2008:

Public Sector ICT Sustainability Survey

Produced by the E-Government Bulletin and the Low Carbon Innovation Network

Executive Summary

Current Practice for Carbon Reduction from ICT within Government

The role of ICT in producing carbon emissions is well recognised and stated specifically in the Carbon Reduction Strategies of the organisation of 44% of the people who responded to the survey. Applications of energy saving technology and well thought out policy are two ways of reducing environmental impacts from ICT.

The Implementation of Technology to Reduce Environmental Impacts

The survey established the take up of; automated switch-off devices, thin-client devices, energy efficient printing devices and web conferencing, as well as action taken to exploit existing resources in the context of data centres.

Findings showed a high level of implementation and interest in thin-client devices, energy efficient printing and web conferencing. With 76% of respondees answering that their organisation encouraged green printing.

The take up for automated switch off was not as high with only 23% of respondees stating that this was used by their organisation. This may be due to the potential of the same results being achieved from addressing the issue via a change in staff culture.

The survey explored three areas where improvements may be made within data centres. Results showed that the use of virtualisation software was popular with organisations as more than half have this in place. The potential to utilise wasted heat energy is something that's being considered by a number of organisations but is still in its early stages.

Climate change is taken into consideration by the vast majority of organisations when making decisions. The implementation of some technologies is more popular than others, often due to multiple benefits which include carbon reduction. However the lower take up of other technologies illustrates that there is still much potential for future carbon reductions through the procurement of green ICT equipment.

The Implementation of Policy to Reduce Environmental Impacts

Questions asked with regards to policy within the survey referenced; the implementation of targets, the procurement of green energy and the use of 'home working' initiatives.

Under half of the sample had no targets set for carbon reductions within ICT. This creates an absence of a clear goal for planners to work towards. The results illustrated the need for greater communication between those involved in carbon reduction strategies within departments, such as ICT, and the organisation as a whole, and the need for the latter to take these factors into consideration when working to empower staff.

The procurement of green energy is something that greatly influences the carbon emissions of ICT, however it is something that the main players in this organisation have little to do with. Their incorporation in these decisions in the future may increase

their awareness of green decisions. The fact that energy is more often than not sourced from renewable resources shows the commitment of the public sector in its quest to reduce carbon emissions.

51% of respondees answered that their organisations allow 'home working'. This initiative saves energy through reduced transport and office lighting and heating. There are multiple benefits as money is saved through a reduction in energy and the scheme is popular with employers who save the time they would have taken to travel. However some job roles require people to be on site and the scheme is not popular with all management approaches.

Policy is a vehicle for organisations to make changes that will lead to greater carbon reductions. Policies that encourage all employees to get on board and work towards a common goal have great potential for driving future savings in carbon emissions.

Future Developments for Carbon Reduction from ICT within Government

Drivers for Change

53% of respondents said that saving money by way of improvements in energy efficiency was the single most important factor driving change outside of their organisation's carbon reduction plan.

Financial incentives are often a driver for change just as much as environmental incentives. Luckily, many schemes/policies which reduce carbon also offer financial benefits to the organisation undertaking them.

When schemes offer more than one benefit, for example carbon reductions and greater control of systems or financial savings, they have an increased take up rate

Obstacles in the way of change

There are a range of challenges that need to be overcome in order to best improve carbon reduction within organisations. User behaviour is a common obstacle in the way of progress as staff support is crucial for carbon reduction policies to enjoy continued long-term success. Other obstacles include a lack of funding and the need for people who recently gained responsibility for carbon reduction to gain knowledge regarding carbon management.

Moving Forward

The obstacles highlighted by the survey have the potential to be overcome through changes made within organisations. The sharing of knowledge between counterparts in different organisations is a valuable way to achieve this. The knowledge that initiatives have been successfully carried out in the past increases confidence in these schemes and may encourage funding from senior levels, and the ability to share with others their experiences of running these projects allows the avoidance of potential pitfalls.

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1. Introduction

The Low Carbon Innovation Network (LCIN) and the E-Government Bulletin combined forces to address how public sector mitigates within ICT to reduce their carbon production and the impact they have on climate change. The LCIN was created in November 2006 and now has over nine thousand executives committed to sharing best practice and innovation in the drive to tackle climate change. The E-Government Bulletin is the first and leading email newsletter on the use of the internet and ICT to improve public services and government, with a12-year history of independent coverage. Its readership is more than 10,000 across the public sector and private sector partners and it organises a series of successful conferences.

Members of both networks include executives within ICT in local, regional and national government departments; each trying to reduce their energy consumption and carbon emissions through the incorporation of energy efficient technology and the production of well thought out policy. The survey brought together the thinking of these persons to better identify the challenges they face and the initiatives they have for future development. The results also indicate the stage that the sector is at in its quest to combat climate change.

With government issuing the UK's national targets for carbon reduction, the departments that compose this central body are under pressure to act as role models in this field. Since climate change first became a recognised concern government departments have been committed to reducing their impact; initiatives such as the Nottingham Declaration, set up in 2005, saw over 330 councils pledge to systematically reduce their carbon emissions.

These bodies have been linked with controversy as the public asked if there really was a need to employ someone in the role of 'Climate Change Officer', however as time has moved forward we have seen persons of the same job role appear in many private sector organisations following the success of the inauguration of these individuals within government.

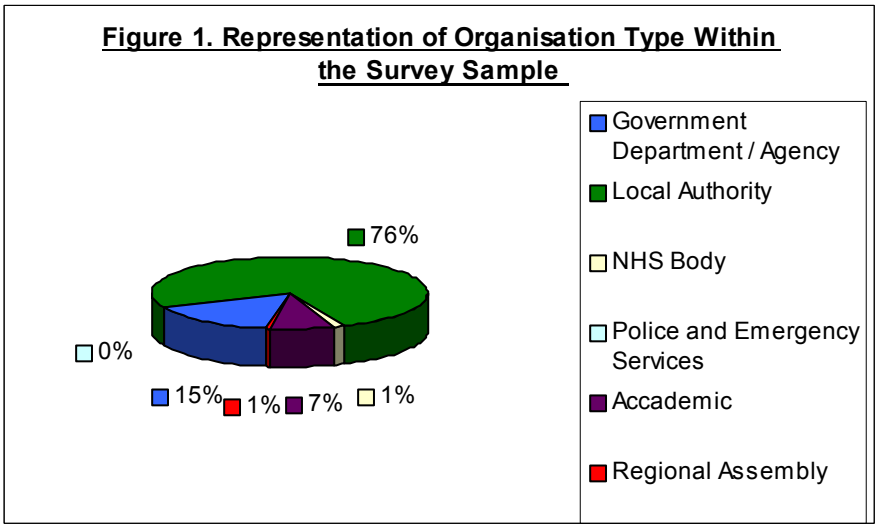
Now given the task to further reduce carbon emissions, government authorities are tasked with addressing all areas where energy use is high. Managers of departments are responsible for the procurement of the technology they use, but along with this they have the responsibility to account for their carbon emissions. The duty to reduce carbon emissions is therefore shared by managers in many areas of government.

With its continuous use of a range of hardware dependent on electrical supply, ICT plays a major role in the energy consumed by an organisation. As well as the energy used to power hardware, ICT departments also have to heat and light offices as well as consider the energy used by commuters coming into work.

The 2008 Public Sector ICT Sustainability Survey referred specifically to ICT departments within public sector. Early questions asked about current practice with regards to the implementation of green technology and policy, in order to establish the stage at which departments are. Later questions set about pinpointing the drivers for further change and the challenges that respondees faced when making these changes. The survey also aimed to ascertain the changes required both in house and by national government to enable and 'make happen' greater reductions in carbon emissions. A breakdown of the questions asked can be located in the appendix (A1).

Figure 1 gives an overview of the government organisations represented by those who responded to the survey. The majority of respondees are situated within local government with good representation also being shown from government departments/agencies and academic institutes. Answers were also received from NHS bodies and regional assemblies.

Figure 1. Representation of Organisation Type Within the Survey Sample



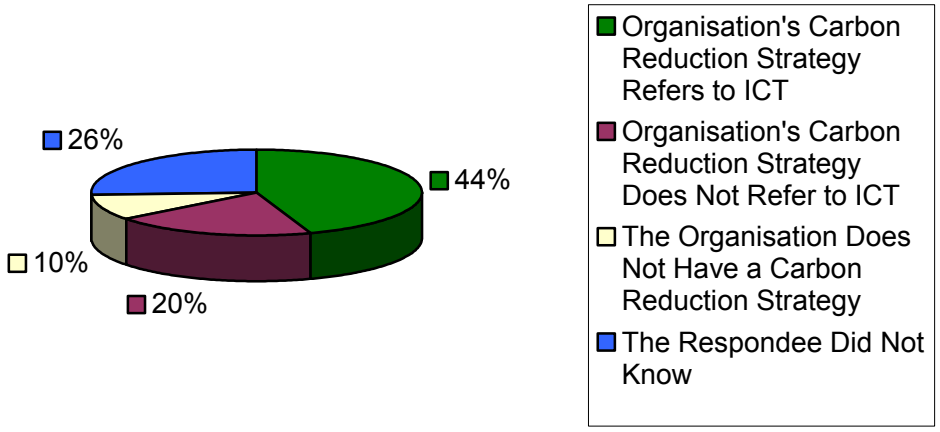
In total over 190 people replied to the survey allowing for a detailed overview of the role ICT plays within government's carbon reduction and the developments being carried out and needed for success in this sector's quest to combat climate change.

