectiveness and cost benefit of the Carbon Trust's Carbon Management and Site Surveys and interest free loans and the Carbon Trust's potential additional carbon dioxide savings for 2010, 2020 and 2050 from its Innovations, Enterprises and Investments activities but not the cost effectiveness of these activities. KPMG performed its work in accordance with ISAE 3000. Apart from two qualifications nothing else came to KPMG's attention to suggest that reported data was not prepared according to the Carbon Trust's methodology, resulting in assurance over the Carbon Trust's performance assessment. ISAE 3000 is an internationally recognised assurance standard and the Carbon Trust believes that the "limited" assurance provided under this standard is the most appropriate level of assurance to use, balancing confidence in its results with the cost effectiveness of collecting the underlying data required for a higher level of assurance.

14 KPMG made two qualifications in its assurance statement. In the first case this was because cost savings had not been captured in relation to 18 per cent of annualised carbon dioxide savings in KPMG's sample of site survey and Carbon Management customers meaning that the overall financial benefits reported by the Carbon Trust were likely to be understated. In the second case this was because in four examples sampled for Carbon Management (representing 22 per cent of the recorded carbon dioxide savings of the sample) the underlying basis of savings estimated were not sufficiently documented as they were from older projects.

APPENDIX FOUR

State Aid

1 State Aid rules are part of the European Union's wider rules on competition, designed to ensure that industry and commerce throughout the EU operate in a freely competitive market. The rules prohibit member states from giving state resources to organisations active in an activity traded in the EU, where the benefit of giving resources does or has the potential to distort competition and affect trade between member states.[38] In some cases, state aid is permitted under block exemptions issued by the European Commission or under schemes which have been notified to the European Commission for their approval. As a condition of its funding from Government and the Devolved Administrations, all Carbon Trust activities must comply with state aid rules. If any activities were found not to comply with state aid rules, the Carbon Trust could be obliged to recover the aid from the recipient of support.

State Aid and Carbon Trust Solutions

2 The Carbon Trust has agreed with Defra and BERR that its carbon management and energy efficiency advice activities currently operate as a "general measure" under state aid rules and therefore do not constitute state aid. A general measure is a measure conferring a benefit which is potentially available to all undertakings in a Member State and is not selective. To comply with this definition, the Carbon Trust's carbon management and energy efficiency advice must be:

- Open to all non-domestic energy users in the UK.
- Provided on the basis of need, assessed using objective criteria and applied on a non-discriminatory basis.
- Reactive not proactive, meaning that it is not targeted towards specific companies or particular sectors.

3 To ensure that the activities do not result in any unfair advantage for specific organisations and for budgetary reasons, the Carbon Trust limits the value of its support to carbon management and energy efficiency customers to £20,000 in any one year or one per cent of the organisation's energy bill (whichever is lower). £20,000 is the maximum cost to the Carbon Trust of the consultancy services provided to the customer and generally applies not just to the applicant, but to the whole corporate group to which the applicant belongs. The Carbon Trust requires co-funding for certain services and by larger organisations (with energy bills of more than £3 million) without which the number of organisations the Carbon Trust is able to work with across the UK without exceeding the £20,000 cap would be limited.

4 The **interest free loans** scheme and the Carbon Trust's **Incubator Services** operate under the state aid de minimis block exemption which is applicable to "aid of minor importance". The level is currently €200,000 over a rolling three year period. For the loans scheme, the element of 'aid' is the interest which is foregone by the Carbon Trust as provider of the loans. For Incubator Services, 'aid' is the value of the incubation service provided to each start up company.

5 When granting **de minimis** aid to an organisation, the Carbon Trust (or its suppliers/contractors) must:

- Inform the organisation of the nature of the aid;
- Obtain from the organisation full information about any other *de minimis* aid it has received in the previous three years or might in the next three years; and
- Ensure that the amount granted will not raise the total amount of *de minimis* aid received by the organisation above the relevant threshold.

Although the Carbon Trust and its suppliers must check thoroughly with applicants their de minimis position, the applicants are responsible for complying with state aid rules.

