

**NHS**

*Sustainable  
Development Unit*

# **Saving** Carbon, **Improving** Health

# UPDATE

NHS CARBON REDUCTION STRATEGY



# NHS Carbon Reduction Strategy Update

This Update is a supplement to the NHS Carbon Reduction Strategy for England.<sup>1</sup> It provides essential new information and additional tools to help your NHS organisation reduce its carbon emissions and become more sustainable.

The Update highlights both opportunities and the scale of the challenges ahead which have not got any easier. The carbon footprint for NHS England has risen to 21 million tonnes per year. This is larger than some medium sized countries and has increased by three million tonnes since the previous footprint was calculated.

This is primarily due to an increase in the growth in NHS services but also because in line with latest conventions we now include other greenhouse gases in our calculations, rather than just carbon dioxide. This is expressed as CO<sub>2</sub> equivalent or CO<sub>2</sub>e.

This work is a synopsis. The subject matter and the way it can help your organisation has been simplified. More detail can be found on our website ([www.sdu.nhs.uk](http://www.sdu.nhs.uk) > Carbon Reduction Strategy > Update).

We see this Update as an essential step in the journey for the NHS as the importance of reducing emissions will grow over the coming decades. A low carbon NHS is good for health and, if you act early, it is an opportunity not only to save your organisation money but also to help the NHS become a quality sustainable healthcare service.



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# NHS England Carbon Footprint

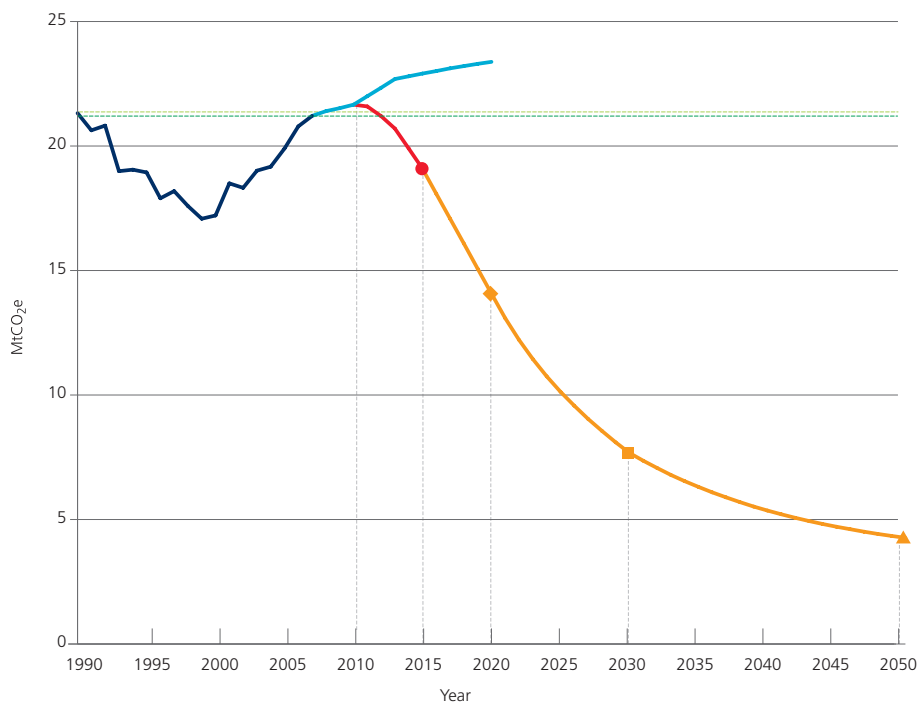
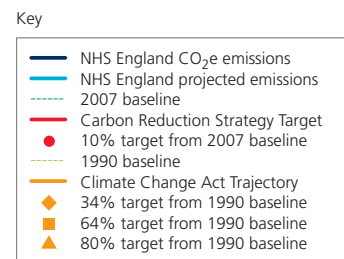


Figure 1: NHS England CO<sub>2</sub>e emissions from 1990 to 2020 with Climate Change Act targets



In 2007 the NHS England carbon footprint rose to 21 million tonnes of CO<sub>2</sub>e (MtCO<sub>2</sub>e).