2. Current Practice

In order to establish a baseline for the contribution that ICT has towards carbon emissions the survey asked questions about organisations' current practice. Questions set about to determine the recognition by organisations of the role ICT plays in producing emissions, and its response to this shown in practice currently in place; in the creation of its policy and the procurement of its technology within ICT departments.

Figure 2.0.1 is a visual representation of the responses collected when respondees were asked about the recognition that was given to ICT's contribution to carbon emissions. 44% of replies stated that ICT was recognised within their organisation's carbon reduction strategy. 30% of replies came from organisations where ICT was not recognised in this way, with one third of this group (10% of the total) admitting that their organisation was yet to implement a carbon reduction strategy. The remaining 26% of those surveyed did not know whether ICT appeared on their carbon reduction strategy or not.

Figure 2.0.1. Recognition of ICT in Carbon Reduction Strategies of Organisations



The majority of respondees stating that ICT is recognised within carbon reduction strategies is promising. It represents good knowledge of a shared goal within an organisation and the presence of communication between ICT managers and environment champions situated in different departments. This organisation of targets, and the people involved in helping to meet them, helps make clear what is expected and this responsibility is likely to drive the changes required to lower carbon emissions from within ICT.

The lack of recognition by some organisations highlights the development of the sector and acts as a reminder that this is an ongoing process. There are still organisations that need to create a carbon reduction strategy, and others that have the strategies in place but need to develop them to include all areas where energy use can be reduced and monitored. It is unlikely that these organisations will not

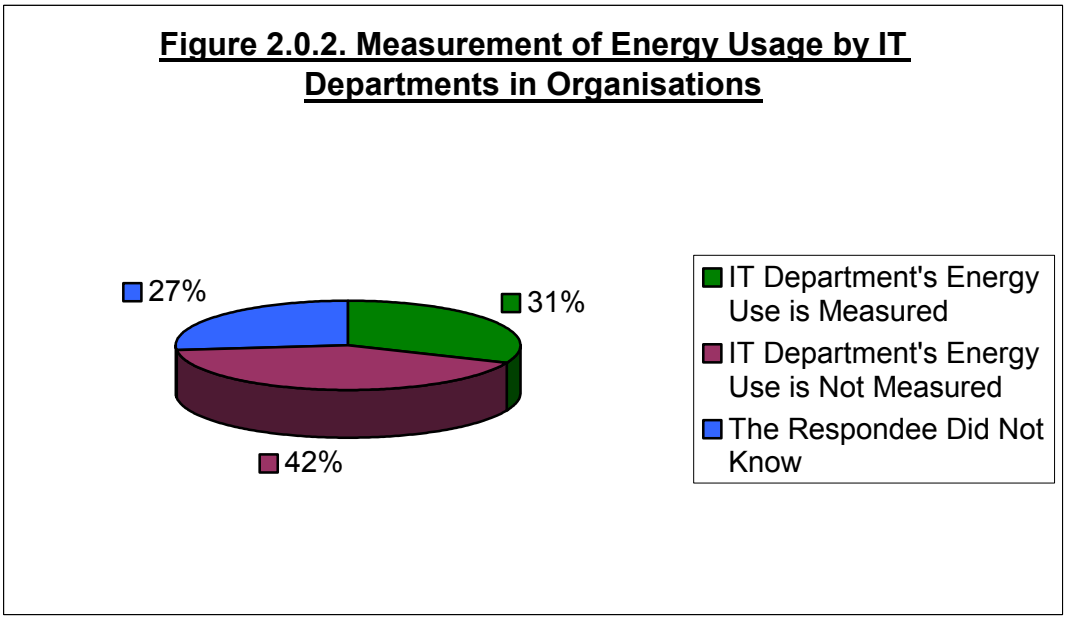
develop to produce a carbon reduction strategy, which recognises the role of ICT, as carbon reduction targets are set to increase over coming years and ICT is an area with big potential to shed carbon shoe sizes.

The transfer of low carbon responsibility could explain the lack of knowledge from the remaining 26% of respondees. The surveyed sample of people included a range of job titles within government (A3 in appendix), the vast majority of which have not traditionally been involved in the creation of carbon reduction strategies. Although there is constant growth in the recognition of the role these people play in carbon reduction from ICT, the process of sharing the responsibility occurs over a period of time and some job roles are not likely to be involved as soon as others.

There is a need for increased communication between creators of carbon reduction strategies and managers of departments with high-energy expenditures, such as ICT, as both will benefit from working towards a shared goal. Many organisations have accomplished this already but others are still progressing towards this level of organisation.

Figure 2.0.2 refers to whether or not energy usage by IT departments is measured by organisations. 33% of respondees stated that their organisation did measure the energy use of their IT department, 42% stated that they did not and 27% of respondees did not know if it was or not. The answers suggest that energy use of IT departments within government organisations is more often not measured than are.

Figure 2.0.2. Measurement of Energy Usage by IT Departments in Organisations



It is somewhat surprising that more organisations do not monitor the use of energy within ICT. From the results shown in figure 2.0.1, that around 44% of organisations recognise the impact of ICT within their carbon reduction strategy, you would assume that these same organisations would measure use in order to monitor any changes that they make.

For the respondees that did not know whether or not energy use from IT departments was or wasn't measured, this is likely to be due once more to the job titles of the persons surveyed; people within some job roles would not be likely to require this information (A3 in the appendix gives a full list of job roles).

In order to see if a newly implemented initiative has been successful or not the savings in energy usage need to be calculated. This can only be done if the energy being used is measured. It is likely that energy use as a whole is being recorded by the organisation, even if just through the analysis of energy bills, however the accuracy of this technique is questionable as many variables act on the overall changes within an organisation. By monitoring energy used by specific departments managers can more accurately determine the success of a specific initiative and decide with greater confidence on the way forward.

An increase in the number of organisations monitoring energy use specifically from their ICT departments is likely to lead to a better understanding if the effects that initiatives have on carbon reduction. As each organisation is different it is also essential to understand how changes affect them specifically. The generation of accurate figures can also help to tweak these initiatives to get the best from them.

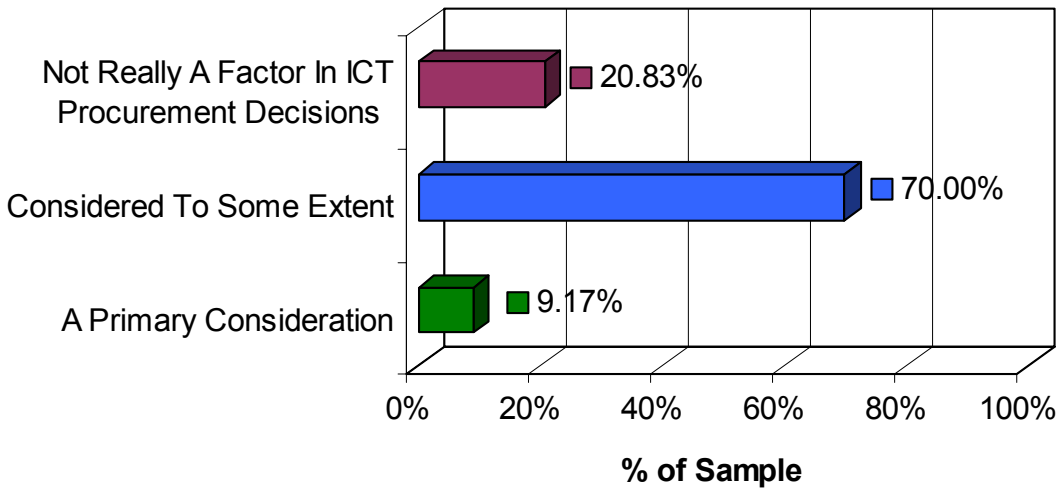
2.1 Technology

Technology is continuously being developed to be greener and to help various business to be greener also. The report explored the take up of technology specific to ICT designed to reduce carbon emissions:

It is important to have managers within ICT on-board with carbon reduction strategies in order to ensure a balance between reducing environmental impacts and a good level of productivity within organisations. A key factor in maintaining this equilibrium is through the procurement of the correct energy saving devices that remain competitive with other products on the market.

Those surveyed were asked the extent to which environmental impacts were considered in procurement decisions of ICT. Figure 2.1 displays this information illustrating that environmental impacts are considered in the majority of organisations; 9.17% of respondees stating that these were a primary concern and 70% answering that they were considered to some extent. The remaining 20.83% responded by saying that environmental impacts were not a major factor in determining the procurement decisions of their organisation.

Figure 2.1 The Extent To Which Environmental Impacts Are Factored Into ICT Procurement Decisions



Modern developments in technology specific to ICT and the emergence of the new clean technology sector has created a supply of affordable ICT appliances not only competitive in performance but also in green credentials. This supply has allowed managers to easily factor environmental impacts into the choices they make about the technology they invest in and explains the strong support for taking environmental impacts into account when making procurement decisions.

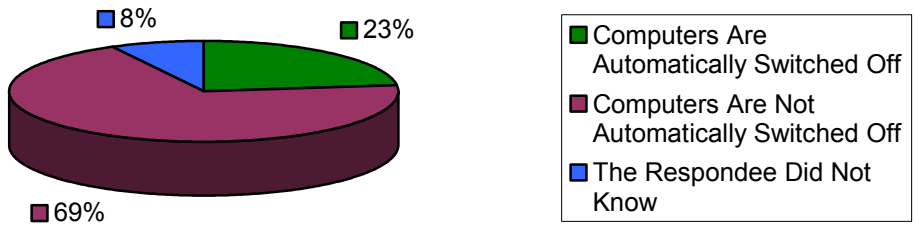
However this is still a dynamic area of progression, earlier we touched on the fact that the survey sample consisted of a wide range of job titles and although the responsibility of carbon reduction now falls with more persons than before, the idea of responsibility lying with everyone is still being established. An important thing to consider throughout this report therefore is that as carbon reduction increases in its importance the take up of low carbon initiatives is therefore likely to increase also.