Applied Research grants and Carbon Vision

6 Applied Research grants, and fundamental research grants under the Carbon Vision programme, have been notified to and approved by the European Commission. The Carbon Trust has approval to make grants for the costs of the research and development of energy efficient and low carbon technologies and renewable resources. The percentage of funding allowed depends on the stage of the project. For example, the Carbon Trust can give grants for up to 100 per cent of fundamental research costs (although it does not use this provision), up to 50 per cent of industrial research and up to 25 per cent of demonstration and pre-competitive development costs (subject to uplifts in certain circumstances).

Venture capital investments

7 Venture capital investments are always made by the Carbon Trust as a co-investor alongside, and on the same terms as, at least one other private sector investor. Provided investments are made on that basis, they do not count as state aid under the "market economy investment principle". The Carbon Trust must make sure that it is investing on the same terms as other investors, especially where either the investor or the Carbon Trust has invested before in the company, or where there are existing investors.

Technology and Research Accelerators

8 The Carbon Trust's Technology Acceleration and Research Acceleration projects are generally structured so that the Carbon Trust is buying, or "procuring", services from third parties (such as technology experts, or technology developers or suppliers) or as collaborative projects on a commercial basis with third parties to enable the Carbon Trust to produce case studies, reports, intellectual property or other outputs which will help to accelerate the development of a particular technology. Where services are procured competitive tenders are invited usually through advertising in the Official Journal of the European Union, either to meet the requirements of the public procurement rules or to ensure that opportunities to participate in the projects are widely advertised.

Commercial ventures

9 Carbon Trust Enterprises Limited (CTEL) creates, develops and manages new low carbon businesses with the aim of accelerating the development of low carbon markets and in so doing generating revenues and profits for the Carbon Trust which can be re-invested in its activities. CTEL invests in the businesses it creates under the "market economy investment principle", meaning that it invests on at least as good terms as investors from the private sector.

APPENDIX FIVE

Information from the Carbon Trust accounts

Consolidated profit and loss account for the periods 2004-05 to 2006-07

	2004-2005 (£000)	2005-2006 (£000)	2006-2007 (£000)
Income			
Grant income	66,432	73,746	85,622
Other income	61	200	500
Interest receivable and similar income	481	946	1,741
Total income	**66,974**	**74,892**	**87,863**
Expenditure			
Programme expenditure	(59,024)	(64,165)	(82,198)
Other management and administration expenditure charged to programmes	(2,133)	(2,355)	(2,991)
Effect of discounted interest free loans	(621)	(1,274)	(2,033)
Impairment of investments	14	(200)	–
Total expenditure	**(61,764)**	**(67,995)**	**(87,222)**
Excess of income over expenditure	**5,210**	**6,897**	**641**
Share of joint ventures' operating losses	–	–	(160)
Profit on disposal of investments	–	1,775	–
Profit on ordinary activities before taxation	**5,210**	**8,672**	**481**
Tax on profit on ordinary activities	(60)	(959)	1
Minority interest	–	–	38
Retained profit for the financial year	**5,150**	**7,713**	**520**

Consolidated balance sheet at 31 March 2005, 2006 and 2007

	31 March 2005	31 March 2006	31 March 2007
Fixed assets			
Goodwill and intangible assets	20	10	–
Tangible assets	364	1,067	946
Investments	2,900	3,773	4,117
Interests in joint ventures	–	–	34
	3,284	**4,850**	**5,097**
Current assets			
Debtors – due within one year	3,763	7,836	14,298
Debtors – due after one year	3,081	6,069	11,029
Cash at bank and in hand	7,382	11,832	17,961
	14,226	**25,737**	**43,288**
Creditors – amounts falling due within one year	(8,797)	(13,220)	(24,073)
Net current assets	**5,429**	**12,517**	**19,215**
Total assets less current liabilities	**8,713**	**17,367**	**24,312**
Creditors – amounts falling due after more than one year	(258)	(506)	(6,996)
Provisions	–	–	(18)
Deferred income	(384)	(1,077)	(946)
Net assets	**8,071**	**15,784**	**16,352**
Members' fund	–	–	–
Profit and loss account	8,071	15,784	16,352
Total funds	**8,071**	**15,784**	**16,352**