This figure is calculated<sup>2</sup> using the most recent data available and is an update to earlier footprinting reports,<sup>3,4</sup> and to the NHS Carbon Reduction Strategy for England's (CRS) carbon emissions graph (original graph, p9 and p37 of the CRS).

There are three key changes:

1. NHS England now reports on greenhouse gas (GHG) emissions, displayed in CO<sub>2</sub> equivalent (CO<sub>2</sub>e). This means that CO<sub>2</sub> is not the only GHG measured. This is consistent with the 2008 Climate Change Act<sup>5</sup> and also the 2009 Defra GHG reporting conventions;<sup>6</sup>
2. The procurement data has also been updated from 2004 to 2007. It confirms an increase in emissions over this period. This is composed of 59% procurement, 24% building energy and 17% travel sector emissions;

3. The 2020 target has been altered in line with the amendment (May 2009) to the Climate Change Act.<sup>7</sup> The target is now a reduction of 34% rather than 26% based on a 1990 baseline.

Reporting GHG emissions has made a significant change to the shape of the graph in the decade 1990 to 2000. This is primarily due to international action to reduce non-CO<sub>2</sub> GHGs over this period.

After 2000 and up to 2020 the CO<sub>2</sub>e actual and projected emissions trajectory follows the same upward trend as the original CO<sub>2</sub> projection in the CRS. This means NHS England CO<sub>2</sub>e reduction targets remain much the same:

- The NHS needs to reduce its emissions by 10% by 2015 (based on 2007 baseline data) from 21 MtCO<sub>2</sub>e to 19 MtCO<sub>2</sub>e;
- There is still a challenging 80% CO<sub>2</sub>e target for 2050 which would reduce NHS England emissions to around 4 MtCO<sub>2</sub>e per year.

# NHS England Marginal Abatement Cost Curve

The NHS can save at least £180 million per year by reducing its carbon emissions.

Figure 2 (on page 5) shows how this can be done. The Marginal Abatement Cost (MAC) curve for NHS England condenses complicated data into a graph showing cost effectiveness and magnitude of carbon saved for different reduction measures. Based on the best available evidence it illustrates that many of the measures listed save far more money than they cost to introduce.

A MAC curve can be created for any Trust and can help it prioritise which measures are best introduced to achieve its carbon emission targets.

The blocks in the graph represent different carbon saving measures (see table opposite).

1. The width of each block illustrates the amount of CO<sub>2</sub> saved each year. The greater the width, the greater the carbon saving.
2. The height of the block illustrates the financial cost or saving (of a measure) per tonne of carbon.
3. If a block is below the line this initiative will save more money than it originally cost to introduce. The greater the area of the block, the greater the return with some savings equating to millions of pounds.
4. If a block is above the line your investment will not be recouped over the lifetime of the project, though there will be a carbon saving which still has important consequences for health.