A recently released publication by the Cabinet Office, Greening Government ICT, has stated that UK Government departments must consider carbon emissions in ICT procurement from January 2009. A survey carried out a year from now would therefore be expected to show a greater priority of carbon credentials in ICT procurement.

2.1.1. Energy Smart Automatic Switch Off Devices

Figure 2.1.1 illustrates the use of technology within government to automatically switch off computers at night and over weekends. 23% of respondees use this Energy-smart technology within their organisation, 69% do not and 8% were unsure.

Figure 2.1.1. The Use of Energy-smart Software to Automatically Switch Off Computers at Night and Over Weekends



Low representations of organisations incorporating this technology may be due to successful implementation of 'change in culture' initiatives that come with little to no cost. One of the first areas to be combated by many environment managers was the shut down of energy consuming devices when not in use. Initiatives to get employers onside and turning off their equipment when they went home included the use of comical stickers saying 'switch me off' and the policy that the last person to leave an area should quickly check that computers were shut down.

However this method of energy conservation is rarely completely successful as people do sometimes forget to switch off. Problems also arise in the switch off of shared equipment with no obvious way to decide whom the responsibility lies with. The implementation of this technology is a good solution to these small problems, however as there are presently much larger contributors to carbon production it is not likely to be a pressing concern of these organisations for some time.

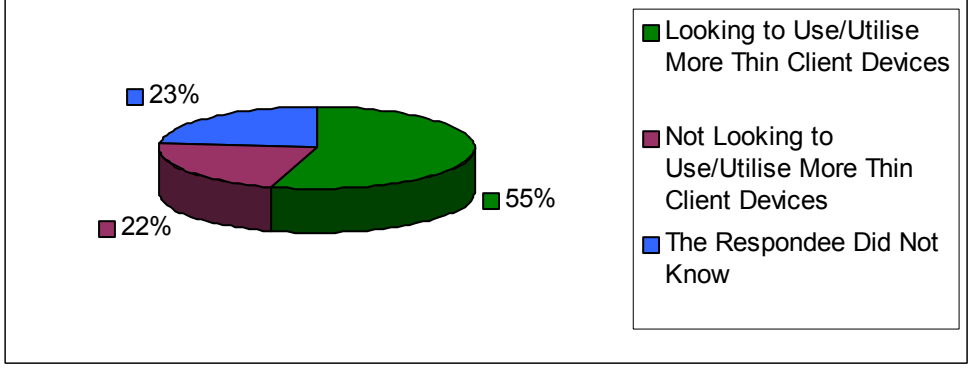
2.1.2. Thin-Client Devices

Thin-client architecture consists of a central sever accessed by thin client devices at each workstation. Energy is saved through the increased efficiency of running equipment that uses much less power at each of these workstations. The server size is not limited and so whole departments can run off as little as one server, reducing the amount of hard drives required and leading to massive reductions in energy consumption.

The decrease in the materials required has many benefits to an organisation's carbon economy as less energy is used in the production and shipping of equipment and fewer visits from engineers will be required if any difficulties are experienced with systems.

Figure 2.1.2. illustrates the popularity of this technology as a majority of 55% of organisations have incorporated it into their set up. 22% of organisations currently do not have this technology in place and the remaining 23% of respondents did not know if the technology was in place or not.

Figure 2.1.2.The Use of Thin-Client Devices to Reduce Energy Use and Increase the Lifespan of Technology



The popularity of the technology is likely to be due to the various areas where carbon is saved: In house energy is saved through the greater efficiency of running this set up compared to having a separate PC at each work station, and the overall carbon footprint of the technology is also much lower due to fewer materials being required in the manufacture of the equipment. The need for fewer units uses less fuel in the shipping of these products and fewer call outs from engineers are required as there is a smaller amount of hardware to be serviced.

Added benefits of the technology, which may impact on popularity alongside carbon reduction, include the ability to retain control of the system centrally. Members of staff using the system are not able to plug in devices, make changes to the anti-virus system in place or download anything that may have otherwise caused problems at their own workstation.

An explanation as to why more organisations do not use this technology may be due to the sizes of departments. In smaller departments the energy savings still exist but are not as extensive.

This technology can also be implemented in conjunction with other energy saving technology, for example switch off devices. In this instance the equipment's lifespan is also increased as it is being used less often, and as the switch off is centrally operated there is much less risk of workstations being left on overnight and when not in use.

2.1.3. Data Centres

Respondees were asked what steps they had taken to fully exploit existing data centre resources with focus on three key aspects:

1. The options to re-use the heat generated
2. Improvements in design and operation
3. Use of virtual software

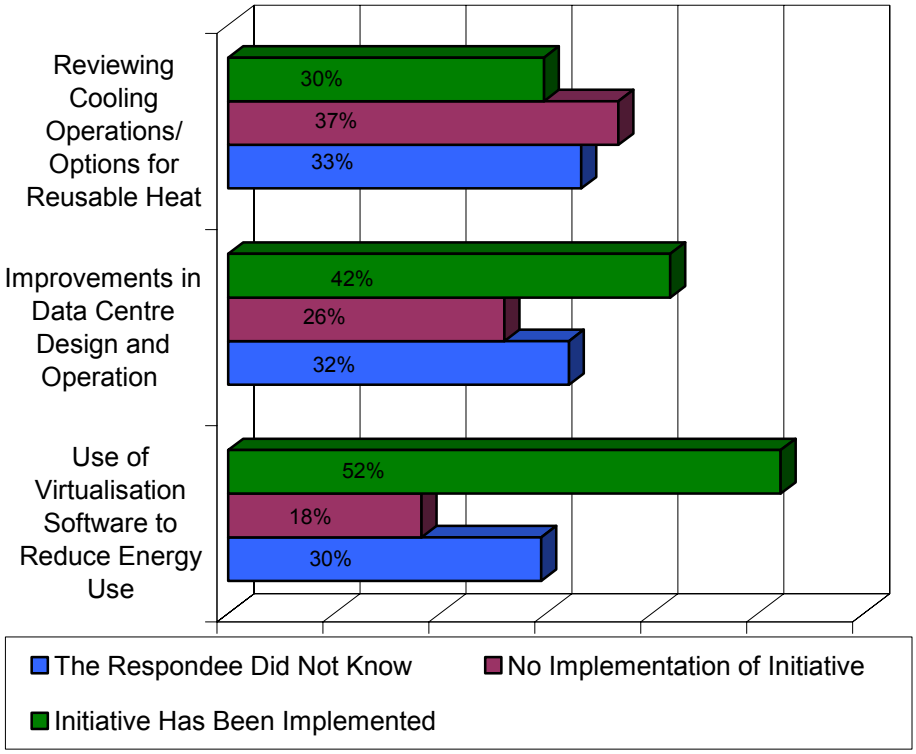
The temperature of data centres has long been a problem, as the technology generates waste energy in the form of heat and requires further energy expenditure, as the room then needs to be cooled. Respondees were asked if any steps had been taken to address cooling operations or explore the reuse of waste heat energy.

Figure 2.1.3 illustrates that 30% of replies stated that steps had been taken towards this, however 37% of replies stated that no steps had been taken. The remaining 33% did not know if this had been looked at within their organisation.

Changes in the design and operation of data centres can alter the energy required to run them. Data centres are dark sites, as they are not required to be manned all of the time; changes in operations may therefore include the transfer to automated lighting in these areas, if the technology has not been incorporated already. Other ways in which operations may be improved is through the switch off of computers when they are not required for use. Figure 2.1.3 shows that 42% of the organisations surveyed had made steps towards these improvements and only 26% had not. Representatives from the remaining 26% were not clear of the steps that had been taken.

Virtualisation software is often housed within data centres. This section refers back to section 2.1.2. of the report. The ability for several staff members to log on to a single server reduces the volume of hardware required by an organisation; reducing in house energy costs and the need for less equipment reduces the carbon footprint of the product itself. This method of increasing the efficiency of data centres is the most popular: 52% of organisations have taken this step, 18% have not and 30% of respondees did not know.

Figure 2.1.3.Steps Taken Within Data Centres to More Fully Exploit Existing Resources



There is still much potential for a reduction of energy usage through the utilisation of energy wasted as heat in data centres. There is an irony in that energy is being consumed by technology and released as waste heat and then more energy is required for cooling. Advances to combat this include the potential to utilise wasted heat by transferring it to where it is required, or by reducing the heat emitted by equipment in the first place. However both of these suggestions require a level of commitment as instigators of these strategies would have to invest in new technology. As more becomes known of the successes in these areas confidence in these strategies is likely to increase.

Both practical and technological changes can be made within data centre design and operation to reduce energy consumption. The greater proportion of organisations having made steps towards this, rather than towards the above, is an indication that advances in this area are a little more straightforward. The adaptations that could be made include simple ideas such as the automated switch off of equipment at night and through weekends when it is not required for use.

Although a greater number of organisations have made these changes than had made changes in heating and cooling operations, 26% of respondees did answer that their organisation had not yet made these changes. This highlights that there is still potential for carbon savings from changes such as these through the implementation of changes in these organisations.