APPENDIX SIX

Glossary

Alternative Investment Market	A market for small, young and growing companies operated by the London Stock Exchange.
Carbon Management	A Carbon Trust service designed to help those with large energy bills take a strategic approach to reducing their energy consumption. The service is generally available to businesses with energy bills of more than £3 million, subject to co-funding by the business, and as a separate scheme to local authorities and other public sector bodies.
Carbon Vision	An academic initiative co-funded by the Carbon Trust and the Engineering and Physical Sciences Research Council with support from other Research Councils.
Carried Interest	The portion of any gains realised by an investment fund above a hurdle rate to which the fund managers and the Carbon Trust are entitled. Twenty per cent of profit above the hurdle rate is payable to be split between the Carbon Trust and the fund advisers. Carried interest payments are customary in the venture capital industry, in order to create a significant economic incentive for venture capital fund managers to achieve capital gains.
Climate Change Agreement	Agreements which can be entered in to by energy intensive industries with the Government that they will meet challenging targets for improving their energy efficiency or reducing their carbon dioxide emissions in exchange for an 80 per cent discount from the Climate Change Levy.
Climate Change Levy	A tax on the use of energy in industry, commerce and the public sector, with offsetting cuts in employers' National Insurance Contributions and additional support for energy efficiency schemes and renewable sources of energy. The levy forms a key part of the Government's overall Climate Change Programme.
Carbon Trust Innovations	A Carbon Trust activity designed to support the development and commercialisation of new low carbon technologies which should lead to a reduction in carbon dioxide emissions in the future.
Carbon Trust Solutions	A Carbon Trust activity designed to support businesses, public sector organisations, and voluntary organisations, to help them reduce their energy use and consequently their carbon dioxide emissions in the short term.
Customer Offer	A project designed to increase the implementation of recommendations by customers of Carbon Trust Solutions and hence increase reductions in emissions of carbon dioxide.

Department	Where the text refers to "the Department" this refers to the Department for Environment, Food and Rural Affairs or its predecessor.
Design Advice	A Carbon Trust service designed to encourage the use of low carbon building design methods for new or refurbished buildings.
Energy Efficiency Loans	Interest free loans of up to £100,000 in England and Wales and £400,000 in Northern Ireland (the Scottish Executive runs its own loans scheme) to replace or upgrade existing equipment with more energy efficient versions.
Enhanced Capital Allowance	A form of tax relief which allows the full cost of an investment in designated energy-saving plant and machinery to be written off against the taxable profits of the period in which the investment is made.
EU Emissions Trading Scheme	A scheme introduced across the EU to help it meet its targets under the Kyoto Protocol involving the allocation and trade of capped emissions allowances.
Grant Offer Letter	A letter setting out the conditions under which a government body is providing a grant.
Incubators	A Carbon Trust activity designed to provide strategic and business development advice to start-up companies and to prepare management teams for further investment.
Innovation Programme	The Innovation Programme includes three areas of Carbon Trust activity: Carbon Trust Innovations, Carbon Trust Investments and Carbon Trust Enterprises.
Kyoto Protocol	An international agreement signed in December 1997 that introduced legally binding emissions targets to be achieved by the period 2008-12. The UK agreed to cut a basket of different greenhouse gases by 12.5 per cent between 1990 and 2008-12.
Limited by Guarantee	A private company that does not have shareholders or share capital. It has members, called guarantors, which undertake to contribute to the company's debts if the company is wound up to a maximum of £1 each. It cannot distribute its profits and these are generally reinvested back into the company's activities.
Open Call	A scheme through which the Carbon Trust makes about three "open calls" for applied research proposals each year of which around 10 per cent receive a grant of up to £250,000.
Research Accelerators	A Carbon Trust activity providing focussed support to overcome technology barriers within key pre-commercial technology.
Services	The products provided by the Carbon Trust to help customers to reduce their current carbon dioxide emissions which include Carbon Management, Standard Surveys, General Advice and Energy Efficiency Loans.
Standard Survey	A Carbon Trust service including a site visit by a consultant resulting in a report with between 10 and 30 recommendations to help the organisation reduce their carbon dioxide emissions. Available to organisations with an energy bill of more than £50,000 per year.

