



Saving Carbon, Improving Health



NHS CARBON REDUCTION STRATEGY FOR ENGLAND January 2009

NHS Sustainable Development Unit

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Tel: 01223 597 792 Fax: 01223 597 712 Web: www.sdu.nhs.uk The NHS Sustainable Development Unit develops organisations, people, tools, policy, and research to help the NHS in England fulfil its potential as a leading sustainable and low carbon organisation.

Statement of support

The NHS works closely with partner organisations to provide the best possible and most sustainable healthcare system. We support the commitment of the NHS to be a leading sustainable and low carbon organisation, and to meet the Government's target of an 80% reduction in carbon emissions by 2050. We will continue to support the NHS to work towards this goal.

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Foreword

Climate change is one of the greatest threats to our health and wellbeing.

It is already affecting health across the globe.

The NHS, as one of the largest employers in the world, has an important role to play in reducing carbon emissions, a key cause of climate change. This strategy has been produced by the NHS, for the NHS. It reflects the outcome of extensive consultation undertaken following the publication of Saving Carbon, Improving Health; a draft carbon reduction strategy for the NHS in England. The consultation demonstrated the importance of this issue to the NHS and the commitment of our staff to ensuring that we act now to reduce carbon emissions.

The UK Government has committed to take action now and has introduced the Climate Change Act with a target to cut carbon emissions by at least 80% by 2050, with a minimum reduction of 26% by 2020 across the UK. The NHS aims to at least meet these targets and to demonstrate early success on the way. This ambition is supported by the Department of Health's Sustainable Development Strategy published in October 2008, designed to complement and support this strategy.

Carbon management is an increasingly important issue for all organisations. Taking sustainability and carbon emissions seriously is an integral part of a high quality health service.

We therefore welcome this Carbon Reduction Strategy for the NHS in England and applaud the ambition of the NHS to lead the way as a low carbon and sustainable organisation.

PhD Hope.

Phil Hope MP Minister of State for Care Services

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David Nicholson, CBE NHS Chief Executive

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Have a Board approved Sustainable Development Management Plan	Sign up to the Good Corporate Citizenship Assessment Model	Monitor, review and report on carbon	Actively raise carbon awareness at every level of the organisation



Executive summary

This carbon reduction strategy has been developed in response to the need to take action on climate change and in consultation with the NHS and other organisations. Widespread support from NHS organisations and staff gives the NHS a mandate to implement this strategy across every aspect of the organisation in England.

The NHS has a carbon footprint of 18 million tonnes CO₂ per year.¹ This is composed of energy (22%), travel (18%) and procurement (60%). Despite an increase in efficiency, the NHS has increased its carbon footprint by 40% since 1990. This means that meeting the Climate Change Act² targets of 26% reduction by 2020 and 80% reduction by 2050 will be a huge challenge. This strategy establishes that the NHS should have a target of reducing its 2007 carbon footprint by 10% by 2015. This will require the current level of growth of emissions to not only be curbed, but the trend to be reversed and absolute emissions reduced. Interim NHS targets will be needed to meet the government targets.

Figure 1 highlights the NHS England projected emissions to 2020 with the NHS and governmental targets.

The four month consultation process produced a 66% response rate from NHS organisations with 95% of respondents stating strong support for the NHS taking a lead on this agenda. A summary of responses is available at www.sdu.nhs.uk.

¹ NHS England Carbon Emissions; Carbon footprint study, 2008. London: Sustainable Development Commission & Stockholm Environment Institute. See definition of carbon in the glossary.

² Climate Change Act 2008. (c.27), London: HMSO

"As the largest public sector contributor to climate change, it is critical that the NHS rapidly establishes a programme of action to reduce its carbon emissions and play its part in meeting government targets."

Environment Agency



Figure 1: Graph of the NHS England CO₂ Emissions Baseline and Climate Change Act Targets



This strategy highlights the key areas for action identified by the NHS SDU: Every organisation should review its energy and carbon management at Board level; develop more use of renewable energy where appropriate; measure and monitor on a whole life cycle cost basis; and ensure appropriate behaviours are encouraged in individuals as well as across the organisation.

Procurement and food

Every organisation should consider minimising wastage at the buying stage; work in partnership with suppliers to lower the carbon impact of all aspects of procurement; make decisions based on whole life cycle costs; and promote sustainable food throughout its business. In addition, the carbon footprint of pharmaceuticals within the NHS will need further research and action to produce significant reductions.



Travel and transport

Water

Waste

Every organisation should routinely and systematically review the need for staff, patients and visitors to travel; consistently monitor business mileage; provide incentives for low carbon transport; and promote care closer to home, telemedicine, and home working opportunities. Because water usage and heating has a direct impact on carbon, every organisation should ensure efficient use of water by measuring and monitoring its usage; by designing it into building developments; by quick operational responses to leaks; by using water efficient technology; and by avoiding the routine purchasing of bottled water. Every organisation should monitor, report and set targets on its management of domestic and clinical waste, including minimising the creation of waste in medicines, food and ICT and review its approach to single use items versus decontamination options.





'Our understanding of what constitutes 'value for money' may need to be recalibrated to take account of investments to save the planet, which do not necessarily demonstrate equivalent revenue savings."

NHS Hull





"As Europe's biggest employer, the NHS has a big opportunity to have 'exemplar employees' who are likely to have far reaching positive impacts, not only on the NHS supply chain, but also on communities throughout the UK."

England's Regional Development Agencies

Designing the built environment

Organisational and workforce development

Built environments should be designed to encourage sustainable development and low carbon usage in every aspect of their operation. This includes resilience to the effects of climate change, energy management strategies, and a broader approach to sustainability including transport, service delivery and community engagement. A taskforce should be created to develop a blueprint for optimum low carbon healthcare buildings. Every member of the NHS workforce should be encouraged and enabled to take action in their workplace. NHS organisations should support their staff by promoting increased awareness, conducting behavioural change programmes, encouraging home working, low carbon travel, the use of ICT, and by ensuring sustainable development is included in every job description.

Partnerships and networks

Every NHS organisation should consolidate partnership working and make use of its leverage within local frameworks including Local Area Agreements, Local Strategic Partnerships and through Comprehensive Area Assessments. Every NHS region should promote and develop a regional network for sustainable development to ensure a broad consistent approach and an action plan across each region to tackle this agenda.

Governance

Finance

Every NHS organisation should sign up to the Good Corporate Citizenship Assessment Model³ and produce a Board approved sustainable development management plan. The NHS should set itself interim targets and trajectories to meet the provisions of the Climate Change Act. In the first instance, this should be set at 10%, as a minimum, of the 2007 levels by 2015. Carbon reduction and sustainable development are corporate responsibilities and should be an inherent part of each organisation's performance and governance mechanisms.

Healthcare regulators should ensure that sustainability and the environmental impact of services are an integral part of quality standards. The Strategic Health Authorities and Regional Government Offices should ensure that:

- the NHS delivers carbon reduction through its commissioning frameworks
- the NHS delivers on its sustainability commitments within Local Area Agreements
- sustainable development regional networks in the NHS are developed further to deliver on this agenda.

³ The Sustainable Development Commission, Good Corporate Citizenship Assessment Model [Online] Available at: www.corporatecitizen.nhs.uk [Accessed 07 January 2009] Every organisation should become carbon literate, carbon numerate and ensure appropriate investment to meet the commitments required to become part of a low carbon NHS and in preparation for a carbon tax regime. Partnership working will be required to deliver appropriate incentives, economies and training to support this shift in culture and for the local economy.



Looking ahead: Preparing for the future

Conclusion

Further development of appropriate metrics to measure and monitor direct and indirect carbon footprints across the NHS are required.

Societal and NHS scenarios in a low carbon world need to be developed to understand the different ways healthcare delivery must be shaped for a low carbon future. The impact this will have on models of care, and how to develop and promote low carbon pathways, must be understood.

Low carbon technology must be developed and exploited to enable the delivery of sustainable healthcare.

This strategy sets the ambition for the NHS to play a leading and innovative role in ensuring the shift to a low carbon society. This requires every organisation to develop a Board approved sustainable development management plan and to start measuring and monitoring progress towards a 10% carbon reduction by 2015 on 2007 levels.





"We would like to reinforce calls for Board level leads and champions for carbon reduction in all NHS organisations and that not only should Boards commit to establishing a Carbon Plan by March 2009 but that 'carbon reduction' should be a regular item on Board agenda."

NHS Yorkshire and the Humber

Why do we need to act now?

"Our mission is, in truth, historic and world changing - to build, over the next fifty years and beyond, a global low carbon economy. And it is not overdramatic to say that the character and course of the coming century will be set by how we measure up to this challenge... All of us - government, business, civil society and individuals - have a part to play in this momentous task."

Prime Minister Gordon Brown 19 November 2007.

"This strategy comes at an important time when our government is realising the significant challenge we face in relation to tackling climate change."

SustaiNE

It is now widely recognised that climate change is probably the most serious threat to life, our health, and our wellbeing. Over 1500 people died prematurely during the heat wave in England in 2003.⁴

Unless we all take effective action now, millions of people around the world will suffer hunger, water shortages and coastal flooding as the climate changes. As one of the world's largest organisations, the NHS has a national and international imperative to act in order to make a real difference and to set an important example.

There is also a strong financial incentive to address climate change. The Stern Review⁵ concluded that the benefits of strong, early and coordinated action against climate change far outweigh the economic costs of doing nothing. It is estimated that the cost of not taking action could be equivalent to losing between 5% and 20% of annual global GDP, whereas the cost of taking action can be limited to around 1% of annual global GDP. Failing to take the right action now and over the coming decades risks major disruption to economic and social activity that would be very difficult and costly to reverse.

In recognition of the urgency of climate change, the UK Government has committed to take action now and has introduced the Climate Change Act with a target to cut carbon emissions by at least 80% by 2050, with a minimum reduction of 26% by 2020.

As the largest organisation in the UK, the NHS is committing itself to meeting this target.

⁴ Bhattacharya, S., 2003, European heat wave caused 35,000 deaths, The New Scientist, [Online]. Available at: http://www. newscientist.com/article/dn4259 [Accessed 07 January 2009]

⁵ Stern Review on the Economics of Climate Change, 2006, Cambridge: HM Treasury: Cambridge University Press

This strategy

What the NHS wants

The NHS in England is responsible for more than 18 million tonnes CO₂ each year from heating, cooling and lighting buildings, powering equipment, procuring goods and commissioning services, sending waste to landfill, and patient, staff and visitor travel. This is 25% of total public sector emissions in England and 3.2% of total carbon emissions in England.

This Carbon Reduction Strategy is the response of the NHS in England to the need for action. It addresses the mounting scientific evidence of the need for transformational change in the way we deliver health services. This Strategy shows how we can rise to that challenge and demonstrates how the NHS in England can be an exemplar sustainable and low carbon public sector organisation. Since we launched the draft strategy "Saving Carbon, Improving Health" for consultation in 2008 we have been overwhelmed by the strength of desire for action from the NHS staff, NHS organisations and partner organisations who work with the NHS.

The result of the four month consultation presents strong evidence and a clear sense of willingness to act urgently.

Sixty-six per cent of all NHS organisations responded to the consultation. Of these responses, 95% strongly supported the NHS acting as a leading organisation in reducing carbon. Significantly, 65% felt that the measures proposed in the draft strategy were not ambitious enough. Seventy-eight per cent of respondents felt that carbon reduction should be measured and managed as part of core business in every NHS organisation.

We can increase physical activity; promote a better diet; improve mental health; reduce obesity; promote safe travel, improve air quality; and help regenerate local communities and economies through carbon reduction, which in turn leads to safer, healthier, and more fulfilled communities.

Sustainability is a quality issue

Actions not words

This strategy reinforces Lord Darzi's call for 'High Quality Care For All'.⁶ An important measure of the quality of any organisation is its capacity to consistently deliver high standards amidst changing circumstances. Organisations that act to reduce their carbon footprint will benefit from greater resilience to the consequences of climate change.

The NHS recognises that its reputation is at risk as the public's consciousness and expectation in the context of global events increases. The public is now much more aware of the threat of global climate change. The public need reassurance that an iconic organisation like the NHS is safeguarding its ability to provide high quality and sustainable healthcare and to be managing these risks now to ensure resilience and business continuity.

⁶ High quality care for all: NHS Next Stage Review final report, 2008, (CM 7432) Department of Health: London: HMSO

The results of the consultation have already demonstrated that NHS organisations and staff are demanding change. We have an opportunity now to turn words into actions by delivering change within a national framework of health service policy. National and regional policies that influence how we deliver health care and how we promote health should be consistently and systematically aligned to ensure that the NHS becomes one of the world's leading sustainable and low carbon healthcare services.

This is not about an altruistic approach to a better future. This is about the future shape of the NHS and how to provide care for a changing population in a changing world. Reducing carbon emissions will not only save money that can be reinvested directly into patient care but will also protect and promote the health of the NHS and the health and sustainability of society.

In this strategy we show where NHS carbon emissions are coming from and then propose clear actions for reducing that carbon footprint. This strategy has been developed by the NHS Sustainable Development Unit, created to provide the leadership, the support, and the opportunities NHS organisations need to lead on action.

The new challenge that now faces the NHS is how to mitigate and adapt to climate change. It can be managed and it can be stopped.

"We see the strategy as a major landmark in driving forward carbon reduction within the NHS and making the important link between carbon emissions and health."

Healthcare Commission

There are six reasons why NHS organisations need to act now to understand, manage, and reduce their carbon footprint.