The majority of the organisations involved in the survey use virtualisation software. As mentioned in section 2.1.2 there are many positives to encourage managers to implement this technology: the equipment runs more efficiently, a reduction in the volume of hardware required means less materials are required for its production and fewer carbon miles are required for its shipping, and the use of one shared server means that engineers, with their own carbon miles, will be called out less often.

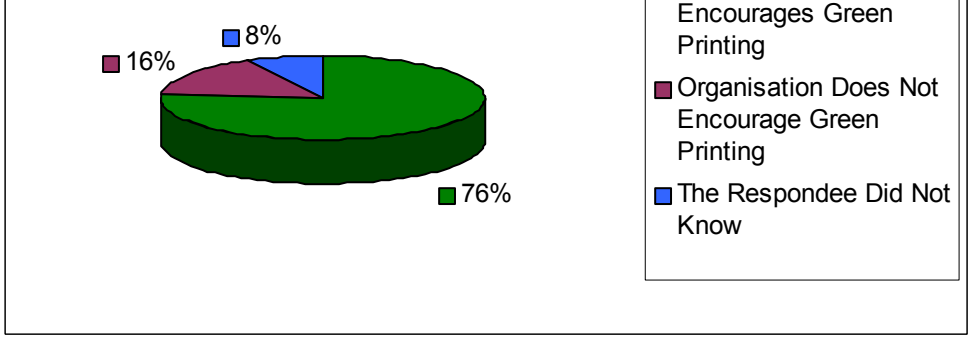
There are points to consider when analysing the results to this question. All three of the initiatives included would benefit not only from carbon savings but also from cost savings. However the use of virtualisation software has other drivers for its implementation; the central control of a system's anti-virus protection and the lack of ports at workstations for memory sticks and similar devices enables ICT managers to run an organised and clean system. This does not detract from the importance of carbon reductions brought about by this system, and is often a fortunate side effect, however it could go towards explaining the heightened level of support for this initiative compared to the other two.

2.1.4. Multifunction Printing Devices and Green Printing Defaults

Printing impacts on carbon reduction through the energy required to; run the process, manufacture the hardware, transport the hardware and produce the paper. Increases in efficiency of the process and the lifespan of the hardware will reduce the carbon created through this process as will decreases in the volume of paper used.

Figure 2.1.4. shows the implementation of multi-function printing devices within organisations. A majority of 76% of respondees answered that this was implemented within their organisation with only 16% stating that it was not.

Figure 2.1.4.The Use of Multi-function Printing Devices and Green Printing Defaults



Reduced energy use in printing is popular as it can be fairly easy to achieve and reduces energy spent through a variety of processes. Perhaps most interesting is the energy spent in the procurement of paper. Energy is used in the production of this resource and its shipping to site. The procurement of the resources to make paper directly diminishes a natural carbon sink, especially if these materials are sourced from equatorial regions, leading to greater care being taken to source this commodity from recycled sources or producers signed up to schemes such as the Sustainable Forestry Initiative.

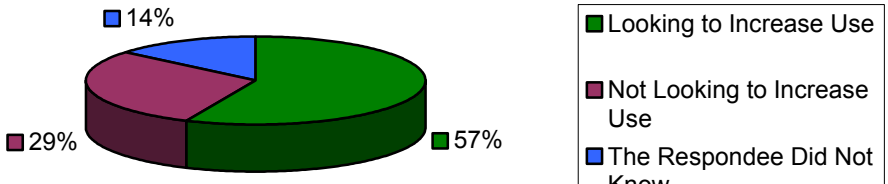
Technology can help reduce the carbon costs of printing through improvements in printer design. There are now printers on the market which have been designed with permanent components to replace many of the devices removed each time a cartridge is changed in a conventional printer, have long life drums and are able to print double sided documents at competitive speeds.

Other techniques to reduce printing volume include the 'think before you print' initiative, asking if paper copies of the information seen on screen are really required. This cost free way of reducing paper use has seen much success, however all organisations are still required to print some documents and in order to reduce impacts further this initiative is extremely beneficial.

2.1.5. Web Conferencing

Web conferencing is a brilliant example of how ICT itself can lower carbon emissions. In this instance ICT has been developed to enable meetings to take place between people from organisations that may be thousands of miles apart without using any carbon miles. Figure 2.1.5 illustrates the popularity of this technology as 57% of respondees replied that their organisation was looking to increase its use of this equipment.

Figure 2.1.5 The Use of Web and Video Conferencing to Reduce an Organisation's Carbon Footprint



It is key when analysing results to consider that not all organisations feel that they require technology of this nature; that taken into account shows how well taken up the technology is. A reason, aside from the carbon savings made, for why the technology is so well supported, is its availability and relative simplicity. Many people are familiar with the process on a personal scale due to the home use of services such as Skype and the addition of a web cam to many people's MSN Messenger services. The availability and quality of these types of products increases massively on a commercial scale meaning that there are choices to suit a wide range of budgets and requirements.

Like the use of virtual software there are non-carbon related positives that contribute to the take up of this technology. The equipment can allow a meeting to take place between several people situated throughout the country, or potentially internationally. Time is saved as these people are not required to take time out to travel long distances; this also means that meetings can be arranged with greater ease as the time allocated by each individual is not as great.

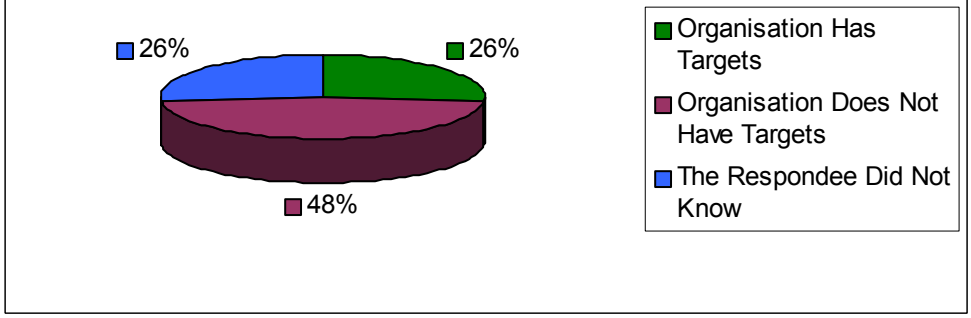
2.2 Policy

Alongside the procurement of energy saving technology, organisations use policy to reduce their impact on the environment. The survey explored the policy in place surrounding carbon reduction within ICT in order to establish the successful implementation and areas of potential.

2.2.1 Implementing Targets

By setting targets managers are able to work towards a clear goal, monitor success and motivate staff to get on board. Figure 2.2.1 demonstrates that 27% of the sample were from organisations where targets in energy and materials reduction were implemented, 47% were from organisations where they were not implemented and 26% of respondees were not sure.

Figure 2.2.1.The Implementation of Targets in Energy and Materials Reduction Within ICT Departments

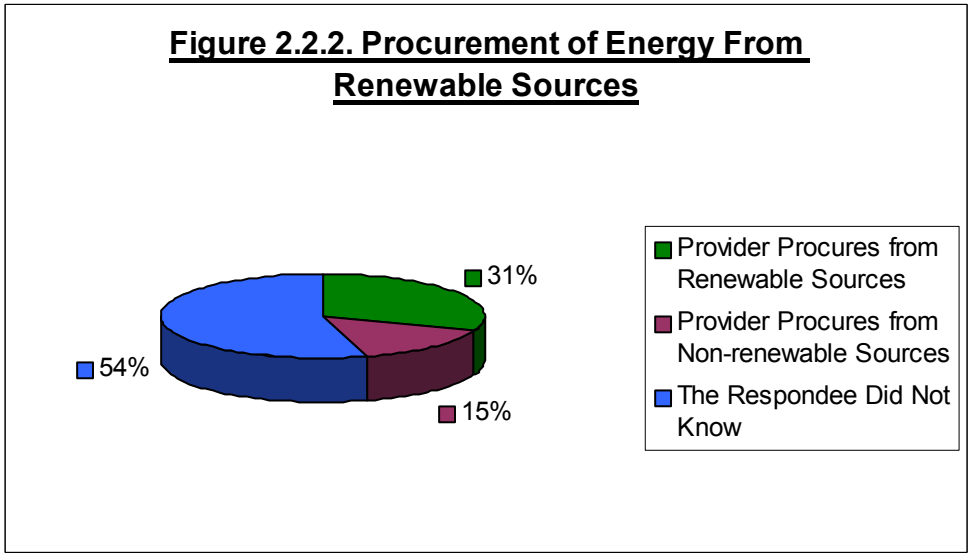


The majority of organisations have no targets for energy and carbon reduction within ICT. When compared to the results in figure 2.0.1, which illustrated that 44% of organisations recognised the impact of ICT within their carbon reduction strategy, the fact that only 27% have targets for reduction in energy and materials reduction is surprising. It shows that although ICT is a recognised contributor towards carbon emissions, managers are still in the earlier stages of addressing this and much progression is needed.

2.2.2 Procurement of Green Energy

Initiatives such as the Carbon Reduction Commitment require organisations to take responsibility for where they source their energy. 31% of the sample stated that their supplier procures energy from renewable sources and 15% stated from non-renewable sources. The remaining 54% did not know the source from which their energy comes.