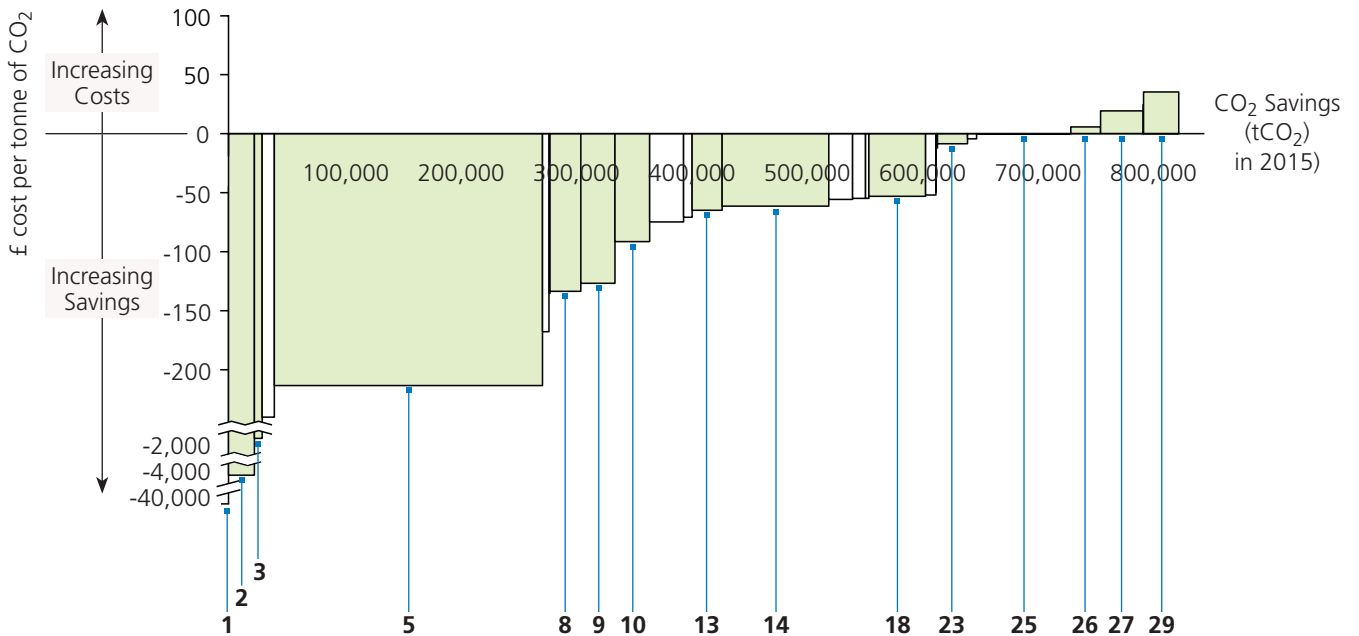
Both high and low cost measures save carbon with some creating considerable financial gains. The value of the MAC curve is that it is a widely tested and accepted method which allows you to easily see the most cost effective way to start reducing your carbon impact.

Figure 2 does not take into account any future charges that may be associated with carbon emissions (e.g. the UK Carbon Reduction Commitment Energy Efficiency Scheme). If the cost of carbon goes up then the various carbon reduction measures will become more cost effective. A graph illustrating this is available on our website (see below).

The NHS Sustainable Development Unit (SDU) has made several different MAC curves available for various categories of Trust. Please visit ([www.sdu.nhs.uk](http://www.sdu.nhs.uk) > Carbon Reduction Strategy > Update).