1. The new legally binding Government framework and national targets. 2. The strength of the scientific evidence to act now on climate change.

3. The health co-benefits now for patients and populations, and for the health system itself.

There are legally binding UK Government targets to reduce carbon emissions by 80% by 2050 compared to 1990 levels⁷. This is a legal requirement and governance arrangements of all organisations will need to demonstrate how this is being measured, monitored, and managed.

⁷Climate Change Act 2008. (c.27), London: HMSO The strength of evidence that climate change is happening now, that it will lead to serious and dangerous climate change and that it is caused by human behaviour, is now too strong to ignore. This is destabilising the world's climate and adversely affecting the population's health. Taking action now will not only reduce this risk in the long term. Action now will also have health benefits immediately. Increased levels of active travel, for instance, lead to a reduced risk of obesity, diabetes, heart disease, and mild mental illness, as well as reducing road traffic injuries and deaths, and improving air quality. Action will not only benefit the health of the population now, but also benefit and support changes in the health care system as a whole.

"As students who will be largely employed by the NHS in the future, our members welcome the challenges posed by this strategy."

Medsin

4. The importance of cost reductions and energy resilience.

5. The willingness and commitment of NHS organisations and staff to act now. 6. The need for the NHS to be a leading public sector exemplar now.

There are important cost savings to be made, initially in the area of energy efficiency. Energy prices are highly unpredictable but are much more likely to increase than decrease. All business plans need to be as resilient as possible to such price and availability fluctuations by sourcing and using energy wisely. Resources saved by such actions can be reinvested into direct patient care. Resilience towards the price and availability of energy should be a part of every organisation's risk register. The results of the 2008 consultation on carbon reduction for the NHS in England show that there is a very strong willingness and commitment from NHS organisations and staff to take a lead. Sixty six per cent of NHS organisations responded, with 95% strongly supporting the NHS in taking a lead to act. This commitment and willingness needs to be coordinated and galvanised by systematic support, guidance and leadership throughout the NHS and from the Department of Health. Finally, there is an important need and opportunity for the NHS to set an example. NHS organisations can demonstrate to partner organisations and the population that healthy people depend on a healthy environment. The rapidly increasing risk of adverse effects on health from climate change is happening on this generation's watch - it will be this generation's legacy.

Sustainable development

The context for sustainable development and links to existing policy and legislation.

The goal of sustainable development is to meet the needs of today, without compromising the ability of future generations to meet their needs.

Stabilising, and then reducing our carbon emissions is key to 'living within environmental limits', just as addressing climate change is central to a 'healthy, just and fair society.'

Sustainable development is the framework within which carbon emissions will be reduced.

"We would like to see the NHS acting as a good corporate citizen and using its resources to make a significant contribution to the health and sustainability of the communities it serves. As a part of this, the NHS must become public sector leaders in carbon reduction, particularly considering the potentially catastrophic effects of climate change on human health. It is absolutely vital that performance against reducing carbon is measured and managed effectively as part of core business, not considered as an additional agenda."

Sustainable Development Commission

To achieve these goals, the following principles should form the basis for all policy:

Living Within Environmental Limits

Respecting the limits of the planet's environment, resources and biodiversity – to improve our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.

Ensuring a Strong, Healthy and Just Society

Meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity for all.

Achieving a Sustainable Economy

Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and in which environmental and social costs fall on those who impose them (pollluter pays), and efficient resource use is incentivised.

Promoting Good Governance

Actively promoting effective, participative systems of governance in all levels of society – engaging people's creativity, energy and diversity.

Using Sound Science Responsibly

Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the precautionary principle) as well as public attitudes and values.

Figure 2: Five principles of sustainable development⁸

⁸Securing the Future, UK Government strategy for sustainable development, 2005 (CM 6467) London: HMSO [Online] Available at: http://www.defra.gov.uk/sustainable/government/publications/uk-strategy/index.htm [Accessed 13 January 2009)



The virtuous circle

In the NHS, sustainable development is often referred to as good corporate citizenship. This means using NHS organisations' corporate powers and resources in ways that benefit rather than damage the social, economic, and physical environment in which we all live. How the NHS behaves can make a big difference to people's health and to the wellbeing of society, the economy and the environment. Behaving as a good corporate citizen can save money, benefit population health and can help reduce health inequalities. Many measures that improve health also contribute to sustainable development and vice versa.

This is best illustrated as a virtuous circle:



Figure 3: Virtuous circle

"We see the medical profession as playing a potentially highly influential role in spearheading a movement towards carbon reduction and sustainable development. Doctors are highly regarded by the public, professionals and policymakers, and their collective voice can make a considerable impact."

Academy of Medical Royal Colleges



Figure 4: Virtuous circle for NHS Travel

In 2006, the NHS Good Corporate Citizenship Assessment Model, a toolkit to help NHS organisations become good corporate citizens, was launched by the Sustainable Development Commission. Over half of all NHS organisations are now registered, although there continues to be wide variation between the regions.

An important and urgent part of being a good corporate citizen is to understand what it means to become a low carbon organisation. Carbon literacy, carbon numeracy, and carbon governance need to be taken as seriously as similar responsibilities towards financial probity and patient safety. Carbon governance needs promoting in the same systematic and scrutinised way as we take financial governance and clinical governance.

Consultation process

What we heard

The consultation on the Draft Carbon Reduction Strategy for the NHS in England was launched by the NHS Sustainable Development Unit (NHS SDU) on 29th May 2008. A Summary of Consultation Responses Report which explores the responses in more detail has been produced as a separate report and published in January 2009 at www.sdu.nhs.uk.

The consultation document was sent to all NHS organisations in England and responses were sought from a wide range of key partners and stakeholders.

The consultation document and supporting carbon footprint report were available during the consultation period on the NHS Sustainable Development Unit website.⁹

Sixty six per cent of NHS organisations responded during this period. The vast majority of responses were received via the website's online form. We also received 495 responses from individuals via the website. During the consultation period a consultation event was held in each of the 10 Strategic Health Authority regions. This allowed detailed views to be heard from a range of staff and organisations through workshop discussion and feedback sessions. These events were organised through the NHS/DH sustainable development regional networks and attracted over 500 people in total. A simple poll run by email generated 3279 votes to the question 'Do you think the NHS should be a leading public sector sustainable and low carbon organisation?' 3078 (94%) voted yes, with 201 (6%) voting no.

In addition to responses from NHS organisations, many responses were received from external stakeholders such as the Environment Agency, the Department for the Environment Food and Rural Affairs (DEFRA), the Sustainable Development Commission, Sustrans and Sustain.

This consultation has been carried out by the NHS for the NHS. Sixty six per cent of NHS organisations responded of which 95% said they are strongly in support of the NHS taking a lead on this agenda (Figure 5).

Despite specific suggestions of action in the draft strategy, 65% of NHS organisational responses felt that the measures proposed were not sufficient for the scale of the impact required to reduce our footprint. Seventy eight per cent of NHS organisations believe that performance against reducing carbon should be measured and managed effectively as part of core business (Figure 6).

⁹ www.sdu.nhs.uk

"The NHS has a very high level of public contact and exposure. This presents a huge opportunity to the NHS Carbon Reduction Strategy, above and beyond the documents primary estate focus, to set an example for partner organisations and clients."

Greater London Authority



Figure 5:

Do you think the NHS should be a public sector leader as a sustainable and low carbon organisation?



Figure 6:

How important is it that performance against reducing carbon is measured and managed effectively as part of core business?

Results

The following points summarise the results of the consultation and highlight the key themes for this strategy;

- 1. NHS organisations are calling for national policies to be congruent and consistent to support them to tackle this agenda.
- 2. Leadership from the Department of Health is seen as key to ensuring that the NHS as a whole takes this crucial health issue on board as part of core business.
- 3. NHS organisations are calling for nationally mandated targets with some local flexibility. The responses suggested this should be an integral part of both the performance and regulatory frameworks of the NHS, and included as part of value for money assessments.
- 4. NHS organisations are calling for continuing investment either through extension / evolution of the energy fund, or the creation of a carbon capital fund. There has been a strong call for ring-fenced funding systems which would enable them to invest in low carbon options even if the return on investment cannot be realised within 12 months.

- 5. Many respondents are requesting reliable and consistent data collection to help them tackle this issue – for example through further development and improvement of the ERIC (Estates Return Information Collection) database. This would also support the requirements for the Carbon Reduction Commitment¹⁰ linked to the Climate Change Act.
- 6. The NHS is calling for improved carbon action at Board level, with public reporting made available as a minimum through annual reports.
- 7. Respondents recognised that a sound business case needs to be made for every component of carbon reduction.
- 8. The service acknowledges that staff involvement and behavioural change through engagement and leadership approaches are vital to taking this agenda forward.
- 9. Many responses recognised that carbon reduction can only truly be tackled through effective partnership working at the local level, especially with local government through Local Area Agreements, Local Strategic Partnerships and Comprehensive Area Assessment.

¹⁰ See glossary for definition

"There are some great innovations happening already in the service, but to make rapid progress the NHS will need clear leadership from the Government and Department of Health to prioritise climate change. The NHS must harness collective power, services must work together locally to put saving carbon at the heart of local priorities tackling the root cause of climate change."

NHS Confederation

A strong message from the consultation is that this strategy must provide a focus for practical action.

The NHS needs to put in place the actions, research and development needed to ensure that a reduction in carbon emissions of 80% by 2050 is an achievable goal.



The carbon footprint of the NHS in England

Ground breaking carbon footprinting research, commissioned by the Sustainable Development Commission and the NHS SDU, has enabled the full consumption-based footprint to be calculated for NHS England for the first time.

The first report, which examined historical emissions, was published in 2008. The technique calculating the footprint uses the known total consumption/expenditure data and converts this into carbon emissions. This carbon footprint was calculated for all NHS related activity taking into account all NHS organisations in England – from Strategic Health Authorities to GP practices, pharmacies to NHS Blood & Transplant. It gives a better understanding of both the direct and indirect emissions associated with the NHS. Direct emissions are here defined as the carbon dioxide emissions that are produced from the burning of fossil fuels for energy use in NHS buildings and vehicles. Indirect emissions are defined as the carbon dioxide emissions that result from the products and services used by the NHS (procurement and waste) and activities related to the NHS, such as staff, visitor and patient travel.

The second report, which projects future emissions, will be published in 2009. Together, they form the key evidence base for the NHS carbon reduction strategy, and as such their key findings are summarised below:

NHS carbon footprint 1992-2004

The NHS carbon footprint in 2004 was 18.6 MtCO₂, which represents 25% of England public sector emissions. The breakdown of emissions in the three primary sectors is as follows:

Travel:	3.41 MtCO ₂	(18%)
Building energy:	4.14 MtCO2	(22%)
Procurement:	11.07 MtCO2	(60%)



Figure 7: Breakdown of NHS England 2004 emissions ¹¹

"There is a need to achieve a culture change within the NHS, rather than just viewing procurement as the transactional process of 'buying'."

NHS London

Procurement provided 60% of NHS England emissions, comprising emissions in the manufacture and transportation of NHS purchased goods and services. Within procurement, pharmaceuticals and medical equipment made up half of the 60% procurement emissions, with pharmaceuticals comprising a fifth of the total for NHS England - comparable to emissions from either building energy use or travel sectors. This is set out in Figure 8.

4.50

4.06



¹² NHS England Carbon Emissions; Carbon footprint study, 2008. London: NHS Sustainable Development Unit, Sustainable Development Commission & Stockholm Environment Institute (p.10)





During the period 1992-2004, NHS England total emissions rose by 12%, with procurement emissions rising 26% in this period. Overall, total NHS emissions fell by 5% between 1992 and 1998, and then rose by 20% from 1998 to 2004, representing a 3% rise/year in this latter period. This is set out in Figure 9.



¹³ NHS England Carbon Emissions; Carbon footprint study, 2008. London: NHS Sustainable Development Unit, Sustainable Development Commission & Stockholm Environment Institute (p.15)

"The NHS is an extremely important, if not the most influential partner for Defra (now DECC) in achieving Public Sector carbon emissions reductions."

Department of Environment Food and Rural Affairs (now the Department of Energy and Climate Change)

NHS carbon modelling to 2020

An analytical model which projects NHS England emissions to 2020 has been developed. This integrates historical emissions data from previous work, future NHS expenditure profiles, and forecast emissions intensity values for 123 economic sectors.

The model's results shown in Figure 10 illustrate that the baseline projection to 2020 could rise to 22.8 MtCO₂, an increase of 55% since 1990.

The NHS SDU and the Stockholm Environment Institute are further developing the model to help determine the impact of the most effective additional interventions which can be used by the NHS to deliver real carbon savings. The full analysis will be published in 2009. Early potential savings, which could each save over 1% of the baseline footprint, are summarised in Figure 11 overleaf.



¹⁴ To be published in 2009: NHS England Carbon Emissions; Carbon footprint study-Phase 2, 2009. London: NHS Sustainable Development Unit, Sustainable Development Commission & Stockholm Environment Institute



Figure 11: NHS England additional contributors to carbon reduction ¹⁵

'We believe that it is important that carbon governance needs to be set alongside clinical and financial governance."

Bradford and Airedale Teaching PCT



Figure 12:

NHS England carbon intensity (kt CO₂/f million) from 1992 to 2004 16

The model can now be used to explore further potential interventions to ensure that the NHS implements the changes required based on sound evidence. The NHS SDU will expand on this work during 2009.

Where does action need to take us?