Figure 2.2.2. Procurement of Energy From Renewable Sources

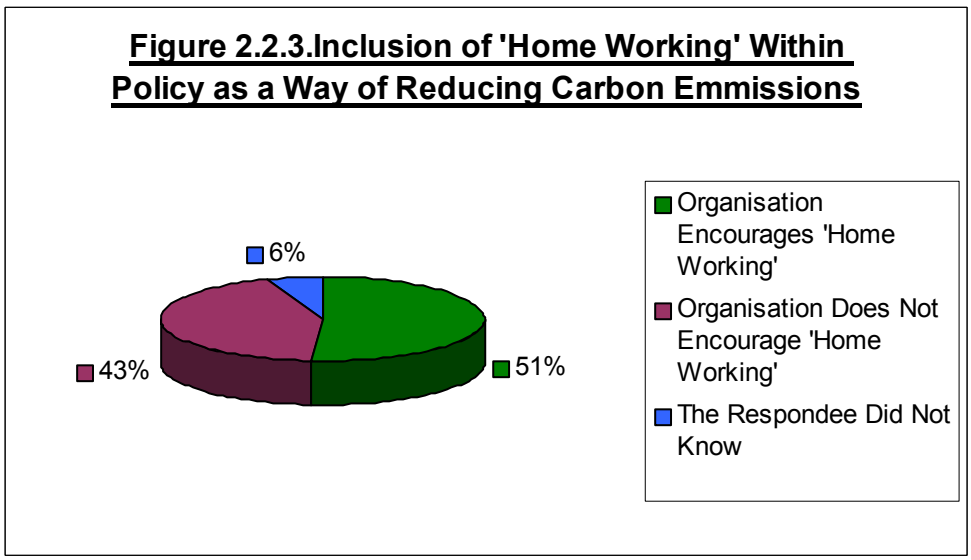


Energy procurement decisions take place between few people within an organisation, which explains why so many were unsure. It is promising that from the remaining sample energy is more often sourced from renewable sources than non-renewable.

2.2.3 'Home Working'

Allowing members of staff to work from home is a scheme that is popular in many places of work to reduce transport and office costs. Fuel used by staff to get to work, especially if travelling by car, has high carbon costs and at times when few people are in the office it is much more economical for employees to work from home rather than heat and light a much larger space. Considerations by some organisations have extended to training staff about energy efficiency in the home, to ensure maximum carbon savings. Figure 2.2.3. illustrates that 51% of organisations include this policy as a way of reducing carbon emissions and 43% do not.

Figure 2.2.3.Inclusion of 'Home Working' Within Policy as a Way of Reducing Carbon Emmissions



The fact that the majority of organisations are in favour of home working is not surprising as this is a good way to reduce fuel usage by employers and also saves them the time they would have taken to travel. However this is not a practical solution for everyone. Some employers are required to be on site and some managers prefer to be in face-to-face contact with their staff. Organisations also have to address the increased carbon use in homes and include these figures in their overall carbon audits. Managers in some organisations do provide training in home energy efficiency, however in practice organisations cannot insure the uptake of this practice out off the office. These factors are likely contributors to the high percentage of organisations that do not run these schemes.

2.3 Conclusions of Current Practice

The vast majority of organisations take environmental impacts, such as climate change, into consideration when making decisions within their organisation. Decisions about the technology used within ICT can play a major role in the impact that a body has and the volume of carbon emissions it produces. There are many opportunities with ICT to invest in devices that will not only reduce carbon emissions within ICT specifically but also aid the reduction of carbon from other sources. A good example of this is video conferencing, using technology developed within ICT to reduce carbon emissions associated with transport.

Policy is also widely used to improve the environmental credentials of organisations through the implementation of targets, the procurement of green energy and the

employment of green strategies such as 'home working'. However there is a need for increased communication between creators of carbon reduction strategies and managers of departments with high-energy expenditures, such as ICT, as both will benefit from working towards a shared goal. Many organisations have accomplished this already but others are still progressing towards this level of organisation.

Responses to the survey have highlighted great potential for progression, as many organisations are still to implement many of the strategies that were asked about in the survey. Areas with particular potential include the incorporation of energy-smart automated switch off technology and the implementation of clear targets.

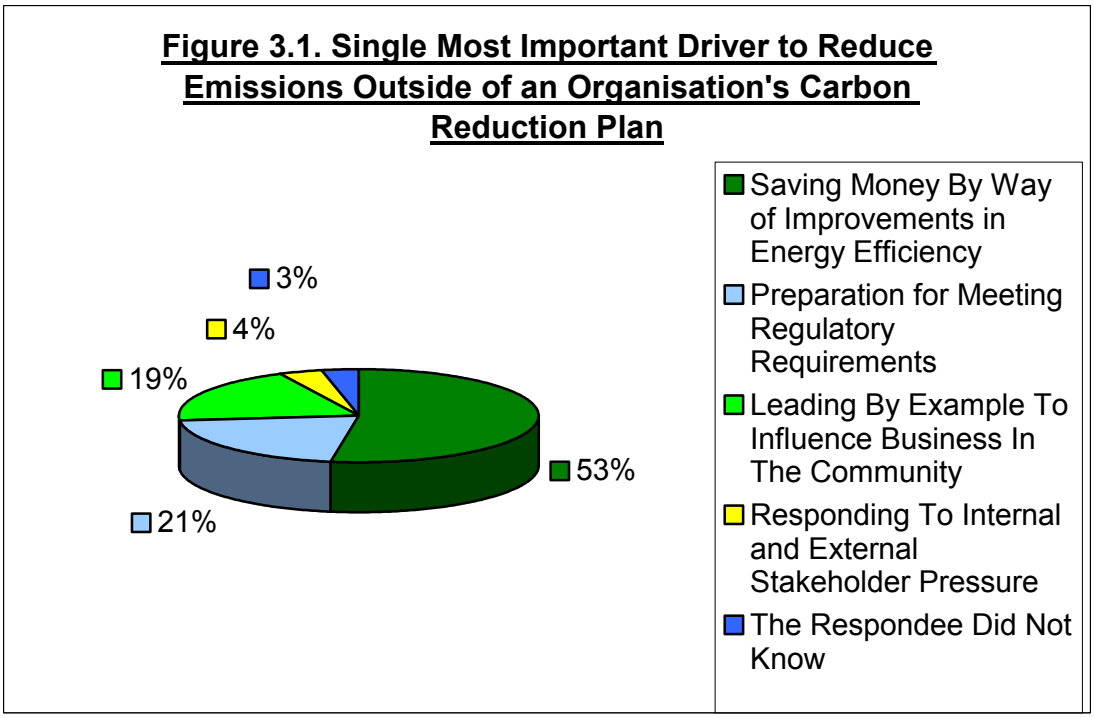
3. Future Development

Section 2 of this report highlighted the possible areas for potential improvements in the carbon performance of government organisations, Section 3 now explores the drive for these improvements and the likely future developments for low carbon schemes within the sector.

3.1 Push Factors for Change

When asked for the single biggest driver for reduction in carbon emissions, outside their organisation's carbon reduction plan, the clear winner came from 53% of respondees; the savings that this brought about. Other key drivers were preparation to meet regulatory requirements (21%), and the ability to lead by example and influence businesses in the area (19%). 4% stated that the biggest driver was stakeholder pressure and 3% were unsure.

Figure 3.1. Single Most Important Driver to Reduce Emissions Outside of an Organisation's Carbon Reduction Plan



The saving of money will always be a driver in energy reduction as figure 3.1. suggests: Carbon production is associated with cost, as the burning of fossil fuels (for electricity production, gas heating and road fuel) involves the release of carbon into the atmosphere, whilst at the same time using expensive resources. Products and schemes introduced to lower carbon therefore have added benefits to organisations finances.

Many changes have been made within organisations to improve efficiency, at little to no cost, however these opportunities are now becoming exhausted and in order to make further reductions and meet regulatory requirements organisations are required to invest in technology. Managers implementing these schemes are therefore driven more by the need to meet these requirements than the long term cost savings that they would make as a result.

Sharing best practice is a great way to encourage others to implement strategies that aid their carbon reduction. By acting as role models and sharing the experiences of carrying out low carbon schemes, local authorities, responsible for improving carbon reduction throughout their district not only gain understanding of the process but also instil confidence in schemes being carried out locally (Section 4 of this report includes case studies from authorities aiming to do just this). Leading by example is a major driver due to the role of government and its responsibility to encourage all business to reduce carbon emissions.

Corporate Social Responsibility plays a role in all large organisations. Climate change is a high profile topic covered in all areas of media on a day-to-day basis. There is pressure on the profile of organisations to act to prevent this phenomenon and so it is not surprising that a percentage of people feel this is the main driver.

Savings in money associated with reduced energy usage are key in the encouragement of organisations to reduce their carbon emissions. Government targets also drive improvements as organisations have goals to work towards and the pressure to meet deadlines. The unique role of government to support development of strategies within all types of business creates another driver, as by acting as role models these authorities are able to encourage low carbon initiatives to take place throughout the country.