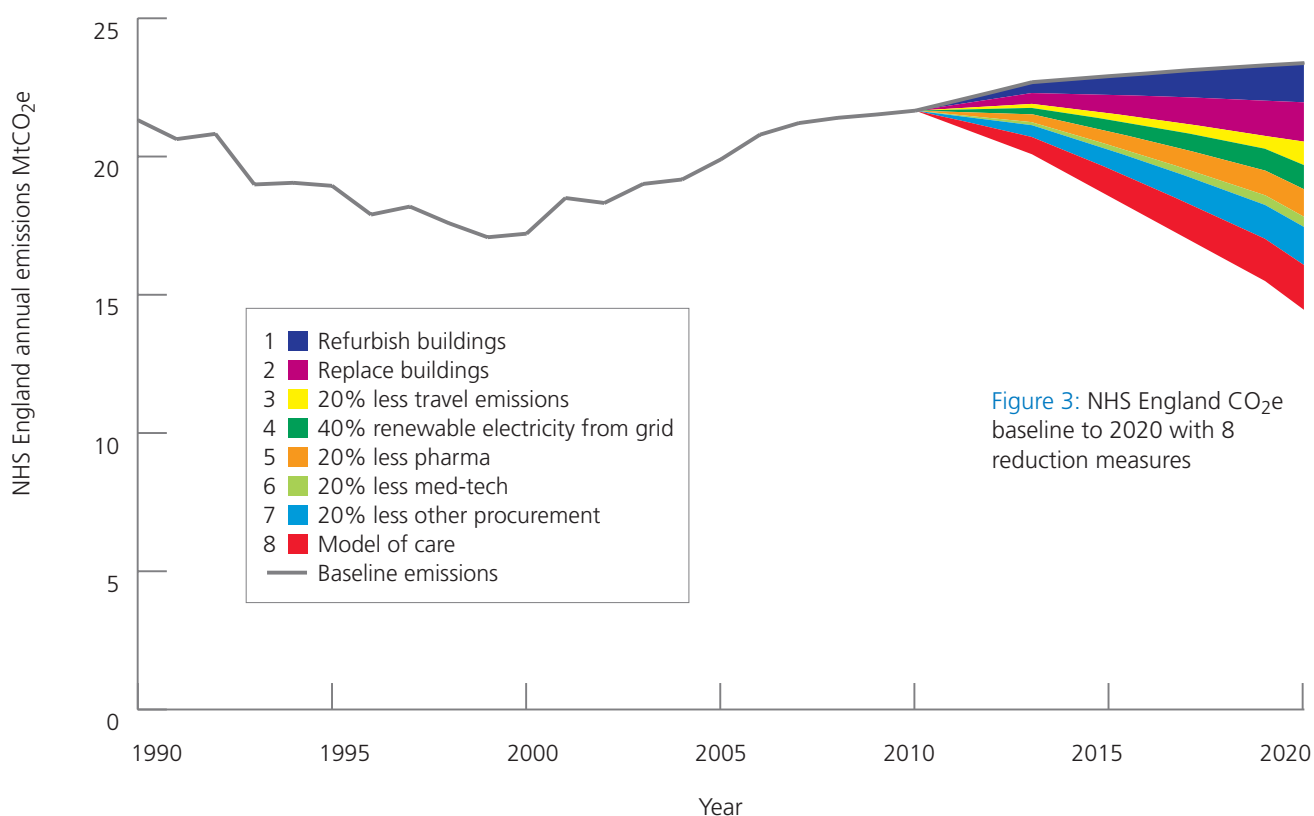
Figure 2: NHS England MAC Curve



This table illustrates just some of the carbon saving measures that the NHS could implement. Not all are numbered above. Some CO<sub>2</sub> savings are too small to depict on this scale of graph.

	(£/tCO <sub>2</sub> ) - savings + costs	CO <sub>2</sub> Savings (tCO <sub>2</sub> /yr)	£000 Savings (£000/yr)
1 Packaging of medical equipment	-40,299	2	+81
2 Reduce drug wastage	-3,987	22,430	+89,428
3 Teleconferencing to replace 5% of business miles	-2,038	6,827	+13,913
4 Decentralisation of hot water boilers in non-acute/PCT	-240	10,612	+2,547
5 Combined Heat and Power installed in acute trusts	-213	232,331	+49,487
6 Variable Speed Drives	-168	5,508	+925
7 Introduce hibernation system for ambulance stations	-135	1,096	+148
8 Improve heating controls	-134	26,551	+3,558
9 Improve lighting controls	-127	29,686	+3,770
10 Energy efficient lighting	-91	30,140	+2,743
11 Voltage optimisation	-75	29,364	+2,202
12 Improve the efficiency of chillers	-71	7,313	+519
13 Roof insulation	-65	25,928	+1,685
14 Energy Awareness Campaign	-61	92,549	+5,645
15 Building Management System optimisation	-56	20,610	+1,154
16 Improve Insulation to pipework, and/in boiler house	-55	11,195	+616
17 Install high efficiency lighting/controls - ambulance trusts	-55	2,999	+165
18 1 degree C reduction in thermostat temperature	-53	49,144	+2,605
19 Improve the efficiency of steam plant or hot water boiler plant	-52	8,933	+465
20 Upgrade garage and workshop heating	-49	214	+10
21 Boiler replacement/optimisation for HQ/control centres	-12	171	+2
22 Improve building insulation levels in ambulance trusts	-12	951	+11
23 Wall insulation	-8	25,928	+207
24 Office electrical equipment improvements	-4	7,957	+32
25 Travel Planning	0	81,524	0
26 Insulation - window glazing and draught proofing	+6	25,928	-156
27 Electric vehicles	+19	36,969	-702
28 Wind Turbine	+25	245	-6
29 Biomass Boiler	+35	30,533	-1069
<b>Total</b>		<b>823,638</b>	<b>179,987</b>

# CO<sub>2</sub>e Reduction Potential for NHS England



This graph gives a visual representation of the effects that various (theoretical) carbon reduction measures would have on NHS England emissions up to 2020. In combination with the table it illustrates the transformational change needed to reduce NHS emissions in line with Government targets.