The NHS SDU has modelled carbon emission projections to calculate the measures that will be needed to meet the legislative requirement to reduce carbon emissions by 80% by 2050. Carbon footprint research has highlighted that the NHS in England has become more carbon efficient as highlighted in the graph in Figure 12.

Despite this increased carbon efficiency the absolute footprint has grown by 40% since 1990. As described earlier, 'Business as usual' projections estimated to 2020 highlight that this growth is projected to increase to 55% above 1990 levels. This analysis suggests stabilisation alone will be a massive challenge.

¹⁵ To be published in 2009: NHS England Carbon Emissions; Carbon footprint study-Phase 2, 2009. London: Sustainable Development Commission & Stockholm Environment Institute

¹⁶ To be published in 2009: NHS England Carbon Emissions; Carbon footprint study-Phase 2, 2009. London: Sustainable Development Commission & Stockholm Environment Institute



Figure 13 shows how our current trajectory modelled to 2020 makes this imperative.

This strategy therefore establishes that the NHS should have a target of reducing its 2007 carbon footprint by 10% by 2015. This will require not only reducing the current level of growth, but also to start reversing this trend and reduce absolute emissions. This means that we should aim to return to 2007 levels of carbon emissions by 2013. This significant reversal in the carbon emissions profile within the next five years requires every organisation to act now.

Once a downward trend is established, the rate of reduction will need to increase in order to meet the required 26% reduction by 2020 identified in the Climate Change Act. This will require huge efforts to ensure it is met. Further interim targets will need to be adjusted to bring the health sector in line with targets in the Climate Change Act. Clearly the governmental targets may continue to evolve and the NHS will want to keep adjusting its targets accordingly.

To ensure that necessary progress is being made towards the 2050 target, milestones need to be set for carbon reduction in the NHS in England for, 2013, 2015, 2020, 2030 and 2040. Mandatory targets have been set before. In 2001, Government set targets for NHS Trusts to reduce carbon from building energy use by 15% by March 2010.¹⁷ As the graph shows, the urgency to achieve carbon reductions is today even more intense and there is no room for failure. The target is currently measured on energy use only. However, the NHS has a responsibility to reduce its entire contribution and hence the target is proposed to cover energy, procurement and travel.

Improving measurement

The current model helps to identify areas for action. In order to measure, monitor and benchmark progress, the carbon footprint of each NHS organisation needs to be calculated. Currently ERIC collects data on direct energy usage and some indirect usage. However the data collected needs to be amended to establish metrics which will allow each NHS organisation to benchmark their actions and set themselves targets for reduction based not just on energy use but also on travel and procurement activities.

¹⁷ Sustainable Operations of the Government Estate; Targets, 2006 [Online] Available at: http://www.defra.gov.uk/sustainable/ government/gov/estates/targets.htm [Accessed 07 January 2009]

"The HPA strongly supports this initiative and although not an NHS organisation; it will be taking on board the activities that the NHS are doing and where relevant building these into its own programme in this area."

Health Protection Agency


Figure 13: Graph of the NHS England CO₂ Emissions Baseline and Climate Change Act Targets



Although we are beginning to better understand the carbon footprint of the NHS, every PCT, Trust and service provider (such as GPs) will be different. Each organisation should become much more carbon aware, understand their own carbon footprint and develop realistic plans for reducing it by monitoring progress against baselines. The way in which carbon is managed should have the same level of priority as financial management (to which it is closely related) and patient safety. It will be difficult to make progress without a widespread carbon culture throughout all levels of all organisations in the NHS.

To achieve this further information is required to establish metrics which will allow each NHS organisation to benchmark their actions and set themselves targets for reduction based not just on energy use but also on travel and procurement activities. Research is required to ensure organisations are able to measure their carbon impact efficiently and consistently. Establishing national standards for this information will create consistent recording of carbon footprints and ensure all organisations contribute to carbon reduction.

The NHS SDU is developing consistent methods to help NHS organisations measure more elements of their total carbon footprint (including procurement and travel). Some tools to help understand sustainable development performance on travel and procurement already exist, such as the NHS Good Corporate Citizenship Assessment Model.



What do we need to do?

We now have clear evidence, from the size and breakdown of the carbon footprint of NHS in England, that there are key areas where we must take action.

These have traditionally been broken down into Energy, Travel and Procurement.

Consultation responses highlighted that as part of this strategy it would be crucial to consider waste, water and the design of buildings as core elements which cut across them and need their own actions. This strategy focuses delivery on the following areas:

- 1. Energy and carbon management
- 2. Procurement and food
- 3. Low carbon travel, transport and access
- 4. Water
- 5. Waste
- 6. Designing the built environment
- 7. Organisational and workforce development
- 8. Role of partnership and networks
- 9. Governance
- 10. Finance

In each of these areas, the NHS SDU has identified a vision and five key actions that NHS organisations should take to achieve a significant reduction in carbon emissions.

All chapters have been summarised. Full chapters are available on the NHS SDU website www.sdu.nhs.uk.

1. Energy and carbon management

KEY ACTIONS:

- Regular Board level reviews of performance in energy efficiency and carbon reduction should be reported annually to staff, the public and other stakeholders.
- 2. Carbon measurements should replace energy measurements as the target for reduction.
- 3. All NHS organisations should create a strategic plan to develop resilient and more renewable energy sources to ensure a guaranteed energy supply, whilst managing their overall carbon footprint.
- 4. All NHS capital developments should be assessed to ensure options are evaluated on a whole life cost basis. Low carbon options include more renewable energy, passive cooling, ultra-efficient lighting, sustainable transport and natural environment.
- 5. Every NHS staff member should be able and encouraged to take responsibility for energy consumption and carbon reduction.



VISION:

A low carbon quality healthcare environment that is sustainable, resilient, and safeguards high quality patient care.



NHS buildings consume over £410 million worth of energy and produce 3.7 million tonnes of CO₂ every year.¹⁸ Energy use contributes 22% of the total NHS carbon footprint and offers many opportunities for saving and efficiency, allowing these savings to be directly reinvested into further reductions in carbon emissions and improved patient care.

People are increasingly aware of the need to reduce energy consumption at home and it is important that the NHS educates, encourages and enables staff to do the same at work.

NHS organisations need to develop the ability to monitor their energy use effectively through the use of modern and fully integrated power management and control tools linked to localised smart metering. This sort of metering will allow all NHS staff to understand how they can contribute to energy savings.

Every NHS organisation should routinely provide information on energy and carbon costs to all building users at every organisational level.

Engagement at all levels in reducing carbon and energy use is essential in achieving action. By reviewing performance at Board level and reporting annually to staff, the public and other stakeholders this will encourage organisations to act. To help organisations better prepare for government regulations and targets, such as the Climate Change Act and the Carbon Reduction Commitment, better metrics are required. Currently ERIC collects data on direct energy usage and some indirect usage. However the data collected will be amended to establish metrics which allow each NHS organisation to benchmark their actions and set themselves targets for reduction based not just on energy use but also on travel and procurement activities.

Investing in the energy efficiency and resilience of the estate is particularly important in view of the current supply climate, escalating fuel costs and the potential impact of 'peak oil'.¹⁹ Switching to low carbon forms of energy, such as renewables helps to guarantee supply and reduce the carbon footprint of the estate.

¹⁸ NHS England Carbon Emissions; Carbon footprint study, 2008. London: Sustainable Development Unit, Sustainable Development Commission & Stockholm Environment Institute

¹⁹ The Oil Depletion Analysis Centre (ODAC) [Online] Available at: http://www.odac-info.org/ [Accessed 08 January 2009]

STAFF COMMENT:

"There is a lot more to do than is currently being done on the ground today. I often turn off lights and computers in offices at night and feel there is a lot of potential for improvement."

Karen Badcock, Portering Team Leader in Outpatients Department, The Cambridge University Hospitals NHS Foundation Trust.

> Addenbrooke's NHS Hospital PORTERING SERVICES

CASE STUDIES:

The Pilgrim Hospital in Lincolnshire will reduce the estate's carbon footprint by up to 50% by installing a biomass boiler. The boiler will run on locally-sourced renewable woodchips and will be up and running by 2009.

The hospital currently produces between 10,000 and 12,000 tonnes of CO₂ each year from heating. The new biomass boiler aims to reduce the CO₂ produced from heating to around 6,000 tonnes.

A combined heat and power plant will further reduce the hospital's carbon footprint by generating its own electricity to provide lighting and power for the hospital, as well as additional heat. The work is being funded through a grant from the Department of Health's Energy and Sustainability Capital Fund, following a successful application by United Lincolnshire Hospital NHS Trust, as well as a £205,000 grant from Lincolnshire County Council's LIGHT Project. In a pioneering project the Rotherham NHS Foundation Trust is using an innovative procurement approach, Forward Commitment Procurement (FCP) to harness the benefits of ultra efficient lighting technology and to significantly improve the efficiency and functionality of ward lighting. The project forms part of the Trust's 'Future Wards' programme which is a major ward reconfiguration and refurbishment programme that will run over a seven year period from 2009, with energy savings greater than 50% of conventional lighting systems.

"FCP is a practical supply chain management process that is helping us to deliver the best possible solution for the new wards, not only in terms of energy efficiency and carbon reduction, but also in terms of patient experience and best value," said Martin Aizlewood, Energy and Environment Manager.

An expanded version of this chapter is available online **www.sdu.nhs.uk**



2. Procurement and food



KEY ACTIONS:

- 1. The NHS should take every opportunity to manage its operations and procurement efficiently, thereby minimising wastage and carbon from the outset.
- 2. The NHS should work in partnership with suppliers to improve sustainable and low carbon procurement. A roadmap to support organisations in this process will be published collaboratively by NHS PASA, DH, the SDC and the NHS SDU.
- Local procurement, whole lifecycle costs and the environmental impact of financial decisions should be considered by all NHS organisations, in preparation for the use of carbon as a currency.
- 4. Further research will be undertaken into the carbon footprint of pharmaceuticals within the NHS to better understand this and to inform actions to produce significant reductions.
- 5. The promotion of sustainable food and nutrition throughout the NHS should become the norm.

VISION:

An NHS which works in partnership with its suppliers to take into account the whole lifecycle carbon of its products, and considers carbon as part of the tender, commissioning and decision making process.



The NHS in England spends £20 billion every year on goods and services. Emissions from this comprise the largest contribution to the NHS carbon footprint totalling over 11 million tonnes CO₂ per annum: nearly 60% of the total NHS carbon footprint. Within this procurement proportion of the NHS carbon footprint, nearly 6 million tonnes CO₂ can be attributed to the pharmaceuticals, medical instruments and equipment that the NHS procures and uses. This is more than the emissions from either building energy use or travel.

To reduce carbon, every organisation needs to consider their approach to commissioning, sourcing and buying. This will include considering if it needs to be purchased in the first place, the level of use of every product, the most appropriate stock levels and reviewing whether an item can be reused or recycled prior to ordering new items. The drive to constantly reduce costs often favours the cheapest short term option, but this can often have a disproportionately high life time carbon cost. When considering a purchase, an understanding of whole lifecycle costs²⁰ and the potential environmental impact will also be necessary.

The NHS, as a major public sector procurer has a leading role to play in partnership with suppliers to minimise carbon impact and promote sustainability. All NHS organisations should start routinely requiring all suppliers to disclose their approach to sustainable development and to carbon management. The NHS must use its buying power to ensure its suppliers take carbon reduction and sustainability seriously. NHS PASA, DH, NHS SDU and the SDC are developing a 'roadmap' to assist organisations in this process. This will give clear guidance on how to incorporate consideration for carbon within procurement activity from engaging with suppliers through to requesting carbon related information and using this information objectively in the procurement decision making processes.

The high carbon footprint of pharmaceuticals is another reason to ensure the minimum wastage of drugs use. Research commissioned by the Department of Health to examine the scale and cost of medicines wasted and the complex reasons why we do not take medicines as intended will be published during 2009.

The NHS is one of the largest purchasers and providers of food in the UK. The NHS will take more systematic action in procuring and producing sustainable, healthy and low carbon food for patients, visitors and staff.

The actions needed to develop a more sustainable food system in the NHS whilst maintaining nutritional value include the use of seasonally adjusted menus, increased use of sustainably sourced fish and a reduction in the reliance on meat, dairy and eggs. Such actions also involve developing and using suppliers that can demonstrate lower carbon forms of production and transport.

²⁰ See Glossary for definition

CASE STUDIES:

The NHS in England spends around £500 million on food to serve 300 million meals in 1,200 hospitals every year. This two-year project aimed to increase the proportion of local and/or organic food to 10 percent of the catering provision of four London NHS hospitals. Ealing General, Lambeth Hospital, St. George's Hospital and the Royal Brompton Hospital, worked in partnership with the Soil Association to increase the proportion of locally produced nutritious food served in London hospitals.

The project evolved after initial encouraging research in 2002 and 2003 by the Soil Association and funding was secured from the Department of Environment, Food and Rural Affairs (Defra) under the Rural Enterprise Scheme and the King's Fund.



The Isle of Man Real Nappy campaign has introduced cloth nappies into the maternity unit of the Noble's Hospital on the Isle of Man. The midwives at the hospital created the sustainable Stork-eco nappy specifically for the NHS. The non profit making project is supported by the Government and provides interest free loans for cloth nappies to young families in receipt of income support benefit in the Isle of Man.

The project has showed that introducing cloth nappies in to maternity services has increased the number of parents using cloth nappies at home.

By procuring in this way the carbon footprint of the NHS organisation has been reduced and it has also influenced the behaviour and carbon footprint of the parents who continue to use cloth nappies at home.