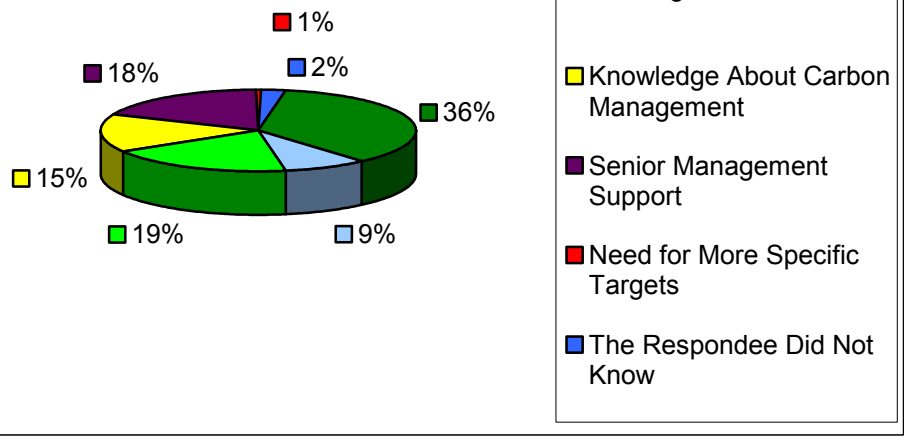
3.2 The Challenges Faced

As section 3.1 shows, there is the drive to reduce emissions, but instigators come against a range of challenges that oppose the changes needed. The survey set out to better understand these challenges by asking what the biggest obstacle standing in the way of further carbon reduction was.

There is no single obstacle that stands out as being the consistent challenge faced by all organisations. Instead figure 3.2. shows that different organisations face different obstacles, and that not just one but a series of obstacles threaten the progression to further carbon reductions.

The greatest obstacle identified was the empowerment of staff to take action and was recognised by 36% of respondees as being the single biggest problem facing their carbon reduction strategy. Large proportions of the sample represented three further concerns; 19% recognised funding, 15% stated a lack in carbon management knowledge and 18% identified senior management support as being their greatest opposition. Other concerns also factor into the mix with 9% identifying ascertaining the validity of green credentials of equipment and 1% recognising the need for more green credentials.

Figure 3.2. The Single Biggest Carbon Reduction Challenge Faced By Organisations



Staff empowerment is an area of great potential in reducing an organisation's carbon emissions. However a lack of support from staff can be as equally detrimental as beneficial. In areas such as; printing, the use of lighting and the switching off of equipment, the engagement of staff is essential. When asked what one thing they would change or make happen within their organisation to help reduce carbon many referred to a change in culture, citing 'a culture that continues to encourage unsustainable energy consumption' and suggesting to 'influence everyday activity to do simple things like switch off lights'. Although a very cost effective change when rectified this process can take a long time to reach full potential, needs maintenance and reminders, and is not always greatly reliable.

Funding is essential to deliver continuous savings in energy. Once organisations have done all they can to turn around culture, implement low carbon policy and run the equipment as energy efficiently as possible, investment is required to keep up the momentum. Investments include training of staff and using efficient technology that in time will bring about cost savings through the reduced use of energy. Funding is essential for organisations moving into the Carbon Reduction Commitment process as a failure to improve energy efficiency year on year will result in large fines.

Knowledge of carbon management is required for managers to determine the success of practices that they carry out. This is especially relevant in this report as the respondees consist not only of carbon managers but a high proportion of ICT professionals that have recently been passed this responsibility. Familiarity with the strategies available and training in the role of carbon management will vastly improve the capabilities of these people as well as the confidence they have in achieving low carbon targets. The accessibility to this information through free e-bulletins, best practice events and in house communication is likely to reduce the impact of this challenge.

Improvements in culture, funding and knowledge all require senior management to be on-board. When identifying the one thing that they would change within their

organisation to improve carbon reduction respondees called for 'more firm guidance from the senior management team' and the creation of a 'senior management director level role with clear responsibility' for these issues.

The challenges being faced by organisations all have the ability to be overcome. Top down, senior management need to make funding available and encourage the sharing of knowledge between those responsible for carbon management, both internally and externally. Bottom up, the workforce needs to get on board and turn around culture to be more energy efficient.

3.3 Moving Forward

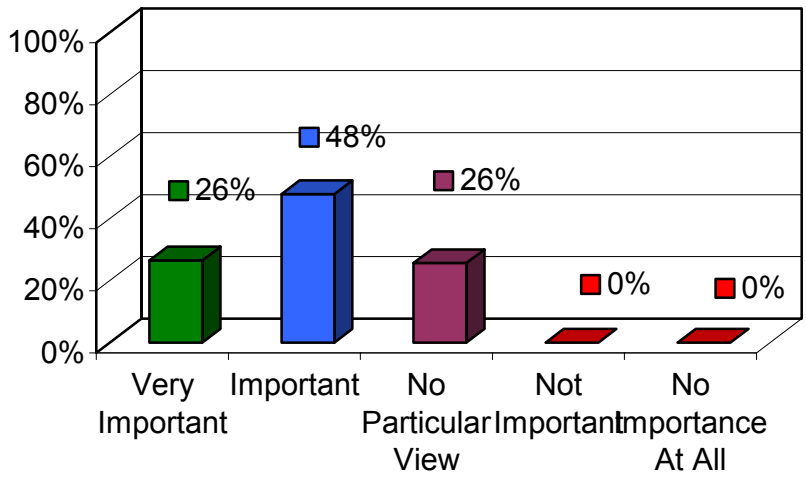
Organisations need to be able to progress in their carbon reduction in order to meet national targets. Having identified the drivers to move forward and the challenges faced, the report asked the changes that respondees would like to make within their organisation to reduce carbon.

Popular topics included; changes in staff culture, better organisation of responsibility, increases in funding, improving transport efficiency and move to paper reduction through the encouragement of email over post and paperless meetings.

The large number of topics being discussed is an indication of the wide range of strategies that can be carried out. Sharing best practice about initiatives carried out with those considering similar strategies allows for unbiased knowledge transfer, a lower likelihood of coming against obstacles and a greater confidence when developing strategies to move forward.

The report asked what importance was given to the opportunity to transfer knowledge. Figure 3.3. shows a clear trend that the transfer of knowledge is important to people in the survey. No respondees stated that no importance was given and only 26% had no particular view; meaning that a majority of 74% saw the opportunity to share best practice as being important.

Figure 3.3. The Importance of Opportunities To Share Best Practice With Counterparts From Other Organisations



As low carbon enterprises are relatively modern the knowledge bank lies principally with the people who have carried out schemes in this area. Sharing best practice opens this knowledge bank and aids the development of low carbon strategies within both ICT and other areas. By gaining insight of schemes that have been carried out and warning people of the possible pitfalls associated them, a greater understanding of schemes is created. This heightened understanding drives a greater number of initiatives to go ahead and improves the success and smooth running of their implementation.

There are a number of ways to share best practice. The Low Carbon Innovation Bulletin and the E-Government Bulletin are sent out electronically and both have a circulation of over nine thousand. They share best practice through the incorporation of case studies and interviews and are examples of free knowledge transfer.

Events are also held around the country, such as the Low Carbon Best Practice Exchange and Techno-Footprint, which provide interactive platforms for decision makers to hear about the initiatives that counterparts in other organisations have carried out and ask them questions about the process.

3.4 Conclusions for Future Development

Currently the biggest driver for change is the cost savings that are associated with carbon reduction. However senior management have to take a long-term view when assessing these benefits; without investment in new technology energy savings are limited to the efficiency of technology already in place. Improvements in energy are required to be made consistently in order to meet national targets and avoid potential fines.

Obstacles preventing the development of carbon reduction strategies do exist and challenge those responsible for carbon management; however these do have the potential to be overcome; for example, the implementation of policy has the potential to improve staff culture and can be combined with the application of automated systems to greatly reduce the energy use of an organisation.

The sharing of best practice is needed between all those involved in carbon reduction to provide them with an awareness of the strategies that are carried out to make these reductions. Confidence in schemes proven to have succeeded in other organisations is likely to secure greater levels of funding, whilst the experiences of those who have carried out initiatives can aid the smooth running of similar projects carried out in the future.

4. Case Studies

Respondees were asked if they would mind being contacted and interviewed about the initiatives that they had carried out in order to share best practice within this report, the Low Carbon Innovation Bulletin and the E-Government Bulletin. We have included a selection of these below to outline the strategies with specific relevance to ICT departments within UK Government.

4.1 Flintshire County Council – virtualisation software

Flintshire County Council employs around 7,500 people, with the area itself having a population of approximately 150,000 residents.

John Thomas, Operational Services Manager within the ICT and Customer Services Division, explained that Flintshire Council has implemented a green ICT policy based around virtualisation technologies, the benefits of which are already becoming clear.

Mr Thomas explained the factors that drove the department to implement changes: "Within the ICT and Customer Services Division, we recognised some time ago the environmental and energy utilisation impact of the increasing volume of server and storage technologies within the datacentres at Flintshire County Council.

"We evaluated, together with our strategic partners, Real Solutions and IBM, the use of virtualisation technologies across our infrastructure to gain better utilisation of our server and storage resources and to reduce energy consumption and carbon emissions."

The result was that server and storage virtualisation was implemented several years ago, allowing the council to run multiple server instances on a single physical server. This meant that fewer actual physical servers were required, and the ones remaining were more powerful. The effects of these changes were better management and allocation of resources, with lower overall energy use.

The benefits of virtualisation were realised by the council when used earlier on to balance server use and manageability. It was found that overall power requirements were less, as well as there being a reduction in packaging and distribution. These positive outcomes, combined with reduced energy use, lower carbon output and better management of ICT resources, led the council to implement virtualisation on a wider scale.

As Mr Thomas explains, the council now have applied these benefits to a wider IT framework: "We have now implemented a Green ICT Policy with clear, achievable objectives to drive down the use of energy in the use of ICT resources together with savings in terms of packaging, use of paper and consumables."