State Aid	Rules prohibiting EU member states from giving state resources to organisations active in an activity traded in the EU, where the benefit of giving resources does distort or has the potential to distort competition and affect trade between member states.
Stern Review	A review, commissioned by the Prime Minister and the Chancellor of the Exchequer, and written by Sir Nicholas Stern, on the economics of climate change.
Technology Accelerators	A Carbon Trust activity aimed at addressing market barriers to the development of new low-carbon technologies through, for example, funding projects which demonstrate the effect of a particular new technology.
UK Climate Change Programme	A programme of work put in place by the Government to help the UK achieve reductions in emissions of greenhouse gases and adapt to climate change.

ENDNOTES

1 The Carbon Trust's contribution to the overall annual reduction of 118 million tonnes is 4.4 million tonnes.

2 In 2004, businesses and public sector organisations emitted an estimated 243 million tonnes of carbon dioxide, 43 per cent of total emissions. These figures were based on carbon dioxide emissions by end users, whereby the emissions produced by power stations, refineries and other energy supply industries were re-allocated to the end users of the electricity, petroleum products and other fuels. The figures were taken from: HM Government, *Climate Change: The UK Programme 2006*, CM 6764, March 2006.

3 See glossary.

4 Prime Minister Tony Blair, October 2000.

5 The company's head office is based in London, although it has smaller regional offices in Glasgow, Cardiff and Belfast and a customer centre at Eynsham.

6 Average across 2006-07.

7 This includes a saving of 0.367 million tonnes of carbon dioxide emissions which arises from additional measures in the UK Climate Change Programme 2006 to enable the Carbon Trust to provide additional support for investment in energy efficiency in small and medium sized enterprises.

8 In 2006-07 the Carbon Trust estimates that the customers to whom it provided services spent between £188 million and £296 million implementing energy saving recommendations. The Carbon Trust estimate that the net present value of the resulting energy savings lies between £410 million and £655 million. The lower cost and benefit figures are matched to each other, as are the higher ones. The lower figures are based on a lower estimate of the amount of recommendations that have been implemented and therefore costs incurred but also benefits accrued.

9 When asked the question, "Which organisations are you aware of whose role it is to help business reduce carbon dioxide emissions and mitigate climate change?" they responded "the Carbon Trust" without being prompted.

10 The Carbon Trust requires co-funding from organisations with an energy bill of over £3 million a year. For smaller businesses, the initial advice is provided for free.

11 Based on a National Audit Office census of organisations who received specific advice from the Carbon Trust between April 2005 and March 2006.

12 This does not include the average annual bonus paid to staff in the Carbon Trust at manager grade or above of £7,000 in 2006-07. Nor does it take into account that, as Carbon Trust employees do not receive a final salary pension scheme the value of their pensions is less than those on an equivalent salary within the Department for Environment, Food and Rural Affairs.

13 This includes a small bonus paid to some Departmental staff.

14 The Carbon Trust has stipulated that an organisation should have an energy bill of over £50,000 to be eligible for a site visit. Companies with an energy bill below £50,000 are eligible for telephone advice, may make use of interest free loans and are able to access information via publications and the website.

15 Our survey found that consultancies with less than five employees said that the Carbon Trust accounted for around half of their work on average whilst consultancies with between 10 and 49 employees said it accounted for 33 per cent and those with more than 50 employees said 19 per cent.

16 *Stern Review Report on the Economics of Climate Change*, 2006.

17 *Climate Change 2007*, The Intergovernmental Panel on Climate Change, 2007.

18 *2006 UK Climate Change Programme*, Department for Environment, Food and Rural Affairs, 2006.

19 *Synthesis of Climate Change Policy Evaluations*, Department for Environment, Food and Rural Affairs, 2006.