The introduction of the Stork-eco nappy in to the Jane Crookall Maternity Unit at the Noble's Hospital has effectively reduced the Unit's disposable nappy waste for clinical incineration by 99.9% and their total clinical waste by 83% helping to make long-term financial and environmental savings.

STAFF COMMENT:

"All contractors and suppliers should be required to reduce their carbon footprint."

Dr Jon Orrell, General Practitioner NHS Dorset.

3. Low carbon travel, transport and access

KEY ACTIONS:

- 1. All Trusts should have a Board approved active travel plan as part of their Sustainable Development Management Plan.
- 2. The NHS should consider introducing a flat rate for business mileage regardless of engine size or even modal option (car, cycle and foot).
- 3. NHS organisations should establish consistent monitoring arrangements so reductions in emissions from road vehicles used for NHS business can be measured.
- 4. Mechanisms to routinely and systemically review the need for staff, patients and visitors to travel need to be established in all NHS organisations.
- 5. Healthcare delivery must continue to move closer to the home.



VISION:

NHS organisations are exemplar in leading the population-wide shift to more active and low carbon travel such as public transport, cycling and walking.

The NHS accounts for 5% of all road traffic in England ²¹ and travel is responsible for 18% of the NHS carbon footprint.

NHS organisations need to be exemplar in leading the populationwide shift from sedentary travel to more active travel such as walking, cycling and public transport.²² This supports the research evidence and policy call by many organisations to improve health.²³

The NHS can provide travel allowances that incentivise the use of low carbon vehicles. If differentiated rates are maintained, the maximum rates should be paid for low carbon options such as cycling.

All Trusts should implement the NICE guidance on physical activity and the environment ²⁴ promoting active travel options and providing incentives for staff to choose low carbon travel options.

Half of NHS organisations have Board approved and corporately implemented sustainable travel plans. All boards should have sustainable travel plans that deliver results.

Where staff do not need to travel to meet or to do their work, there should be every incentive and opportunity available to reduce the time and distance travelled. This can increase productivity, improve safety, save money, and reduce carbon emissions. All NHS organisations should make training and equipment available that promote tele, video and web-conferencing. Staff groups and Trades Unions are crucial in helping the design and implementation of environmentally sensitive travel plans.

The NHS can provide car mileage allowances that provide incentives to use low carbon vehicles. Maximum rates for mileage should be paid for low carbon options such as cycling. Tools for understanding NHS travel are needed to help calculate carbon footprints. Such tools will need to be fit for purpose for partner and government requirements and be able to feed into carbon management tools.

²¹ Taking the Temperature -Towards an NHS response to Global Warning, 2007. London: NHS Confederation

²² Take Action on Active Travel, 2008. Bristol: SUSTRANS and the Association of Directors of Public Health.

²³ Take Action on Active Travel, 2008. Bristol: SUSTRANS and the Association of Directors of Public Health.

²⁴ PH13 Promoting Physical Activity and the Workplace, 2008. Public Health Programme Guidance, NICE [Online] Available at: http:// www.nice.org.uk/guidance/index. jsp?action=download&o=40673 [Accessed 08 January 2009]

STAFF COMMENT:

"Raise the minimum cycle mileage rate to at least 15p. Car mileage rates should favour lower emission cars. Car parking on NHS properties should be charged and monies generated contribute to green projects."

Bal Kaur, Trainee in Public Health Dudlev PCT.

An expanded version of this chapter is available online **www.sdu.nhs.uk**

CASE STUDIES:

Winchester and Eastleigh Healthcare NHS Trust has introduced a patient travel bus saving 4,000 patient journeys per annum, equating to a reduction of 68,000 miles. This has been combined with a staff travel plan that has reduced staff car journeys by 1,540 per week. Based on an estimation of 8 miles per journey this equates to 500,000 miles per annum saved.

The Trust will shortly offer staff who cycle to work a free 'Loan-U-Lock' security system to reduce bike theft. Such initiatives as this will appear regularly on the relevant section of the new Trust website.

These initiatives have led to a reduction in the number of cars travelling to the Royal Hampshire County Hospital site. This will help the Trust travel plan to reduce car use and increase sustainable travel modes, thereby producing a positive effect on the environment and reducing carbon emissions.



The Cambridge University Hospitals NHS Foundation Trust Travel Plan owes its success to some key factors: commitment by the Board, strong leadership in introducing car park management, ring-fenced income from car parks, union support, effective communication with staff, patients and visitors and dedication to behaving as 'good corporate citizens' and reducing carbon emissions. Its main aim is to encourage and create opportunity for all staff, patients and visitors, to travel to work by alternative means to the car wherever possible, reduce traffic onto site, to increase the travel choices so that they are safe, fair and accessible for all, to encourage healthier behaviour and to reduce carbon emissions.

In 2007 there were over 18,000 return trips made to and from the campus each day. Changes in the mode of travel are measured annually as part of a one-day, 100% headcount and traffic survey. To date, Addenbrooke's Travel plan has successfully reduced the number of staff travelling onto site by single occupancy car journeys from 50% in 2000 to 34% in 2007. Patients and visitors who travel by car have decreased from 92% in 2002, to 85% in 2007.

Measuring success in the following ways ensures a good payback on this scheme:

- Reduced need for car parking spaces
- Less air and noise pollution
- Less congestion
- Fairness in the costs of travel
- A healthier, fitter and happier workforce
- Reduction in carbon emissions

4. Water

KEY ACTIONS:

- 1. Efficient use of water should be integrated into building developments at the design stage.
- 2. Water costs and consumption should be measured, monitored and reported annually by all NHS organisations as part of their Annual Report to staff, patients and the public.
- 3. Leaks in NHS infrastructure should be identified and fixed immediately.
- 4. Water efficiency technology should be adopted as standard across the NHS estate.
- 5. Routine purchasing of bottled water should be avoided.



VISION:

The NHS values water as a precious resource and measures, monitors and reports on its consumption annually to staff, patients and the public.

Water should be considered and managed as a precious resource. In 2007-08, the NHS in England consumed an estimated 38.8 million cubic metres of water and generated approximately 26.3 million cubic metres of sewage at a cost approximately £145 million.²⁵

Water is a contributor to the carbon footprint of the NHS and currently is not metered or measured consistently. The management, distribution and disposal of water contributes to the overall carbon footprint of the NHS.

NHS organisations should refer to the Department of Health guidance in HTM 07-04 'Water management and water efficiency' in managing water within the existing operational estate or when commissioning new buildings or refurbishments current sites.

Hot water production is carbon intensive. The DH Estates and Facilities Division and DEFRA are in the process of developing water efficiency measures for the NHS (see HTM on Water Management and Water Efficiency). Specific studies will be undertaken to investigate how hot water use can be reduced, without compromising the standard of healthcare. NHS organisations should adopt a policy of using only tap water for meetings on their sites, rather than buying in bottled water. It takes energy, transport, and many litres of water to produce a half litre of bottled water.

Leakages often remain undetected for long periods of time, wasting huge volumes of water and therefore money. Across the country over 10% of all water is lost through leakages once it has left the water suppliers infrastructure.

The NHS should consider the many opportunities to recycle water on NHS sites. Ideas such as recycling clean water from sterilisers and dialysis machines have been trialled and adopted in other countries.

²⁵ Health Technical Memorandum 07-04: Water management and water efficiency, 2008; (HTM) Department of Health: London: HMSO

CASE STUDY:

A study carried out at Gartnavel Hospital and Stobhill Hospital in Glasgow found that the type of tap used for surgical scrubbing could save water, energy and carbon. The 'knee on' version of tap design helped save 5.7 litres of hot water per scrub verses the 'elbow on' tap. This is approximately 600KJ of energy and 80 grams of carbon dioxide per surgical scrub.

This simple difference of tap types can reduce water and energy use without producing any negative effects in terms of scrubbing efficiency. It helps to modify hand-washing behaviour and could help to reduce the carbon footprint of surgical scrubbing across the NHS.

STAFF COMMENT:

"A mandatory requirement to include energy/environmental awareness sessions in all new staff inductions. This can then be carried forward through HR departments, raising awareness in itself."

Tom Kelly, Project Manager, NHS Wirral.

5. Waste

KEY ACTIONS:

- 1. Management of domestic, clinical and hazardous waste should be reported at Board level by all NHS organisations as a key part of their sustainability reporting.
- 2. Boards should undertake a balanced risk assessment of waste and its associated costs and carbon including those related to single issue, use and disposal policies in contrast to sterilisation and re-use policies.
- 3. All Trusts should ensure they have the necessary skills to manage waste legally, efficiently and cost effectively.
- 4. All Trusts should monitor the quantity and cost of all waste streams and set trajectories to monitor, manage and reduce them over time.
- 5. The DH and the NHS SDU will consider appropriate targets to:
 - reduce waste from clinical areas / hazardous waste
 - reduce domestic waste to landfill
 - increase recycling.



VISION:

In a low carbon NHS, waste is minimised, and managed to consistently comply with legislation, and is recycled or composted routinely.



Waste in the NHS continues to increase and in 2007/08 waste cost the NHS £71.2 million.²⁶ As waste created by the NHS continues to rise, both by tonnage and by disposal cost, investment in sound waste management will save money and reduce carbon emissions.

Every NHS organisation should monitor, report and set targets on its management of domestic and clinical waste, including minimising the creation of waste in medicines, food and ICT and review its approach to single use items versus decontamination options.

NHS organisations should aspire to at least match the targets set for the Sustainable Operations on the Government Estate (SOGE) targets ²⁷ in managing the different waste streams, although it is acknowledged that these targets are not directly relevant to NHS clinical activity. The NHS SDU and the DH will consider waste reduction metrics which are more appropriate for the NHS.

One in every 100 tonnes of domestic waste generated in the UK comes from the NHS, with the vast majority going to landfill.²⁸ The NHS Confederation and the New Economics Foundation calculates that recycling all the paper, cardboard, magazines and newspapers produced by the NHS in England and Wales could save up to 42,000 tonnes of CO₂. This is equivalent to the savings made by replacing over half a million 100W incandescent light bulbs with 20W energy-saving bulbs, or taking around 17,000 cars off the road.²⁹ Responses to the draft strategy highlighted a strong desire amongst NHS staff to reduce the use and disposal of single use items. To pursue this, further work is needed to review current practices and to ensure all standards and legislation governing staff and patient safety are met, in accordance with DH HTM 01-01 series - Decontamination of Reusable Medical Devices, whilst taking account of associated waste and carbon emissions reduction issues.

All NHS organisations should contract only with waste management companies who are able to provide them with robust data on quantities of waste collected and disposed of as a result of their healthcare activities. NHS organisations should monitor and record these via the NHS ERIC data system.

Organisations should set a baseline year and a set of Board approved waste reduction trajectories for all waste streams – domestic, clinical and hazardous.

²⁹ Taking the Temperature - Towards an NHS response to Global Warning, 2007. London: NHS Confederation

STAFF COMMENT:

"Health professionals should, as they did with cigarette smoking, set a good example. To do this they need permission, encouragement and (non-material) reward."

Lindley Owen, Consultant in Public Health, Cornwall & Isles of Scilly PCT.

²⁶ ERIC data 2007/08 [Online] Available at: http://www.hefs.ic.nhs. uk/ [Accessed 09 January 2009]

²⁷ Sustainable Operations of the Government Estate; Targets, 2006 [Online] Available at: http://www.defra.gov.uk/sustainable government/gov/estates/targets.htm [Accessed 07 January 2009]

²⁸ Taking the Temperature - Towards an NHS response to Global Warning, 2007. London: NHS Confederation

6. Designing the built environment

KEY ACTIONS:

- 1. All new buildings and major refurbishments should be designed to withstand significant climate change and weather extremes.
- 2. All new healthcare buildings should aim to achieve a target of being low carbon by 2015.
- 3. A Low Carbon Design Taskforce of public and private sector expertise should be established to develop a blueprint for the optimum low carbon healthcare building, accompanied by best practice guidance.
- 4. All decisions about design and build of healthcare facilities must be explicit about how they encourage a broader approach to sustainability including transport, delivery of services and community engagement.
- 5. All NHS buildings need to move quickly to have a significantly lower carbon impact, not only in their construction but also in their lifetime use and in their decommissioning. NHS buildings must be designed to promote sustainable behaviours in staff, patients and visitors, and they must be adaptable to support change towards low carbon patient pathways.



VISION:

Built environments are designed to encourage sustainable development and low carbon usage in every aspect of their fabric and function.



All decision making governing the construction of new healthcare buildings should be made with reference to information published by the UK Climates Impact Programme, ³⁰ for each region and locality over the building's lifetime.

In its 2008 Budget,³¹ the Government set out an ambition for all new non-domestic buildings to be zero carbon from 2019, with an earlier target (2018) for new public sector buildings. In order to support this, all new NHS healthcare buildings should aim to be low carbon by 2015.

Learning across sectors that share common issues and objectives could be shared through a Low Carbon Design Taskforce of public and private sector expertise. This taskforce could develop a blueprint for the optimum low carbon healthcare building, accompanied by best practice guidance. The blueprint could focus on four levels in design:

- Site selection transport and integration with other services
- Orientation to maximise daylight, shade, and ventilation naturally
- Thermal issues shape, density, materials and systems for winter heating and summer cooling
- Use of renewable forms of energy.

Buildings that provide healthcare traditionally bring together a wide range of carbon intensive activities and processes. There is a need for all NHS organisations making capital investment to integrate formal carbon reduction requirements in project briefs, tender documents and contracts. Wider environmental considerations such as energy supply and distribution, and the integration with active transport systems, make significant contributions to carbon emissions. These considerations should be taken into account at the very early design stage of the project.