Though precise figures for energy saved and carbon reduction are still being gathered, the policies implemented have seen a reduction in power utilisation of around 20% in the datacentres, resulting from less physical servers and subsequently, less power needed and less cooling requirements.

Clearly, virtualisation has had the biggest impact upon the council in terms of energy-saving technology, but it is encouraging to hear that further technology initiatives are also being implemented due to the success of the project: "We are also about to

implement IBM Director Power Management software to allow us to monitor power utilisation and set policies to throttle back resources or switch them off when not in use and bring them back online as demand increases; for example overnight and at the weekend."

Though the benefits of these green IT initiatives will spread throughout Flintshire County Council as a whole, unsurprisingly for a technical operation such as virtualisation, the ICT department were responsible for executing the scheme, with the leadership of Chris Guest, Head of ICT and Customer Services. Staff in the department were also extremely supportive of the project, realising the wide-ranging benefits such a scheme could offer.

The project itself also ran smoothly, and Mr Thomas tells me that initially piloting the scheme meant that all major setbacks were neatly avoided. The effectiveness of the technology used was also paramount to its success, and this too delivered exactly as it should have, resulting in widespread satisfaction throughout the department: "The technology really does what it says it will do and the migration tools are excellent, so this meant the project was really straightforward. We are delighted with the results of the technologies we have implemented and the benefits they have delivered across the board. We have reduced the number of physical servers in use by 40% and this is now an ongoing programme."

In terms of the whole of Flintshire County Council, carbon reduction is seen as an important priority, with a 'spend to save' budget in place for wider carbon reduction projects. The council is carefully examining energy output costs and is also focused on increasing awareness of energy-saving projects: "As an organisation we are working to reduce emissions across the board and are very focused on the costs associated with increased energy use and dependence. The authority is engaged in training and awareness raising as well as projects to reduce energy use."

Flintshire's handling of the virtualisation project and its effect on other green initiatives is a fine example of planning, good execution and using the knowledge and expertise of those in your organisation to maximise the effectiveness and efficiency of a scheme. For those organisations wishing to adopt a similar virtualisation programme, Mr Thomas offers the following advice: "Engage with a partner such as IBM to look at the overall infrastructure and put a server implementation strategy together to eliminate physical servers where possible, using them only for specialist functions, and move the rest of the infrastructure to a smaller number of more powerful servers running server virtualisation."

4.2 Manchester City Council - Citrix thin client deployment, print consolidation, server virtualisation and monitor replacement

Manchester City Council has recently seen the implementation of several major IT initiatives, all of which have had a significant positive impact on reducing carbon emissions from the council. The initiatives can be broadly classed into four areas: Citrix thin client deployment; print consolidation; server virtualisation; and monitor replacement.

Citrix Systems (an American company which specialises in virtualisation and remote access software) has allowed the council to undertake a programme of thin client deployment. This ongoing project has enabled the council to replace a significant number of legacy PCs (PCS over three years old) with terminals, which typically

utilise less than 20% of the power of the older PCs. So far, 2,000 terminals have been deployed, which will create a power saving of over 1 million kilowatt hours per year.

In terms of print consolidation, Manchester City Council are currently consolidating its printer numbers from over 3,200 to less than 1,200, nearly all of which will use Xerox solid ink technology. This energy-efficient print technology utilises the concept of block toner; instead of the traditional fluid ink or toner powder used in many printers, solid ink comes in 'blocks' or 'sticks' (which are non-toxic and safe to handle), which are then heated and melted in the printers to produce the ink which will be used in the printing process. As well as various quality and efficiency benefits, this method of printing also produces far less waste to then be disposed of, as there are no print cartridges to discard.

Many organisations, including council departments, are now implementing or examining for future use the idea of server virtualisation; the process of integrating multiple computer servers together on to one physical server. Manchester City Council have also taken up this idea and initiated a server virtualisation project to reduce its Wintel Application Server Estate from around 300 physical servers to less than 30. This is calculated to cut carbon emissions by approximately 300 tonnes per annum.

As with server virtualisation, monitor replacement schemes for PCs are becoming more and more commonplace in large-scale carbon reduction projects, and again the council has taken up this example by replacing 85% of its monitors from CRT (older, larger monitors) to TFT (flat-screens). Environmental benefits of TFT monitors include less physical waste when disposing of the monitors themselves, and considerably less energy being consumed during usage, as well as during the actual building of the monitors.

4.3 Newport City Council - Changing user behaviour, Print rationalisation, Virtualisation, Greener IT procurement, Recycling old equipment and Web development

Newport City Council has taken a multi-step approach to delivering 'green IT', with a view very much towards the future and the benefits that implementing change at an early stage can bring. Kimberley Sims, Office Manager for Information Systems and Communications at the council, explained that the 'push' factors driving the changes were related to industry research stating that 'greener' IT will become increasingly important and increasingly effective over the next two years.

"However," says Ms Sims, "the planning and cost assessment needs to start now in the context of the overall IT strategy. Therefore the spend in the current year will make best use of the technologies already available, and start the planning process for investments in future years.

"The perennial squeeze on public sector budgets has forced organisations to look at increasingly innovative ways of providing cost savings whilst continuing to deliver front line services. We see the use of greener technologies as a way of supporting this requirement."

There are six main ways in which the council is lowering carbon emissions and implementing green policies: Changing user behaviour; Print rationalisation;

Virtualisation; Greener IT procurement; Recycling old equipment; and Web development.

Changing user behaviour – an area not always tackled by organisations implementing green IT – is recognised as a key element in the initiatives of Newport City Council. Ms Sims explained the thinking behind the council's actions: "As the environmental impact of IT is reduced by behavioural as well as technological changes, a key issue for us has been ensuring that computer users are better informed as to what they can do to support changes in their own place of work.

"This work started with a print rationalisation project with 'think before you print' posters displayed at multi-function print devices, and a policy discouraging print. More recently work has continued with a 'shutdown' weekend, as a first step towards reducing the energy saved through improving shutdown and reduced use of energy on machines that are not in use during the working day. We are now rolling out power management across the desktop fleet and continue to raise awareness in newsletters, through the council's intranet and user 'champions'."

In terms of print rationalisation, the council have removed over 440 print devices since 2005, saving an estimated 7.8 tonnes of carbon per year and £5000 in electricity costs, whilst current work on virtualisation to a single server means that the number of separate servers can be considerably decreased (reducing energy use and cooling requirements), as well as replacement of older equipment with smaller, more efficient machines.

Greener IT procurement is also making a considerable impact on carbon reductions not just for the council, but on a wider scale. Dell, the council's main supplier of desktop IT across the corporate and schools infrastructure, has pledged to neutralise the carbon impact of its worldwide operations by 2008, and the council are also reviewing contracts with the aim of moving to energy-efficient corporate desktop PCs. Projected savings of this move are £14.50 per unit, with an estimated (by the manufacturer) carbon reduction of 0.22 tonnes per annum.

The council is also working in partnership with E-inclusion Recycling, an organisation which aims to promote community involvement through computer recycling. Staff at the council are encouraged to return unused hardware which is then recycled into the community or disposed of appropriately (in accordance with Waste Electrical & Electronic Equipment directives.

Web development has played an important role in the council's green IT policy, as Ms Sims explains: "A key priority for web development over the last two years has been the move to more transactional services supported by the introduction of online forms. This allows more customers to send information to the council and interact with us online, rather than submitting paper forms. The council also provides an intranet service for staff members, including a comprehensive document management system, reducing the need for distribution of paper."

As well as focusing on these areas, the council has also employed the use of general energy-saving technology across its IT framework, such as using automated power management for desktop PCs; all newly installed desktop PCs are power managed – with monitors switched off after five minutes, system standby taking effect after 30 minutes and hibernation after one hour of non-use.

Though staff have generally been extremely supportive of the changes and of the green IT initiatives overall, there is still progress to make in terms of staff attitudes and knowledge of the subject. As Ms Sims realistically points out: “Changes in user behaviour require ongoing endorsement and promotion, and there is still more to do around ‘shutdown’ and reducing print output. For example, if the authority increased the amount of duplex (double sided) printing by just 15% this would save 600 boxes of paper per year, which equates to 5.4 tonnes of carbon and £6,000 in savings for the council. Continued investment in this and other initiatives will require bids for resources against other priorities.”

Overall though, Newport City Council has produced a detailed, wide-ranging and highly effective set of guidelines for tackling carbon emissions and environmental … as a whole. The thoroughness of its policies are also complemented by a desire to continually improve upon areas which may require work. For those wishing follow a similar path, Ms Sims offers the following well-rounded advice: “Focus on changing user behaviour as well as technological changes, ensuring that computer users are better informed as to what they can do to support changes in their own place of work.

“The work completed thus far has provided us with a solid foundation upon which we can develop further. The key requirement now is to ensure that the momentum does not slow and that the enthusiasm is maintained across the council.”

4.4 South Lanarkshire Council- ICT energy/carbon action plan: electricity reduction through a number of cost-effective and easily applicable steps

A detailed ICT energy/carbon action plan from South Lanarkshire Council puts an emphasis on electricity reduction through a number of cost-effective and easily applicable steps, many of which can be used to directly measure carbon reductions. The council’s Carbon Officer can then quantify energy and associated carbon savings achieved from carrying out the action plan.