20 The funding bodies have limited influence over the operation of the Carbon Trust. The Grant Offer Letter from the Department for Environment, Food and Rural Affairs provides greater flexibility to the Carbon Trust than it would typically give to its non departmental public bodies. The Department's influence over the Carbon Trust is largely restricted to commenting on its annual business plan and by raising issues at quarterly board meetings. In addition the Carbon Trust provides all of its funders with a quarterly report on progress against the objectives set out in its business plan, and meets its funders quarterly to discuss. The Carbon Trust also engages its funders as stakeholders when developing significant new initiatives.

21 The income and expenditure figures in this report include amounts which are not reflected in the profit and loss account of the Carbon Trust's accounts. Under the Carbon Trust's accounting policies grant income is recognised in the profit and loss account to match expenditure. Three areas of activity: capital expenditure, investments and making loans are not chargeable as expenditure for statutory profit and loss purposes. For a detailed explanation of the interpretation of the Carbon Trust's profit and loss accounts see the Carbon Trust Annual Report 2006-07, page 36.

22 The Advisory Committee for Business and Environment was a forum between government and business on environmental issues. The Climate Change Working Group was a sub group of the main committee.

23 This includes the capital value of finance provided to organisations through the Energy Efficiency Loans scheme and through Salix for public sector invest-to-save schemes in energy efficiency equipment.

24 The difference between the cost of these activities and the Carbon Trust's total net expenditure of £95 million is £3 million for overheads such as accommodation and IT costs that could not be readily allocated to these work areas. A further £9 million in Value Added Tax and interest income received of £500,000 accounts for the difference between the total net expenditure of £95 million and the Carbon Trust's total funding used of £103 million.

25 In most cases the allocated account manager will be a telephone account manager based at the Carbon Trust customer centre in Eynsham. In Wales the account manager may be regionally based.

26 The cost of the loan is the cost of administering the loan plus the interest foregone.

27 The range in costs per tonne of carbon dioxide saved each year reflects the methods used to estimate the impact of the Carbon Trust's general advice.

28 Thirty two customers who received a Carbon Management service answered the survey and of these nine said that the service failed to meet their expectations. These results are only indicative and are not statistically valid.

29 One per cent of respondents had implemented all recommendations, four per cent had implemented none, 60 per cent had implemented between one and five, and 28 per cent had implemented more than five. The remaining seven per cent did not answer the question.

30 In 2006-07 the Carbon Trust commissioned KPMG to review their impact assessment and provide assurance over the application of the Carbon Trust's methodology in calculating selected performance data. With the exception of two qualifications nothing came to KPMG's attention that the reported data was not prepared in accordance with the Carbon Trust's methodology. For further details of the assurance given see Appendix 3.

31 A corporate group can include many companies, some of which are unlikely to have significant, if any, contact with each other.

32 Of the 415 consultants who were able to work for the Carbon Trust, 327 applied for accreditation, of which four failed at the standard level and 13 failed at the more technical solutions development level.

33 Based on the turnover of companies operating in the market.

34 *Carbon Trust landscape review of the energy market,* Carbon Trust, 2007.

35 *Meeting the productivity challenge from the 2006 budget,* HM Treasury, 2006.

36 The internal rate of return on the Carbon Trust's portfolio has been examined by the Carbon Trust's advisers on the fundraising in accordance with the International Private Equity and Venture Capital Guidelines, and found to be 20 per cent in early 2007. This compares well with wider market rates: a British Venture Capital Association survey shows negative internal rates of return for venture and technology funds over a five year period to 2006.

37 The upper end target of £65 million was dependent on the Carbon Trust raising a third party low carbon technology fund to be listed on the Alternative Investment Market. The Carbon Trust failed to raise the fund (see paragraph 3.11) and therefore fell well short of the upper end target. It did however exceed expectations in terms of raising private sector funds via other means.

38 Treaty of Rome, Article 87(1) EC states: "Save as otherwise provided in this Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favoring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market". Article 87(1) states that the following criteria must be met for state aid to be present. The aid: favours certain undertakings or the production of certain goods; is provided through State resources; distorts or threatens to distort competition; and affects trade between Member States.

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