All decisions about design and build of healthcare facilities must be explicit about how they encourage a broader approach to sustainability including transport, delivery of services and community engagement.

All NHS buildings need to have a significantly lower carbon impact, not only in their construction but also in their lifetime use and in their decommissioning. NHS buildings must be designed to promote sustainable behaviours in staff, patients and visitors, and they must be adaptable to support change towards low carbon patient pathways.

NHS organisations should take every opportunity to protect and enhance the natural environment surrounding NHS buildings.

³⁰ UKCIP, 2008. UKCP09: The climate of the United Kingdom and recent trends. [Online] Available at: www.ukcip.org.uk [Accessed 07 January 2009]

³¹ HM Treasury, 2008. Budget 2008: Stability and opportunity: building a strong, sustainable future [Online] Available at: http://www.hmtreasury.gov.uk/d/bud08_completereport.pdf [Accessed 09 January 2009]

CASE STUDIES:

The new wing of The Lewisham Hospital NHS Trust contains over 400 beds in single rooms and units of four beds. The Riverside Building provides a high quality, mainly naturally ventilated environment, despite the pressures of a seven-storey building in a tight urban environment. It manages to reduce energy costs and cut CO₂ emissions through good design and the use of photovoltaics. Biodiversity and the local environment have been improved by regenerating a derelict watercourse and promoting changes to an adjacent park, while stakeholders were successfully involved at the start in developing the project brief.

The total construction costs were £69 million, for a building of 52,800m³ or about 22,000m². The photovoltaics system cost £79,846, paid for by a grant from the Energy Savings Trust, and leading to savings in electricity costs.

The main benefit from this building is improving the patient experience. There is also a benefit in providing attractive working conditions to attract and retain a skilled workforce.



Buildings designed with passive ventilation have improved resilience to energy supply failure and are more energy efficient than mechanically ventilated buildings. In an acute hospital up to 70% of net floor space could be entirely or partially naturally ventilated. Concern regarding airborne disease and cross infection appears to be a major driver for installing fully mechanically ventilated systems in health premises. Consequently, other public buildings have installed more naturally and passively ventilated systems.

The UK National Institute of Health Research has found that there may not be as large a risk as many believe. Modelling, carried out in a 200 bed hospital configured to current NHS service delivery policy, shows that increased energy performance, and therefore carbon saving, is achievable whilst saving on energy bills.

An expanded version of this chapter is available online **www.sdu.nhs.uk**



7. Organisational and workforce development

KEY ACTIONS:

- 1. Future leadership development should take account of the organisational and individual competencies required to deliver carbon reduction.
- 2. NHS organisations and SHAs should work in partnership with Higher Education Institutions to ensure that sustainability and carbon reduction concepts are included in undergraduate and postgraduate curricula.
- 2. NHS organisations should consider including sustainability and carbon governance as a responsibility on all job descriptions for Chief Executives and Director level posts and on all job descriptions for NHS staff.
- 3. NHS organisations must ensure their staff have information about, and opportunities to use, low carbon travel options (see travel).
- 4. Audio, video and web conferencing technology must be made available by NHS organisations and staff must be trained in these technologies to support a cultural shift away from routine care and other high carbon travel and to encourage more home working where appropriate.



VISION:

All NHS staff are informed, empowered and motivated to take action to deliver high quality care today that does not compromise our ability to deliver care in the future.

An expanded version of this chapter is available online **www.sdu.nhs.uk**

SUMMARY:

A culture of carbon awareness should become an integral part of working for the NHS. Particularly as a significant amount of the energy used, travel choices and goods purchased throughout the NHS is in the direct control of individual members of staff.

The responsibilities and actions described throughout this document needs to be delivered through strong leadership at every level of the NHS.

Carbon reduction and sustainability awareness should be a routine part of the training and development process for Boards. Organisations such as the NHS Appointments Commission have an important opportunity to develop this commitment.

To support this a Sustainable Development Programme will be introduced specifically for NHS Boards. This will be designed to help embed sustainability and a low carbon future as part of the corporate and quality agenda for NHS leadership.

NHS organisations and SHAs should work in partnership with Higher Education Institutions to ensure that sustainability and carbon reduction concepts are included in undergraduate and postgraduate curricula.

Young people are essential contributors to a low carbon society. NHS leaders need to help the development of young people as advocates for a low carbon NHS.



Derby Hospitals Foundation Trust has made great strides in involving its staff in lowering the hospitals carbon impact. Over the last four years this has helped the trust reduce its energy consumption and saved £628,000. Their Earth Beat magazine supplement 'keeping you informed on green issues', provides staff with up-to-date information on developments within the Hospital on energy saving, cycle2work schemes and recycling.

The Hospital's 'environmental champions', who are volunteer members of staff also feed back issues from ward and department level, creating an interactive framework across the trust. This helps to foster ideas sharing and raises awareness of carbon and sustainability issues.

STAFF COMMENT:

"I believe that if we are to make the NHS a leading low carbon enterprise then this can only be achieved if Chairs and Non-Executive Directors share the vision and lead the change required."

Elisabeth Buggins, Chair, NHS West Midlands.

8. Role of partnership and networks

KEY ACTIONS:

- 1. The NHS should use its leverage within local partnership and performance frameworks to promote carbon reduction.
- 2. Every NHS organisation should pursue climate change action in their Local Strategic Partnership (LSP).
- 3. NHS/DH regional sustainable development networks need further support to ensure wide representation across organisations and functions.
- 4. Each SHA Board should receive, at least annually, a report about progress in meeting the requirements of this strategy in their region.
- 5. The NHS should take a lead on sustainable development and carbon reduction and be an exemplar to other sectors and to other health systems.



VISION:

An NHS recognised for and working in strong partnerships to promote and ensure the changes required for a low carbon society.



The NHS cannot address its impact on climate change alone. It needs to work with partners nationally, regionally and especially locally in order to develop and promote renewable energy sources, sustainable transport for staff and patients and the procurement of goods and services that are sustainable and low carbon.

Local Strategic Partnerships provide a single overarching local coordination framework for partnerships to operate. Every NHS organisation has a role to play in influencing and leading on carbon reduction within this framework. The LSP is responsible for developing and driving the implementation of the Local Area Agreement (LAA). Approximately two thirds of the 150 LAAs currently include a carbon reduction target in their set of indicators.

NHS/DH sustainable development regional networks have already been raising awareness and mobilising action in their regions. These networks will need to develop an even stronger strategic and corporate role to ensure action and delivery on sustainable development innovations across sectors at a regional level. The NHS SDU will help to develop NHS/DH regional sustainable development networks further and ensure that each region has a clear understanding about the most effective and consistent ways of developing and monitoring their progress. This will include how the evidence of all the sustainable and low carbon initiatives in each region are evaluated and shared widely.

Every SHA should receive, at least annually, a report on progress made in meeting the requirements of this carbon reduction strategy in their region.

The NHS has a great opportunity to take the lead on sustainable development and carbon reduction in England and beyond and should do so as part of its ambition to be a high quality service.

STAFF COMMENT:

"We need to work with our existing LAA partnerships rather than just go it alone."

David Cox, Chair, NHS South Birmingham

9. Governance

KEY ACTIONS:

- Every NHS organisation should sign up to the NHS Good Corporate Citizenship Assessment Model ³² and produce a Board approved Sustainable Development Management Plan which sets out clear measurable milestones to measure, monitor and reduce direct carbon emissions.
- 2. The NHS should set itself targets and trajectories to at least meet the provisions of the Climate Change Act. In the first instance this should be a 10% reduction of the 2007 levels by 2015, as a minimum.
- Carbon reduction and sustainable development are corporate responsibilities for all organisations and should be an inherent part of each NHS organisation's performance and governance mechanisms.
- 4. Healthcare regulators should consider making sustainability and the environmental impacts of services an integral part of quality standards.
- 5. SHAs (through PCTs) and Regional Government Offices should ensure:
 - the NHS delivers carbon reduction through its commissioning frameworks
 - the NHS delivers on its sustainability commitments within Local Area Agreements (LAAs)
 - Sustainable Development Regional Networks in the NHS are developed further and given more prominence to ensure broad corporate representation across organisations and directorates.

SUMMARY:

Carbon reduction and sustainable development are becoming corporate responsibilities for all organisations. As such, they should both be part of the formal objectives and governance arrangements of every NHS organisation.

Every NHS organisation should sign up to the NHS Good Corporate Citizenship Assessment Model and produce Board approved Sustainable Development Management Plans, including their approach to reduction.

Every organisation should start reporting on sustainable development and carbon reductions in their annual reports, including a measure of carbon emissions. Initially this will be based on ERIC data. However, over time this will need to include other measures of direct and indirect carbon emissions. This will be based on the 10% reduction target by 2015, established by this strategy.

The Department of Health produced a Sustainable Development Strategy³³ in October 2008, which confirms its commitment to sustainability. In support of the NHS, the strategy includes:

- identifying and introducing the best blend of policy levers
- leading on the introduction of a pricing scheme for carbon
- supporting NHS PASA and the NHS to improve the sustainability of purchasing in accordance with the Government's Flexible Framework for Procurement
- working with the NHS SDU and the SDC on introducing metrics to allow organisations to benchmark and track improvements in their performance on carbon reduction and sustainability.

VISION:

Carbon and sustainable development should be explicit and accounted for in every aspect of NHS life.



The Operating Framework for the NHS in England 2009/10³⁴ recommends that every NHS organisation should ensure it measures and progressively reduces its own carbon footprint.

Discussions will take place with DH about a metric for carbon reduction for future inclusion in Tier 2 of the Vital Signs.

SHAs need to ensure there is a consistent approach to managing and monitoring sustainable development in their region and to make it core to each Trust's business, planning, and commissioning cycles, and partnership arrangements.

To drive sustainability and carbon reduction at a regional level, Strategic Health Authorities should:

- remind commissioners of the importance of contracting with NHS providers who are signed up to the Good Corporate Citizenship Assessment Model.
- routinely review every PCT's approach to publishing and monitoring their Board approved Sustainable Development Management Plans.
- manage the national system of commissioning assurance, at a local level, and ensure sustainability forms part of the governance requirements.

SHAs are encouraged to ensure that the NHS/DH sustainable development regional networks are developed further and given more prominence to ensure wide corporate representation across organisations and directorates. These regional networks are well placed to help develop and implement the proposals in this strategy. The NHS SDU is committed to supporting this work across all the regions.³⁵

This strategy recommends that every SHA Board should receive at least annually a report about progress in meeting the requirements of this strategy in their region.

The NHS SDU is committed to working with regulatory agencies on the qualitative and quantitative mechanisms for including carbon reduction and sustainability into registration and assessment procedures.

A new Low Carbon Award³⁶ will be included in the 2009 Health and Social Care Awards to support taking carbon reduction forward in the NHS. This award recognises commitment to achieving reductions in carbon emissions in the operations of health and social care, and the achievement in other programmes aimed at combating climate change.

³² The Sustainable Development Commission, Good Corporate Citizenship Assessment Model [Online] Available at: www.corporatecitizen.nhs.uk [Accessed 07 January 2009]

³³ Department of Health, 2008. Taking the long term view: the Department of Health's strategy for delivering sustainable development 2008-2011, London: HSMO

³⁴ Department Of Health, 2008. The Operating Framework for 2009/10 for the NHS in England, London: HMSO

³⁵ See Section: Partnerships and Networks

³⁶ Institute for Innovation and Improvement, 2009. Low carbon award- Health and Social Care Awards [Online] Available at: http:// www.institute.nhs.uk/health_and_social_care_awards/award_ categories/low_carbon_award.html [Accessed 06 January 2009]

STAFF COMMENT:

"This Agenda needs to be mainstreamed and part of the day job, a bit like health and safety."

Christina Gray, Associate Director Public Health, NHS Bristol.

10. Finance

KEY ACTIONS:

- 1. NHS organisations should develop carbon literacy and embed carbon reduction in their financial mechanisms.
- 2. NHS organisations should take advantage of schemes which support investment in energy efficiency initiatives.
- 3. DH and NHS SDU will provide practical guidance for Trusts on the Carbon Reduction Commitment following the consultation process in 2009.
- 4. NHS organisations should be involved in local strategic partnership arrangements and regional economic forums in order to play their part in developing a sustainable and resilient health economy.
- 5. The DH and the NHS SDU will work in collaboration to encourage the development of further incentives to support carbon reduction in the NHS.



VISION:

All NHS organisations are carbon literate and reduce carbon as a long term investment in a quality healthcare system.



The Advisory Committee on Climate Change have set out three carbon budgets for the UK which "will take their place alongside financial budgets, and become pivotal to policy decisions in the UK".³⁷ This means that every organisation will need to develop its understanding of carbon and how it can be used as a tax regime and currency.

For every 1% reduction in energy consumption, at 2008 prices, it is estimated the NHS could save about £4 million every year. This means that many investments in adequate energy management are likely to be cost effective.

Reducing the carbon impact of the NHS promotes the sustainability and resilience of the healthcare system by:

- helping the NHS to comply with forthcoming legislation and financial incentives
- keeping costs down by reducing the demand for, and increasing the efficiency of, energy use in the NHS
- increasing the resilience of the NHS against unpredictable energy supply and prices
- advertising the sustainability credentials of the NHS as a public sector exemplar
- helping to mitigate the negative health consequences of climate change.