Managing the action plan on behalf of the council is I.T. Business Systems Manager Lindsay Greenock. There are a number of points included in the plan, some of which have already been achieved, whilst others are ongoing or planned to take place in the near future (with figures included here being taken from July 2008). One significant aim of the plan is to gradually refresh all PC monitors to flat screen. There are various environmental benefits of switching to flat screen monitors, with the key advantage based around energy use. As well as consuming less energy (by up to 70% according to some studies) during use, less energy is also used to build the monitors themselves. Disposal of flat screen monitors is also less problematic to the environment. To date, the council has reduced carbon emissions by 143.5 tonnes, with 192 tonnes being forecast on completion, making a saving of £28,357, with a saving of £37,883 being forecast upon completion (savings are based on a 74.2% refresh up to 11 July 2008), which is due at the end of June 2010.

Another significant reduction comes from the council’s education PCs; refreshing all models to PCs with low carbon emissions. From this initiative, carbon emissions have, to date, been reduced by 64.1 tonnes, with a forecasted saving of 281 tonnes, so far saving £12,662, with a forecasted total saving of £55,522 (savings based on a 22.9% refresh of PCs up to 30 June 2008). Another benefit of both these schemes is that the costs are met within the existing budget, meaning that no additional revenue is needed to finance the carbon reduction.

The education PCs have also been programmed to shut down automatically overnight; an increasingly common practice in ICT carbon reduction policy. Through this scheme, the council has saved 35.4 tonnes of carbon, saving £6,988.

Other steps of the action plan included adjusting the power settings on computers' 'control panel' setting to save unnecessary power usage (with potential savings currently being calculated), and remote software upgrades being used on council computers, reducing the need for council engineers to travel unnecessary carbon-producing miles to undertake the task. This last scheme (an ongoing project) has reduced carbon emissions by 0.277 tonnes, making a saving of £362.96. Work is now underway to calculate the cost of the project. Additionally, SMS messages are now used for the remote updating of PCs and fault diagnosis, again reducing the need for travel of engineers.

The monitoring and reduction of energy usage is key throughout the action plan, with plans for a printer carbon energy tracker spreadsheet in the near future. Other energy monitoring schemes are also in place; currently, as well as power usage at the council's Caird datacentre being monitored to establish energy consumption, the possibility of compiling electricity use statistics for all council hardware items is being examined. From these statistics, a further action plan will be developed, with the aim of potentially reducing power usage throughout the council.

In taking numerous sensible, logical and often simple steps to reduce carbon emissions, South Lanarkshire Council have provided an admirable model for many businesses and organisations. Their example shows that energy-saving measures within an IT framework do not, as some fear, have to be complex and high cost in order to be effective. The council's action plan is also one that takes the future into account, with ongoing schemes and further carbon reductions being fundamental to its success.

4.5 Spelthorne Borough Council - a strategy of detailed monitoring and analysis

Spelthorne Borough Council has employed a strategy of detailed monitoring and analysis of carbon output in order to tackle the issue of energy reduction more effectively. Carol Sheridan, the council's Asset Manager, explained how these steps had helped the council to pin down which areas in particular needed tackling.
Both electrical and carbon output were measured monthly over the course of a year (October 2007-October 2008), producing the following findings: covering a gross floor area of 6,189.11 metres squared, Spelthorne's offices produced a calculated total of 272.10 tonnes of carbon from electrical usage and 161.59 tonnes from gas usage, creating an overall total of 433.71 tonnes. This makes total carbon emissions 0.070 tonnes per square metre. The council's total energy consumption, again over the course of a year is 1,291,164.61 kWh, meaning that energy consumption per square metre is 208.62 kilowatts.
These detailed figures were produced from half hourly meter read data for the council's civic offices, which allows close monitoring of energy levels. Over the last year, the council has introduced a number of energy-saving measures: in terms of gas and heat emissions, cavity wall and loft insulation is now in place, and to save electricity, some more general measures were introduced, such as energy-efficient lighting and sensors, and power switch-off controls at night. These projects were funded by Salix – an independent company who specialise in public sector

investment in energy efficiency technologies through 'save to invest' schemes. The company is also funded by the Carbon Trust.
Ms Sheridan points out that the council buildings have a high base-load of electrical output at nighttimes. Examining a detailed graph (with half-hourly readings throughout a 24-hour period) for a Friday in mid-November reveals output levels to be at an average of 18-19 kHz per half hour in the evening. Being around half of the electricity levels during the day, this is a relatively high amount. Base levels were also high at weekends.
To monitor energy usage, sub meters will be installed in the relevant floors in mid December (when a 'powerPerfector' will also be installed. This device can lower energy costs and carbon emissions by optimising incoming voltage), with another meter being put on to the ICT suite (which contains 45 servers) itself and also on the circuit which operates the three air-conditioning units.
These two areas are known to be the biggest energy consumers. Ms Sheridan mentions that when some of these servers unexpectedly shut down several weeks ago, and when the air-conditioning failed, there was a notably large decrease in energy usage levels.
Two of the air-conditioning units were replaced after failing, and subsequently turned around in order to better circulate the airflow. This had a positive effect on HH (half-hourly) readings, with a drop of around 67 kWh in the average total for a 24-hour period.
The forthcoming sub-meters are expected to be a useful asset in tackling the problem of energy wastage. As Ms Sheridan says: "From December we can isolate the suite and see its contribution in the day and night. It will also allow us to focus on areas of the council which are high consumers, knowing this base-load data is indeed the ICT suite and not because someone has left some electrical equipment on."
Spelthorne is also considering introducing night watchmen software to save money and reduce overnight energy usage – the software is designed to shut down networks of PCs overnight, even where different setting are required by different users on the network.
Monitoring and intelligent analysis is crucial to a successful energy-saving scheme, and Spelthorne's use of these tactics to great effect can only be commended.

4.6 Wakefield Metropolitan District Council – Flexible working

Wakefield District Council covers a diverse and community-based area, with many of its policies feeding back towards a clear goal, based around building 'knowledge communities' in order to improve the lives of citizens in the district.

Central to the council's strategy towards corporate ICT carbon reduction is their Worksmart programme, which won the SOCITM (Society of Information Technology Management) IT Excellence Award 2008 for mobile and flexible working. Worksmart is a wide-scale programme which aims to transform the work structure of the council through several schemes, based largely around the concept of flexible working and the numerous benefits it offers for employer, employee and the environment.

Aims of the project included: significantly reducing the number of administrative buildings within the council (from 34 to 6 by 2010/2011); becoming able to support a more flexible/mobile workforce; moving 2,500 employees to flexible working; achieving efficiencies and environmental benefits; and improving services to citizens.

As well as the other clear environmental benefits of reducing the number of buildings used by the council, the concept of flexible working is increasingly being used in regard to lowering carbon emissions and increasing satisfaction levels within a company's workforce, and these points are fundamental to Worksmart's ethos, as is an engagement with technology.

Alan Kirkham, Service Director for Strategic Procurement and e-Services at Wakefield District Council, explains: "The key area of activity is to use technology to support a flexible workforce through the Council's 'Worksmart' programme. Employees in the programme are able to work from home full or part-time, and we are mapping the commuting miles and carbon emissions saved as a result."

Based on a service of 105 employees, annual commuting distances were calculated to be reduced by 225,000 miles, resulting in carbon reduction calculated at 65 tonnes. The project also produced a reduction in copier paper, calculated at 70%.

One element of Worksmart's environmental development is the 'lights-off' data centre, which uses extensive monitoring and efficient cooling systems, and is run at a slightly higher temperature than the previous data centre, allowing for reduced energy consumption in the cooling system. There are also plans for virtualisation, which will reduce the number of servers needed and, in turn, further reduce energy consumption.

Aside from the Worksmart programme, use of specific ICT energy-saving technology is also planned for the near future, including the managed shut-down of PCs overnight.

Some of the factors that drove the council to taking these steps were explained by Mr Kirkham: "The need to rationalise expensive office accommodation, support new ways of working, and maintain a strong focus on delivering value for money and high quality services to citizens."

The ICT behind the programme is crucial to both its execution and success, and as well as current changes taking place, continuing expansion in this area is also planned. 2008 has seen the following improvements: an upgrade to Microsoft Exchange 2007; installation of Microsoft SharePoint; a Systems Centre Configuration Manager; a Systems Centre Operations Manager; and implementation of the Local Authority CRM application – a high specification customer management system. 2009 will see the council working towards integrated data and comms, meaning improved communication for those undertaking flexible working – an important consideration for those wanting to become involved with the carbon-cutting scheme but worried about potential communication difficulties with others whilst working at home.

Though exact figures are difficult to estimate for the programme, finances for Worksmart are ring-fenced, meaning that all costs are met from savings generated by the programme itself.

Mr Kirkham mentions that employees reacted to the Worksmart programme extremely favourably, quickly adapting to the new working styles, with over 80% of e-Services employees now working from home between one and four days per week.

The council's approach toward carbon reduction and environmental awareness as a whole is a refreshingly people-based one, with its workforce being central to new policies implemented and changes made. Recommending the experience to other organisations, Mr Kirkham offered the following advice for those who are considering taking similar measures: "Treat it as a people project, not a technology project, and engage with everyone individually in order to identify the best work-style fit (taking account of individual circumstances and the nature of the work) and capture the benefits."

For further information about this and other reports please contact:

Ellie Hooper
Communications
The Low Carbon Innovation Network
ellie@carbon-innovation.com
+44 (0) 1883 344 799

Or

Tristan Parker
Communications
The E-Government Bulletin
Tristan@headstar.com
+44 (0)1273 267173

A copy of the full appendix can be sent out via email on request. Please send requests to Ellie Hooper at the Low Carbon Innovation Network.
ellie@carbon-innovation.com