It updates<sup>4</sup> and adds to data on p33 and p34 of the CRS. It also incorporates CO<sub>2</sub>e emissions rather than just CO<sub>2</sub>.

The baseline is a projection of business as usual CO<sub>2</sub>e emissions for NHS England to 2020. Each coloured wedge represents a reduction in emissions caused by a different action (1-8).

Eight different interventions were selected for analysis, with CO<sub>2</sub>e reductions quoted against projected levels for 2020.

## Description of CO<sub>2</sub>e reduction measures 1 - 8

Description of CO <sub>2</sub> e reduction measures 1 - 8	Saving on 2020 baseline	
	MtCO <sub>2</sub> e	% of total NHS footprint
1. Refurbish all NHS buildings using Low or Zero Carbon Technologies (LZCT) - reduces NHS building energy use by 25%.	1.4 MtCO <sub>2</sub> e	6%
2. Replace all NHS buildings with super-efficient stock - reduces NHS building energy use by a further 25%.	1.4 MtCO <sub>2</sub> e	6%
3. Low carbon travel plans adopted across entire NHS - reduce mileage and corresponding CO <sub>2</sub> by 20%. Increasing vehicle efficiency reduces business travel emissions by a further 30%.	0.8 MtCO <sub>2</sub> e	3%
4. 40% renewable electricity from National Grid - reduces NHS building energy emissions by 40%. Procurement related emissions will also drop by 5%.	0.9 MtCO <sub>2</sub> e	4%
5. Reduce pharmaceuticals wastage - improvements in dispensing and packaging leads to 20% cut in pharmaceuticals purchased.	1.0 MtCO <sub>2</sub> e	4%
6. Review procuring medical equipment - efficiencies reduce purchases by 20% in combination with sharing specialist equipment between Trusts.	0.4 MtCO <sub>2</sub> e	2%
7. Maximising procurement efficiencies - minimising waste produces 20% savings in non pharmaceutical and medical equipment.	1.4 MtCO <sub>2</sub> e	6%
8. Shifts to less intensive models of care - reduce NHS emissions by an extra 10% above efficiencies already gained in transport and procurement.	1.6 MtCO <sub>2</sub> e	7%
<b>Total</b>	<b>8.9 MtCO<sub>2</sub>e</b>	<b>38%</b>

# Additional Support



## Procuring for Carbon Reduction

Approximately 60% of the total carbon footprint of the NHS is related to procurement i.e. all purchasing done on behalf of NHS organisations. The NHS spends £20 billion per year on goods and services. Reducing wastage and generating efficiency savings will make NHS procurement more financially sustainable and also save a considerable amount of carbon.

The Procuring for Carbon Reduction (P4CR) guidance provides an overall approach to reducing carbon in NHS procurement activity and demonstrates how to communicate it to NHS supply organisations.

The P4CR framework will assist an organisation to understand the carbon impact of what it buys, uses and wastes and will help it procure more sustainably.

For more information see ([www.sdu.nhs.uk](http://www.sdu.nhs.uk) > Carbon Reduction Strategy > Update).

## Regional Network

Each of the 10 Strategic Health Authorities (SHA) in NHS England has identified a Sustainable Development (SD) Lead as part of its leadership role. This group meets regularly to support the implementation of the NHS Carbon Reduction Strategy across the regions.

All 10 regions have developed SD networks and are pushing the SD agenda through at a high level across all NHS organisations in their area.

Many regions have particular areas of expertise. These strengths are used to support the other SHA regions wishing to develop SD in those specific fields.

## Fit for the Future

The Fit for the Future document<sup>8</sup> is designed to help NHS leaders, managers and staff produce longer term, more robust strategic plans, with the emphasis on taking action now.

It helps organisations to think about what makes a truly sustainable healthcare service and creates a basis for discussion to establish what it could look like.

It is a tool which gives examples of different environmental scenarios and asks readers to think how their strategic plans would cope in these different worlds.