The financial case to reduce carbon will be even stronger with the introduction of the Carbon Reduction Commitment (CRC) in spring 2010. This will place a requirement on all organisations to buy carbon credits. The process and the detail of how the NHS is part of the CRC is currently under discussion. The carbon credits are expected to be initially priced at £12 per tonne. The process for including NHS organisations in this scheme is currently under discussion. The DH and NHS SDU will make information and guidance available to all NHS organisations as soon as practicable.

NHS organisations can strengthen links and partnership working with universities, local authorities, charities and local business through LSPs, through economic forums and spatial planning frameworks, in order to play a more strategic role in developing a sustainable and resilient health economy.

NHS organisations should take advantage of schemes which support investment in energy efficiency initiatives. For example, NHS Foundation Trusts can double any financial commitment made to energy efficiency by setting up a fund under Salix Finance.³⁸

The financial system supporting the NHS needs to be updated to ensure that capital can be funded to take advantage of the longer term gains of innovative and truly sustainable and low carbon projects. Private Finance Initiatives (PFIs) must be able to demonstrate long term low carbon performance and sustainability. The NHS and DH will consider further financial mechanisms to support carbon reduction.

³⁷ Ed Miliband, Secretary of State for Energy and Climate Change, Nov 2008

³⁸ Salix finance [Online] Available at: www.salixfinance.co.uk [Accessed 08 January 2009]

Looking ahead - the next steps

KEY ACTIONS:

- The NHS SDU, SDC and DH will continue to develop the most appropriate metrics to measure and monitor direct and indirect carbon footprints across the NHS and translate them into trajectories and milestones for the NHS to meet legally binding Government targets.
- 2. Societal and NHS scenarios set in a low carbon world will be developed by the NHS SDU to better understand the ways healthcare delivery should be shaped in a medium to longer term low carbon future. This will involve integrating societal approaches to a low carbon future into the core values and mechanisms of the NHS over the next 40 years.
- 3. Models of care and how they may be developed in a low carbon society, should be considered by the NHS in order to develop low carbon pathways and maximise the co-benefits to health and health systems.
- 4. The NHS should be exemplar users and investors in low carbon technology to enable to the delivery of sustainable healthcare.
- Current and future NHS leaders should be developed to understand and manage future risks and opportunities of sustainability, carbon reduction and climate change.

SUMMARY:

Beyond the recommendations and actions in this strategy, further programmes of research will be necessary to understand how a public sector organisation like the NHS can achieve an 80% reduction in carbon emissions by 2050.

Current carbon and sustainable development metrics fall short of the requirements to review and monitor the different elements contributing to all direct and indirect carbon measurement let alone sustainable development indicators. The NHS SDU and SDC were commissioned by the Healthcare Commission (HCC) to produce a report on carbon metrics that could be included in regulatory frameworks. This work will contribute to the further research that will be required to establish additional metrics or indicators to ensure consistent mechanisms for measuring, monitoring and reviewing progress in the NHS.

Scenarios for low carbon societies have been developed by many external organisations.³⁹ However, none of the scenarios developed refer specifically or in sufficient detail to the effect a low carbon society will have on public services such as the NHS. The NHS needs to consider these scenarios and evaluate how healthcare will need to develop in these circumstances. The NHS SDU has commissioned work to take this forward and will publish the results and recommendations by autumn 2009.

The NHS has an important role to play in supporting and providing incentives to develop low carbon technologies and a low carbon economy. The NHS can and should, in partnership with others, be prepared to innovate and support grants for demonstration projects.

VISION:

An NHS well prepared for the future and which ensures future health services play a leading part in a sustainable society, despite the challenges of climate change. To become a public sector leader, or even meet the government's aspirations, will require transformational thinking and action on how the core business of the NHS is delivered in the next 40 years. This will mean considering the structures and models of care that are delivered as well as individual pathways of care.

Mechanisms are required to ensure the NHS continually reviews the evidence and learning emanating from change and that it is engaged in further research to help answer tomorrow's questions. For this to happen, every individual should take action and leaders need to be integrating these challenging concepts into NHS strategy and developments.

A high level advisory and support group of national opinion leaders, implementers and thinkers has been set up by the NHS SDU to help guide a realistic but innovative approach to taking further action. The NHS SDU is also developing a forum to encourage discussion and thinking around future policy in conjunction with the DH, SDC, NHS Confederation, and current and future leaders of the NHS.

London Energy Partnership, 2006. London Carbon Scenarios to 2026 [Online] Available at: http://www.london.gov.uk/mayor/environment/energy/partnership-steering-group/docs/ energy-scenarios.pdf [Accessed 09 January 2009]

PricewaterhouseCoopers, 2008. The world in 2050: Can rapid global growth be reconciled with moving to a low-carbon economy? [Online] Available at: http://www.pwc.com/Extweb/pwcpublications.nsf/docid/1F23CBEB991587A6852574770053771D/\$FILE/World_in_2050_Carbon_emissions_08_2.pdf [Accessed 09 January 2009]

Reform, 2008. Demand for a new era: The future of health [Online]

Available at: http://www.reform.co.uk/demandforanewerathefutureofhealth_178.php [Accessed 09 January 2009]

CASE STUDY:



The West Midlands Cancer Intelligence Unit have pioneered the use of Cancer registry data along with GIS (Geographical Information Systems) to calculate the carbon emissions associated with treating breast cancer. Data comparisons from 1999 and 2004 showed that there has been a 214% increase in total car miles travelled which equates to over 400 tonnes of carbon associated with radiotherapy treatment in the West Midlands. Looking at patient and visitor mileage, and therefore carbon, will prove to be a useful tool in the designing of low carbon patient pathways.

³⁹ Forum for the Future, 2008. Climate Futures: responses to climate change in 2030 [Online] Available at: http://www.forumforthefuture.org/files/Climate%20Futures_WEB.pdf [Accessed 09 January 2009]

Glossary Abbreviations and Definitions

ACT: ACT TravelWise is the UK's premier network for all organisations working to promote sustainable travel

ALE: The Auditors' Local Evaluation (ALE) assesses how well Primary Care Trusts (PCTs) and NHS Trusts manage and obtain value for money from their financial resources. ALE was introduced in 2005/06

BIFM: British Institute of Facilities Managers

BREEAM: The BREEAM family of standards, assessment methods and tools are all designed to help construction professionals understand and mitigate the environmental impacts of the developments they design and build.

CAA: Comprehensive Area Assessment provides independent assessment of the prospects for local areas and the quality of life for people living there. It assesses and reports how well public money is spent and will ensure that local public bodies are accountable for their quality and impact.

CABE: The Commission for Architecture and the Built Environment is the government's advisor on architecture, urban design and public space.

Carbon: Throughout this strategy the word carbon is used to as a generic term for CO2. However where a numerical value is mentioned CO2 is used for accuracy as a technical term.

Carbon currency: the credits and debits of carbon emissions trading.

Carbon intensity: a measure of the carbon emissions attributable to each pound spent e.g. expressed in kilotonnes CO2/£million

Carbon neutral: Commonly accepted terminology for something having net zero emissions (for example, an organisation or product).

Carbon literacy: general knowledge or awareness of the concepts, causes, and the effects of atmospheric pollution or greenhouse gases.

Carbon numeracy: knowledge and skills necessary to participate in carbon trading systems and platforms which focus on financial incentives and investments in new methods, systems, and technologies that limit or reduce greenhouse gas pollution and the research and development of alternative energy sources.

CCC: Committee on Climate Change is an independent body established under the Climate Change Act to advise the Government on setting carbon budgets, and to report to Parliament on the progress made in reducing greenhouse gas emissions.

CEO: Chief Executive Officer

Community Health Partnerships: develops, creates investment in and helps deliver innovative ways to improve health and local authority services.

CHP: Combined Heat and Power

CIBSE: The Chartered Institution of Building Services Engineers is the standard setter and authority on building services engineering. It publishes Guidance and Codes which are internationally recognised as authoritative, and sets the criteria for best practice in the profession.

CIOB: Chartered Institute of Building

CO2: Carbon dioxide is the most prevalent greenhouse gas. CO2 emissions result from the combustion of fuel, from land use changes and from some industrial processes.

CO2e: Carbon Dioxide Equivalent. There are six main greenhouse gases which cause climate change and are limited by the Kyoto protocol. Each gas has a different global warming potential. For simplicity of reporting, the mass of each gas emitted is commonly translated into a carbon dioxide equivalent (CO2e) amount so that the total impact from all sources can be summed to one figure.

CQC: Care Quality Commission

CRC: Carbon Reduction Commitment is the new legally binding climate change and energy saving scheme that will cover large business and public sector organisations.

CSR: Corporate Social Responsibility

DCSF: Department of Children, Schools and Families

DEC: Display Energy Certificates

DECC: Department of Energy and Climate Change: The Department brings together much of the Climate Change Group, previously housed within the Department for Environment, Food and Rural Affairs (Defra), with the Energy Group from the Department for Business, Enterprise and Regulatory Reform (BERR).

DfT: Department for Transport

DH: Department of Health

DEFRA: Department of Environment, Food and Rural Affairs

Direct Carbon Emissions: these emissions are synonymous with energy use from buildings. Most commonly, direct emissions will result from combustion of fuels which produce CO2 emissions, for example the gas used to provide hot water for the workspace. In addition, some organisations will directly emit other greenhouse gases. For example, the manufacture of some chemicals produces methane (CH4) and the use of fertiliser leads to nitrous oxide (N2O) emissions.

EU: European Union

ERIC: Estates Return Information Collection enables the analysis of Estates and Facilities information from NHS Trusts and PCTs in England.

EC: European Commission

Energy Performance of Buildings Directive:

European legislation set up to 'promote the improvement of energy performance of buildings within the Community taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost effectiveness'.

Energy Efficiency Fund: Set up by the DH to help NHS organisations put in place improvements in electrical efficiency, building insulation, combined heat and power installations, and contribute to the Government's Climate Change Programme.

EPC: Energy Performance Certificates

EU ETS: European Union Emissions Trading Scheme

Forward Commitment Procurement (FCP): provides a practical and proven means to enable NHS Trusts to stimulate and harness innovation for the public good and achieve a step change in environmental performance. It does this by transforming the market for innovative and sustainable solutions, making new and emerging solutions more affordable and widely available, and providing a way for the public sector to manage the risk of procuring innovative products and services

GCC: Good Corporate Citizenship: describes how NHS organisations can embrace sustainable development and tackle health inequalities through their day-to-day activities. The Sustainable Development Commission has developed a self assessment model that will helps organisations to identify and assess their contribution to good corporate citizenship.

GHG: Greenhouse gases (GHG) include carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. They trap heat in the earth's atmosphere, such that a rise in levels of GHG increases temperature – the so-called greenhouse effect.

HCC: Health Care Commission - see CQC

HEFMA: Health Estates and Facilities Management Association

HTM 07:02; ENCO2de: The aim of this Health Technical Memorandum, EnCO2de is to ensure that everyone involved in managing, procuring and using healthcare buildings and equipment considers the implications of energy use.

ICT: Information and Communications Technology

Indirect Carbon Emissions: Each product or service that is purchased by an organisation is responsible for both indirect and direct emissions. For example, a company that manufactures a product is indirectly responsible for the carbon that is emitted in the preparation and transport of the raw materials. Downstream emissions from the use and disposal of products can also be indirectly attributed to the organisation. IPCC: Intergovernmental Panel on Climate Change

KTNs: Knowledge Transfer Networks

LAA: Local Area Agreements: set out the priorities for a local area agreed between central government and a local area (the local authority and Local Strategic Partnership) and other key partners at the local level. LAAs simplify some central funding, help join up public services more effectively and allow greater flexibility for local solutions to local circumstances.

Life Cycle: see Whole Life Cycle cost

LIFT: Local Improvement Finance Trust. NHS LIFT is a vehicle for improving and developing frontline primary and community care facilities. It is allowing PCTs to invest in new premises in new locations, not merely reproduce existing types of service. It is providing patients with modern integrated health services in high quality, fit for purpose primary care premises.

Local Development Framework: is the name given to the new system of Development Plans introduced by the Planning and Compulsory Purchase Act 2004. The Local Development Framework will gradually replace the Unitary Development Plan.

Low carbon: A building, project or product that has the lowest possible CO2 emissions.

Low Carbon Building project: BERR's Low Carbon Buildings Programme Phase 1 will run over four years and replaces the previous DTI Clear Skies and Solar PV grant programmes. Open to householders, public, not for profit and commercial organisations across the UK (except the Channel Islands and the Isle of Man), the programme will demonstrate how energy efficiency and microgeneration can work hand in hand to create low carbon buildings.

LSP: Local Strategic Partnerships are non-statutory, multi agency partnerships, which match local authority boundaries. LSPs bring together at a local level the different parts of the public, private, community and voluntary sectors allowing different initiatives and services to support one another so that they can work together more effectively

MtCO2: 1 million tonnes of CO2

NAO: National Audit Office

NHS CRS: NHS Carbon Reduction Strategy

NHS organisations: This strategy refers to NHS organisations whilst acknowledging the different regulatory regimes for NHS organisations and their ultimate lines of accountability.

NHSBT: NHS Blood and Transplant

NICE: The National Institute for Health and Clinical Excellence

OFT: Office of Fair Trading

OGC: Office of Government Commerce

PASA: NHS Purchasing and Supply Agency

PSA: Public Service Agreements set out the key priority outcomes the Government wants to achieve in the next Comprehensive Spending Review (CSR) period 2008–2011, this work is led by the Department of Work and Pensions.

PCT: Primary Care Trust

Peak Oil: A range of oil analysts are expecting global oil production to reach a peak and then begin its decline within the next 10 years. Peak oil is the point in time when the maximum rate of global petroleum extraction is reached, after which availability of production will decline.

PFI: Private Finance Initiative provides a way of funding major capital investments, without immediate recourse to the public purse. Private consortia, usually involving large construction firms, are contracted to design, build, and in some cases manage new projects. Contracts typically last for 30 years, during which time the building is leased by a public authority.

ProCure21: ProCure21 is a procurement method for publicly funded NHS Capital Schemes. It is currently being used to deliver community hospitals, primary care centres, mental health units and other acute services such as cardiac care and out-patient units. It stands along side the Private Finance Initiative (PFI) and the Local Investment Finance Trust (LIFT) initiative to deliver the future of NHS facilities.

Procurement: Refers to all purchasing done on behalf of NHS organisations.

SDC: Sustainable Development Commission

SDU: NHS Sustainable Development Unit provides leadership, support and policy input to ensure the NHS in England is a leading public sector organisation in promoting sustainable development and mitigating climate change.

SHA: Strategic Health Authority

SHINE: The Sustainable Healthcare Network is a learning network for sustainable healthcare buildings. It has been developed as a partnership programme between leading healthcare, sustainability and built environment organisations and aims to help NHS organisations improve the sustainability performance of their new build projects by providing them with a learning network of guidance, education and support.

SOGE: Sustainable Operations on the Government Estate targets.

Strategy: In the case of this document, refers to the NHS Carbon Reduction Strategy.

SUSTRANS: is a sustainable transport charity.

Telemedicine: Delivery of health services via remote telecommunications.

UKCIP: UK Climate Impacts Programme helps organisations to understand climate change.

UKPHA: UK Public Health Association

UNFCCC: United Nations Framework Convention on Climate Change

WRAP: helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.

Whole Life Cycle Cost: Life Cycle Costing (LCC) also called Whole Life Costing is a technique to establish the total cost of ownership. It is a structured approach that addresses all the elements of this cost and can be used to produce a spend profile of the product or service over its anticipated life span.

Zero Carbon: A common understanding of the terms zero carbon with regards to buildings for example, is one where there are zero net emissions from all energy used over one year. This means that energy needed for heating, lighting, hot water and all electrical appliances in the building. The terms has however been criticized by many as not taking into account life cycle carbon emissions, which may be significantly more than the energy used in operating the building.

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However, the responsibility for the final product lies with the NHS Sustainable Development Unit for England.

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Andy House Frances Howie Chris Howlett Eva Hrobonova Alison Hughes Jim Hughes John Hughes Mike Hughes Nicola Hughes Robert Hughes Rupert Hughes Amanda Humphreys Peter Hunt Simon Hunter Adam Huszcza Nevil Hutchinson Ismail Ibrahim Phil Insall P Isaacs Dale Jackson Harriet Jackson Michael Jackson Ann James Gary James Keith James Mark Jarman-Howe Sharon Jarrett Roger Jay Stuart Jeffery Martyn Jeffery Caroline Jessel Ben Johnsen Marie Johnson Sid Johnson Andy Johnston Kate Jolly Andrew Jones Cherry Jones Chris Jones Howard Jones Louise Jones Paul Jones Peter Jones Stephanie Jones Caroline Jordan Paula Judd Dominic Kane Sue Kardahji B Kaur Duncan Kay Pat Keeling Charlie Keeney Alastair Keir Thomas Kelly Tom Kelly Paul Kennard Michael Kennedy Andrew Kenworthy Darryn Kerr Kate King Shane King Ruth Kipping Graham Kirk Bill Kirkup Robert Knibbs Kyriacos Kyriacou Gary Ladhams Rajalashmi Lakshman Mark Lambert Clive Lancaster Tim Lang Liz Lansley Debra Lapthorne John Lassetter J Lasspool T Laundy Paul Lawler Chris Lawson L Lawson Susan Leeming Carolyn Lester Abera Leta Pauline Lewin Kaeley Lewis Kevin Lewis Paul Lewis Mark Lim David Limb Tom Ling Tim Litherland Ivan Little David Livingstone Karen Livingstone David Lloyd Nigel Lloyd Scott Lloyd Sean Lockie Julie Lockwood Larissa Lockwood Roger Long Judith Longstaff-Mackay Stuart Lovack Hermione Lovel Martin Lovell M Lowe Robert Lowe Caroline Lucas Yoryos Lyratzopoulos Helen MacCallum Helen MacCarthy Jamie MacDonald Roy Macgregor John Machin John Machray Christine Macleod Lynne Madden Neil Maher Naomi Makin Joe Mallon Kaveh Manavi Rupert Manley Sarah Manley Trevor Mann Michael Mansfield Colin Mapperley Philip Marsden John Marshall K Marshall Simon Marshall David Martin George Martin Susan Martin Alan Maryon-Davis Peter Maullin Angela Mawle Tom May Rachel Maybank Robert Maynard Magdalene Mbanefo Helen McCallum Katarina McCartney John McClean Dee McCormack Barry McCormick Justin McCraken Amy McCullough Felicity McElderry Abayomi McEwen Gary McFarlane Malcolm McFrederick Alán McGlennan Steve McGuire Mike Mchugh Neil McKay Andy McKeon Sheena McLaggan Nigel McMahon Christine McMaster Rory McMullan Alan McPherson-Bidewell Tom Meade Ali Mehrzad Sarju Mehta Steven Melhuish Joe Mellor Maggie Meltzer Simon Meredith Peter Merson Jeannie Metcalfe-Hall Martine Meyer Phil Micklethwaite John Middleton Martin Milburn Joan Miller Paul Millet Chris Millett Eugene Milne Khandu Mistry Keith Mole Mary Montgomery Hugh Montgomery Chris Moon Tom Mooney Ciara Moore Denyse Moore Lucy Morecroft David Morgan W Morgan Kieran Morgan Allan Morley Clive Morris David Evan Morris Katy Morrow Frances Mortimer Valerie Moton C Moss Andrew Mould Gary Mountjoy P Moxon Joseph Murphy Peter Murphy Elisabeth Murray Brian Murray Craig Myers Nigel Myhill C Nattrass James Naughton Sameena Naz Chris Needham Bob Nettleton Louise Newport Charles Newstead David Nicholl Ian Nicholls Maggie Nicol Natalie Norman Peter Norman Phil Normanton Peter North Jo Nurse Jubeida Nyangari James O'Brien Emer O'Connell Andy O'Connor Ciara O'Connor Sue Odams Aislinn O'Dwyer Elaine Ogden Inger O'Meara Michael Opone Denise Orange Jon Orrell J Orton Keith Osborn Simon Osborn Mark Overton Lindley Owen Martin Owen Gemma Owens Oluwaseun Oyemade-Babatunde Kevin Oxley Paul Oxley Robin Packman Mark Page Mark Paice Richard Parish Ray Parker Sadie Parker Sarah Parkin Sandie Parsley Chris Parsons Ruth Passman Arun Patel June Patel Lisa Patel Yash Patel Ash Paul Chris Paul Martin Payne Trevor Payne Lorna Peacock Peter Peake Mike Pearson Chris Peck Joe Peers Jenny Pell-Walpole J Pemberton Gary Penn Richard Penney Bob Pepper Chrissie Pepper Isabel Perez Nadia Permalloo Bob Perry Robert Perry David Phillips Nigel Phillips David Philliskirk Mervyn Phipps Zoe Pietrzak Grahame Pinches Sally Pinnock Geoff Place Paula Plant Shirley Plenderleith Trevor Plows Chris Pocklington Roger Pollard Michael Poole Jonathon Porritt Charles Porter Philip Posner Emmi Poteliakhoff Ross Pow Peter Powell John Powles Gillian Prager Sarah Prema H Price Peter Price Alison Pritchard Claire Probert Karen Probert Sue Proctor Andy Proud Norman Proudfoot Jane Prust Tim Pryce Natalie Pugh Philip Purnell Roger Quince Maureen Quinn Paul Quinsey Rachel Rablen Clive Radestock Angela Raffle Laura Rai Julian Rainsford Waheed Rajeed Sarah Rann Helen Rawson Salman Razvi Cathy Read Richard Reading Paul Redgrave Chris Redmond Colin Reisner Jamie Rentoul Jon Restell Chris Revell Jake Reynolds John Rhodes M Riaz-Mansoor Nikki Richardson Keith Ridge Simon Rigby Peter Ring Tom Rivett-Carnac Gerry Robbin Aled Roberts Heather Roberts Ian Roberts Katharine Roberts Kym Roberts Colin Robertshaw Claire Robinson Clive Robinson Natasha Robinson Richard Robson Penny Rogers Alfred Ronald Gul Root Leverne Rose Helen Ross Martin Rossor Lionel Roughley Martin Royal Mark Rowe Chris Rowland David Rowley Paul Rowley Jayne Rowney Jan Rowsell Shaibal Roy Iain Roy Ruth Ruggles John Rumble Sheila Rundle Terri Russell Harry Rutter Chris Ryan Ruth Sabin Waheed Saleem A Sanders Mark Sanderson Lincoln Sargeant Tim Saunders Gabriel Scally Michael Scott Caroline Seaman James Sedgwick Ann Seeds Jason Seez Chloe Sellwood Sue Senior Paul Seymour Mahesh Shah Ruth Shakespeare Alex Shanks Sue Shannon Julia Sharman Heather Sharp Tracey Sharp Katherine Shepherd Sue Shepherd Malcolm Shepherd Mark Shepperd Philip Sherratt Sheila Shribman Sarah Shuttlewood Vaskar Siddique Peter Sidebotham John Simpson Gulab Singh Sanjay Sisodiya Steve Sizmur Brian Skinner Kathleen Skinner Kevin Smeaton Paul Smethurst David Smith Edward Smith James Smith Jenifer Smith Jeremy Smith Kathy Smith Maria Smith Matthew Smith Rebecca Smith Rob Smith Jonathan Smye T Solanki John Somers J Somner Karen Sorensen Lindsay Southcombe Christopher Spark Graham Spence Phil Spencer Jackie Spiby Gillian Squires Christine St John Cox Susan Stallabrass Malcolm Stamp Rachel Stancliffe Diana Standing Martine Standish Peter Stannard Tony Stanyard Liz Steel Robert Steele Yvonne Stephens Dene Stevens Kevin Stevens Jonathan Stewart Adrian Stobie Gill Stokes Martin Stott Robin Stott Mike Streather Nicola Strickland Laurance Stroud Nicki Sullivan Mark Summers Kim Sunley Karthik Surendran Philip Sutcliffe Andrea Sutcliffe Holly Sutherland Mark Sutherland Shaun Swaby-Larsen Terry Sweeney Matt Sweeting Nicky Swetnam J Swift Jan Swithinbank Sam Sydney Andy Sylvester Sue Symington Leonard Szepietowski Adrian Taylor David Taylor Ryan Taylor Donna Telfer Jon Templeton Gary Theobald Mark Thomas Shylaja Thomas Steve Thomas Val Thomas Wayne Thomas Ian Thompson Nick Thompson Mark Thompson Derek Thorne Clare Thornton Stephen Thornton Claire Tiffany Vanessa Tilling Helena Tinker Charlie Tomson Angela Tonge Steve Town Kate Trant. Dee Traue. Andrew Tucker: Matthew Tulley. Chris Tuppen. Dave Turner: M.Tweeddale: Elozona Uzoegwu Sivakamy Vanniasegaram. Nerissa Vaughan. Penny Venables. Andy Vowles. Hester Wain. Hamilton Walcott. Colin Waldren. Andy Walker David Walker Sarah Walker Gareth Walker Hannah Wall Steve Waller Matthew Wallis Sarah Walpole David Walsh Fiona Walter Andrew Ward David Ward Tim Ward Mandy Wardle Les Warren Steve Warren Tony Waterston David Wathey Stuart Watkin Lucy Watkins Graham Watkinson Janet Watkinson John Watkinson David Watts Graham Watts Kerry Watts Andrew Way Susan Wayne Sharon Wears Michelle Webb Garth Weever Anthony Weight Catherine Weightman Julius Weinberg Celia Weldon Stephen Welfare Chris West S Whale Jane Wheatley Tim Wheeler Anthony Whitaker Stuart White John White Martin White Lee Whitehead Richard Whitehouse Paula Whitty Jenny Wilby Martin Wilby Susan Wild Jason Wilkes John Wilkinson Mark Wilkinson Paul Williams J Williams Jude Williams Roger Williams Cort Williamson Bruce Willoughby Alison Wilson Deborah Wilson Joanne Wilson Martin Wiltshire Jim Wiltshire Terry Windle Philip Winstanley Tony Winter Glenn Winteringham Graham Winyard Alex Wood Mark Wood Claire Woodward Adam Worricker Robert Wotton Peter Wright Tim Wright Frank Wuggenig Emma Wynn Mackenzie John Yates Andrea Young Pamela Young Kim Zeidler