The document (with associated tools) complements the NHS Carbon Reduction Strategy and has been specifically commissioned for the NHS by the NHS Sustainable Development Unit. It is highly recommended and supported by the Chief Executive of the NHS and the Lead NHS Chief Executive for Sustainable Development.



## Glossary

### Carbon Reduction Commitment Energy Efficiency Scheme<sup>9</sup>

A climate change and U.K. energy saving scheme. Its aim is to improve energy efficiency and reduce carbon emissions.

### Climate Change Act 2008<sup>5</sup>

U.K. Government Act which includes a target for the year 2050 for the reduction of greenhouse gas emissions.

### CO<sub>2</sub>e emissions / Greenhouse Gases (GHG)

Carbon dioxide equivalent emissions. This refers to six greenhouse gases: Carbon dioxide; Hydrofluorocarbons; Methane; Nitrous oxide; Perfluorocarbons; Sulphur hexafluoride. Using CO<sub>2</sub>e allows different greenhouse gases to be compared on a like for like basis relative to one unit of CO<sub>2</sub>.<sup>6</sup>

### CRS

The NHS Carbon Reduction Strategy for England: Saving Carbon, Improving Health. Published in January 2009. It gives the NHS vision and guidance on how and why to become an exemplar low carbon public sector organisation. It details the type of action required to deliver carbon reductions in line with Government targets on climate change.

### Fit for the Future Scenarios

A document detailing four future possibilities or scenarios which give a picture of how health and healthcare in England could differ by 2030.

### Low or Zero Carbon Technologies

Technologies such as combined heat and power, ground source heat pumps, wind power and solar power which help to lower the carbon intensity of energy requirements.

### P4CR

Procuring for Carbon Reduction. Guidance to help reduce carbon emissions of NHS procurement activity.

### Procurement

Refers to all purchasing done on behalf of NHS organisations.

### SDU

The NHS Sustainable Development Unit was established in April 2008. It develops organisations, people, tools, policy, and research to help the NHS in England fulfil its potential as a leading sustainable and low carbon organisation.

## References

<sup>1</sup> NHS Carbon Reduction Strategy for England: Saving Carbon, Improving Health, 2009. Cambridge: NHS Sustainable Development Unit

<sup>2</sup> All calculations in this publication have been made with the latest available data and the most widely accepted and tested methodology. There will inevitably be changes in both data (and to some extent methodology) in years to come.

<sup>3</sup> NHS Sustainable Development Unit & Stockholm Environment Institute, 2008. NHS England Carbon Emissions; Carbon footprinting report [Online] Available at: [http://www.sdu.nhs.uk/page.php?page\\_id=93](http://www.sdu.nhs.uk/page.php?page_id=93) [Accessed 20 January 2009]

<sup>4</sup> NHS Sustainable Development Unit, ARUP & Stockholm Environment Institute, 2009. NHS England Carbon Emissions: Carbon footprint modelling to 2020. [Online] Available at: [http://www.sdu.nhs.uk/page.php?page\\_id=93](http://www.sdu.nhs.uk/page.php?page_id=93) [Accessed 20 January 2009]

<sup>5</sup> Climate Change Act 2008. (c.27), London: HMSO.

<sup>6</sup> Department for Environment, Food and Rural Affairs & Department of Energy & Climate Change, 2009. Guidance on how to measure and report your greenhouse gas emissions [Online] Available at: <http://www.defra.gov.uk/environment/business/reporting/index.htm> [Accessed 20 January 2009]

<sup>7</sup> Climate Change Act 2008 (2020 Target, Credit limit and Definitions) order 2009. London: HMSO

<sup>8</sup> Fit for the Future: Scenarios for low-carbon healthcare 2030, 2009. Cambridge: NHS Sustainable Development Unit & Forum for the Future

<sup>9</sup> Department of Energy & Climate Change, 2010. CRC Energy Efficiency Scheme [Online] Available at: [http://www.decc.gov.uk/en/content/cms/what\\_we\\_do/lc\\_uk/crc/crc.aspx](http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/crc.aspx) [Accessed 19 January 2010]