NHS Organisations

2gether NHS FT 5 Boroughs Partnership NHS Trust Aintree Hospitals Airedale NHS Trust Anglia Cancer Network Ashton, Leigh and Wigan PCT Barking & Dagenham PCT Barnet & Chase Farm Hospitals NHS Trust Barnet Enfiled & Haringay MHT Barnsley Hospital NHS FT Barnsley PCT Barts & The London NHS Trust Basildon & Thurrock University Hospitals NHS FT Basingstoke and North Hants NHS FT Bassetlaw PCT Bath and North East Somerset PCT Bedford Hospital NHS Trusts Beds and Luton Mental Health and Partnership NHS Trust Berkshire East PCT Berkshire Healthcare NHS FT Berkshire West PCT Birmingham and Solihull Mental Health NHS FT Birmingham Childrens Hospital Birmingham Primary Care Shared Services Agency Birmingham Womens Hospital NHS FT Blackpool, Fylde and Wyre Hospitals NHS FT Bolton PCT Bournemouth and Poole Teaching PCT Bradford and Airedale Teaching PCT Bradford District Care Trust Brent Teaching PCT Brighton & Hove City Teaching PCT Brighton & Sussex University Hospitals NHS Trust Bristol PCT Bromley Hospitals NHS Trust Bromley PCT Buckinghamshire Hospitals NHS Trust Bury PCT Cambridge University hospitals NHS FT Cambridgeshire and Peterborough NHS FT Camden PCT Camden and Islington FT Central & North West London MH NHS FT Central Lancashire PCT Cheshire and Wirral Partnership NHS FT Chesterfield Royal Hospital NHS FT City & Hackney PCT City Hospitals Sunderland NHS FT Colchester Hospital University NHS FT Cornwall & Isles of Scilly PCT Cornwall Partnerhsip NHS Trust Countess of Chester Hospital NHS Foundation Trust County Durham & Darlington NHS FT County Durham PCT Dartford and Gravesham NHS Trust Derby Hospitals NHS FT Derbyshire County PCT

Devon PCT Dorset County Hospital NHS FT Dorset HealthCare NHS FT Dorset PCT Dudley Group of Hospitals NHS Trust Ealing PCT East and North Hertfordshire PCT East Cheshire NHS Trust East Kent Hospitals NHS Trust East Lancashire Hospitals NHS Trust East Midlands Ambulance Service NHS Trust East Midlands Public Health Observatory East of England Ambulance Service NHS Trust East Sussex Downs and Weald PCT East Sussex Hospitals NHS Trust Epsom and St Helier University Hospitals NHS Trust Frimley Park Hospital NHS FT Gateshead Health George Eliot Hospital NHS Trust Gloucestershire Hospitals NHS FT Great Western Ambulance Service Great Yarmouth & Waveney PCT Greater Manchester West Mental Health NHS FT Guy's & St Thomas' NHS FT Hampshire Partnership NHS Trust Hampshire PC Harrogate and District FT Hastings and Rother PCT Havering PCT Health Enterprise East Health Protection Agency Heart of England NHS FT Hereford Hospitals NHS Trust Hertfordshire Partnership NHS FT Hillingdon PCT Hinchingbrooke Health Care NHS Trust Hull & East Yorkshire Hospitals NHS Trust Hull Teaching PCT Humber Mental Health NHS Trust Ipswich Hopsital NHS Trust Isle Of Wight NHS PCT Islington PCT James Paget University Hospital Kensington and Chelsea PCT Kettering General Hospital Lambeth PCT Lancashire Teaching Hospitals NHS FT Leeds PCT Leeds Teaching Hospitals NHS Trust Leicestershire Partnership NHS Trust Lewisham Hospital NHS Trust Lewisham PCT Lincolnshire Partnership NHS FT Liverpool Heart & Chest Hospital NHS Trust Liverpool PCT London Ambulance Service LSLEM Maidstone & Tunbridge Wells NHS Trust Medway NHS FT Mid Essex Hospital Services NHS Trust

Milton Keynes Hospital NHS FT National Patient Safety Agency Newham NHS PCT NHS Blackburn with Darwen NHS Blood and Transplant NHS Cambridgeshire PCT NHS Cumbria PCT NHS East Midlands NHS East of England NHS Kirklees NHS Leicester City NHS Lincolnshire NHS London NHS Milton Keynes NHS Norfolk NHS North East NHS North West NHS Plymouth NHS Purchasing & Supply Agency NHS Rotherham PCT NHS South Central NHS South East Coast NHS South West NHS Suffolk NHS Supporting Public Health NHS West Kent NHS West Midlands NHS Yorkshire and The Humber Norfolk and Waveney Mental Health NHS FT North Bristol NHS Trust North Cheshire Hospitals NHS Trust North Cumbria University Hospitals NHS Trust North East Ambulance Service NHS Trust North East Essex PCT North East Lincolnshire Care Trust Plus North East London NHS F North Essex Partnership NHS FT North Somerset PCT North Staffordshire Combined Healthcare NHS Trust North Tees and Hartlepool NHS FT North West Ambulance Service NHS Trust North West London Hospitals NHS Trust North Yorkshire and York PCI Northern Devon Healthcare NHS Trust Northern Lincolnshire & Goole Hospitals NHS Trust Northwest NHS Nottingham City PCT Nottingham University Hospitals NHS Trust Nottinghamshire County Teaching PCT Nottinghamshire Healthcare NHS Trust Nuffield Orthopaedic Centre NHS Trust Oxford Radcliffe Hospitals NHS Trust Pennine Care NHS FT Peterborough & Stamford Hospitals NHS FT Peterborough PCT Poole Hospital NHS FT Portsmouth Hospitals NHS Trust Princess Alexandra Hospital NHS Trust Queen Mary's Hospital NHS Trust Redbridge PCT
Ridgeway Partnership (Oxfordshire Learning Disability NHS Trust) Rotherham, Doncaster & South Humber Mental Health NHS FT Royal Berkshire NHS FT Royal Bolton Hospitals NHS Trust Royal Bournemouth & Christchurch NHS FT Royal Brompton and Harefield NHS Trust Royal Cornwall Hospitals NHS Trust Royal Devon & Exeter NHS FT Royal Liverpool & Broadgreen University Hospital NHS Trust Royal Liverpool Childrens NHS Trust Royal National Hospital for Rheumatic Diseases NHS FT Royal Surrey Country Hospital Royal United Hospital Bath NHS Trust Saffron Group Practice Salford PCT Salford Royal NHS FT Salisbury Hospital NHS FT Sandwell Mental Health NHS & Social Care Trust Sandwell PCT Scarborough and North East Yorkshire Healthcare NHS Trust Sheffield Childrens NHS FT Sheffield Health & Social Care NHS FT Sheffield PCT Sherwood Forest Hospitals NHS FT Shropshire County PCT Solihull Care Trust Somerset Partnership NHS FT Somerset PCT South Central Ambulance Trust NHS Trust South Devon Healthcare NHS FT South Downs Health NHS Trust South East Coast Ambulance Service NHS Trust South Essex Partnership NHS Trust South Gloucestershire PCT South London and Maudsley NHS FT South Staffordshire PCT South Tees Hospitals NHS Trust South Tyneside NHS FT South West London and St George's MHT South West Public Health Observatory South West Yorkshire NHS MHT South Western Ambulance Service NHS Trust Southampton City PCT Southampton University Hospitals NHS trust Southend University Hospital NHS FT Southwark PCT St Georges Healthcare NHS Trust Stennack Surgery Stockport NHS FT Stoke PCT Suffolk Mental Health NHS Trust Support Services Partnership Surrey & Borders Partnership NHS FT Surrey PCT Sussex Partnership NHS FT Swindon and Marlborough NHS Trust Swindon Primary Care Trust

Tameside Hospital NHS FT Taunton & Somerset NHS FT Tees, Esk and Wear Valleys NHS Trust Telford & Wrekin PCT The Hillingdon Hospital NHS Trust The Luton & Dunstable Hospital NHS FT The Pennine Acute Hospitals NHS Trust The Rotherham NHS FT The Royal Marsden NHS FT The Royal Wolverhampton Hospitals Trust The Shrewsbury & Telford Hospital Trust The Whittington Hospital NHS Trust Torbay Care Trust Trafford Healthcare NHS Trust Trent Cancer Registry University College London Hospitals NHS FT University Hospital Birmingham NHS FT University Hospital of South Manchester NHS FT University Hospitals Bristol NHS FT University Hospitals of Leicester NHS Trust University Hospitals of Morecambe Bay NHS Trust Walsall Hospitals NHS Trust Walsall Teaching PCT Warrington PCT West Essex PCT West Hertfordshire NHS Trust West London Health Estates West Middlesex University Hopsital NHS Trust West Midlands Ambulance Service NHS Trust West Suffolk Hospital NHS Trust Western Cheshire PCT Westminster PCT Winchester and Eastleigh Healthcare Trust Wirral University Teaching Hospital NHS Trust Wolverhampton City PCT Yeovil District Hospital NHS FT York Hospital Yorkshire and Humber Directors of Public Health

Health Organisations

Academy of Royal Colleges Cambridgeshire Association to Commission Health Ltd Climate and Health Council Healthcare Commission MEDACT Medsin-UK Mental Health Act Commission National Public Health Service for Wales NHS Confederation NHS London Healthy Urban Development Unit NHS West Midlands / DH West Midlands Regional Public Health Group - London Royal College of Anaesthetists Royal College of GPs Royal College of Nursing Royal College of Obstetricians and Gynaecologists Royal College of Physicians The Campaign for Greener Healthcare UK Public Health Association

Partner Organisations

ACT TravelWise Aid to Hospitals Worldwide Air Quality Management Resource Centre, UWE Atkins Sustainable Transport Team Bedfordshire County Council Ben Cave Associates BRE CABE CHP Cornwall County Council Cycling England Cyclists Touring Club Defra Dudley Infracare LIFT Limited East of England Energy Group Environment Agency Faithful and Gould Forum for the Future Greater London Authority Green Party Groundwork UK HEFMA South West Branch Improvement & Development Agency (I&DeA) Kirklees Council Merseyside Cycling Campaign Merseyside TravelWise Team Nightingale Associates Osmooze Penoyre & Prasad PriceWaterhouseCoopers Regional Development Agencies Salix Finance Sustain Sustainable Development Commission Sustainability North East (SustaiNE) Sustrans The Carbon Trust West Midlands Regional Assembly West Suffolk Local Strategic Partnership WRAP



Reports

NHS England Carbon Emissions; Carbon footprint study, 2008. London: Sustainable Development Unit, Sustainable Development Commission & Stockholm Environment Institute

Take Action on Active Travel, 2008.Bristol: SUSTRANS and the Association of Directors of Public Health

Taking the Temperature-Towards an NHS response to Global Warning, 2007. London: NHS Confederation and NEF

Official publications

Department of Health, 2008. Health Technical Memorandum 07-04: Water management and water efficiency (HTM) London: HMSO

Department Of Health, 2008. The Operating Framework for 2009/10 for the NHS in England, London: HMSO

Department of Health, 2008. Taking the long term view: the Department of Health's strategy for delivering sustainable development 2008-2011, London: HSMO

Journals

Bhattacharya, S., 2003, European heat wave caused 35,000 deaths, The New Scientist, [Online]. Available at: http://www.newscientist.com/article/dn4259 [Accessed 07 January 2009]

Online resources

Forum for the Future, 2008. Climate Futures: responses to climate change in 2030 [Online] Available at: http://www.forumforthefuture.org/files/Climate%20Futures_WEB.pdf [Accessed 09 January 2009]

ERIC data 2007/08 [Online] Available at: http://www.hefs.ic.nhs.uk/ [Accessed 09 January 2009]

HM Treasury, 2008. Budget 2008: Stability and opportunity: building a strong, sustainable future [Online] Available at: http://www.hm-treasury.gov.uk/d/bud08_completereport.pdf [Accessed 09 January 2009]

Institute for Innovation and Improvement, 2009. Low carbon award- Health and Social Care Awards [Online] Available at: http://www.institute.nhs.uk/health_and_social_care_awards/award_categories/low_carbon_award.html [Accessed 06 January 2009]

London Energy Partnership, 2006. London Carbon Scenarios to 2026 [Online] Available at: http://www.london.gov.uk/mayor/environment/energy/partnership-steering-group/docs/energy-scenarios.pdf [Accessed 09 January 2009] The Oil Depletion Analysis Centre (ODAC) [Online] Available at: http://www.odac-info.org/ [Accessed 08 January 2009]

PH13 Promoting Physical Activity and the Workplace, 2008. Public Health Programme Guidance, NICE [Online] Available at: http://www.nice.org.uk/guidance/index.jsp?action=download&o=40673 [Accessed 08 January 2009]

PricewaterhouseCoopers, 2008. The world in 2050: Can rapid global growth be reconciled with moving to a low-carbon economy? [Online] Available at: http://www.pwc.com/Extweb/pwcpublications.nsf/docid/1F23CBEB991587A6852574770053 771D/\$FILE/World_in_2050_Carbon_emissions_08_2.pdf [Accessed 09 January 2009]

Reform, 2008. Demand for a new era: The future of health [Online] Available at: http://www.reform.co.uk/ demandforanewerathefutureofhealth_178.php [Accessed 09 January 2009]

Salix finance [Online] Available at: www.salixfinance.co.uk [Accessed 08 January 2009]

The Sustainable Development Commission, Good Corporate Citizenship Assessment Model [Online] Available at: www.corporatecitizen.nhs.uk [Accessed 07 January 2009]

Sustainable Operations of the Government Estate; Targets, 2006 [Online] Available at: http://www.defra.gov.uk/sustainable/government/gov/estates/targets.htm [Accessed 07 January 2009]

UKCIP, 2008. UKCP09: The climate of the United Kingdom and recent trends. [Online] Available at: www.ukcip.org.uk [Accessed 07 January 2009]

www.carbontrust.co.uk/nhs



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Tel: 01223 597 792 Fax: 01223 597 712 Web: www.sdu.nhs.uk The NHS Sustainable Development Unit develops organisations, people, tools, policy, and research to help the NHS in England fulfil its potential as a leading sustainable and low carbon organisation.