

Scottish (Managed) Sustainable Health Network (SMaSH)

Report

**Greenhouse Gas Emissions and Energy Use in Scotland's Health Sector:
Current Data Review**

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This report has been signed off by the Chair of the Scottish (Managed) Sustainable Health Network steering group, see Appendix 1 for membership.

Abbreviations

CO ₂ e	Carbon dioxide equivalent
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
GCCAM	Good Corporate Citizenship Assessment Model
GHG	Greenhouse Gas
GJ	Gigajoules
HEAT	Health Improvement, Efficiency, Access and Treatment
HFS	Health Facilities Scotland
I–O	Input–Output
kWh	Kilowatt hour
ScotPHN	Scottish Public Health Network
SMaSH	Scottish (Managed) Sustainable Health Network

Executive summary

The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations. Reducing greenhouse gas (GHG) emissions and energy use are major contributors to sustainable development. Scotland has had targets to reduce both in recent decades. Meeting these requires action across all parts of society including the health sector.

The Climate Change (Scotland) Act 2009 set out specific duties to which public bodies (including NHSScotland Boards) must adhere. It set an obligation that GHG emissions be reduced by 80% in Scotland by 2050 (from 1990 levels). In 2012 the Scottish Government published a sustainable development policy for NHSScotland (CEL 2 (2012)) with a remit to improve sustainability of NHSScotland's activities. Published alongside this, the revised Sustainable Development Strategy for NHSScotland by Health Facilities Scotland (HFS) provides guidance for NHSScotland Boards on the interpretation and implementation of this policy.

The Scottish (Managed) Sustainable Health Network (SMaSH) is a new network, (www.scotphn.net/projects/current_projects/sustainable_health_network) supported by the Scottish Public Health Network (ScotPHN). It aims to highlight the key role the health sector can play in progressing the sustainability agenda and meeting the challenges it contains. This briefing summarises a review and critical appraisal of the currently-available published information and data on GHG emissions and energy use in Scotland's health sector, undertaken to inform SMaSH. It provides a baseline that can help inform future work and identify priorities for action.

A search for appropriate sources of information and data for Scotland from 1990 was undertaken. This search included coverage of publications presenting UK data from which the Scottish data can be inferred and involved contacting key informants within Scotland and scanning key websites. Many documents identified covered the UK as a whole, were not specific to the health sector or discussed what should be assessed ideally.

Two reports were identified documenting routine annual data on GHG emissions and energy use in Scotland's health sector. A third, one-off report documented how this data could be used with other nationally available data, input-output tables and the Scottish National Travel Survey to create a total consumption-based carbon footprint of NHSScotland. A strength of the available data is the coverage of Scope 1 and Scope 2 emissions and energy usage, but even these are incomplete. The major limitation of the data is the poor coverage of Scope 3 emissions, and these are thought to make up the bulk of GHG emissions for NHSScotland. This limitation largely reflects the fact that current data collection is governed by meeting HEAT (Health Improvement, Efficiency, Access and Treatment) target requirements which, at present, do not cover Scope 3 emissions. Further limitations surround the methodologies used, which involve conversion factors to obtain emission figures and assumptions, for example, especially as some data are estimated. Finally, even when data are available, care is required in the interpretation of what trends actually mean.

The clear message from this review is that action is required to improve data quality and completeness, especially for Scope 3 emissions. The creation of new public sector sustainability reporting guidance by the Scottish Government and the support provided for the health sector by HFS is, however, already helping to improve the available data over time.

Introduction

The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.¹ Reducing greenhouse gas (GHG) emissions^a and energy use are major contributors to sustainable development. Scotland has had targets to reduce both in recent decades and meeting these requires action across all parts of society. This includes the health sector, which can play a key role in progressing the sustainability agenda and meeting the challenges.

The recent targets that apply to the health sector include:

- the internationally agreed Kyoto Protocol, which obliged wealthy nations (including the UK) to cut their carbon emissions by 4.2% on average for 2008–2012 relative to 1990 in most cases.² This was updated at talks in Doha in 2012 committing the participating countries to a 18% reduction on 1990 levels by 2020. However, a large number of countries have not signed up to the targets or do not intend to ratify the commitments
- the 1.5–2% annual energy efficiency target for NHSScotland for 1985–2000, which was subsequently updated to become a 2% annual energy efficiency target for 2001–2010
- the HEAT (Health Improvement, Efficiency, Access and Treatment) Target E8 2010–11 to 2014–15 of 1% year-on-year energy efficiency target and 3% year-on-year reduction in CO₂ emissions on all fossil fuel use (this does not include electricity related emissions) (baseline final outturn of 2009–10).³

Of these, the HEAT target is the main environmental target against which NHSScotland Boards are assessed and hence governs all energy and GHG data collection.

More generally, the Climate Change (Scotland) Act 2009⁴ set out specific duties to which public bodies (including NHSScotland Boards^b) must adhere. These duties require that those public bodies covered must, in exercising their functions, contribute to carbon emissions reduction (climate change mitigation) and climate change adaptation and also act sustainably. The act set a target for Scotland to reduce GHG emissions by 80% by 2050 (from 1990 levels), with an interim target reduction of 42% by 2020. Secondary legislation set an additional series of annual emission reduction targets for 2010–2022 and 2023–2027.

Across all sectors in Scotland, the Scottish Government is committed to delivering increased, sustainable economic growth, reaffirmed by its recently published economic strategy.⁵ This established a new strategic priority of transition to a low carbon economy and included as a key objective to provide leadership to support this. In this strategy, the Scottish Government also committed to four transformational changes:

- decarbonise electricity generation by 2030, largely decarbonise heat sector by 2050
- almost complete decarbonisation of road transport by 2050

^a This refers to the six main GHGs, which are covered by the Kyoto Protocol: carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). Emissions are translated into CO₂ equivalents.

^b The duties apply to all 14 local and 8 Special Health Boards within NHSScotland.

- significant decarbonisation of rail by 2050
- establish a comprehensive approach to ensure that carbon is fully factored into strategic and local decisions about rural and urban land use

and set itself targets of:

- the equivalent to 100% of Scotland's demand for electricity to be met by renewables by 2020
- end-use energy consumption to reduce by 12% by 2020
- 11% of heat demand to be met by renewables by 2020.

Specifically in 2012 for the health sector, the Scottish Government published a sustainable development policy for NHSScotland (CEL 2 (2012)⁶) with a remit to improve sustainability of NHSScotland's activities principally in the context of asset management. It commits each NHSScotland body to conduct a self-assessment using the Good Corporate Citizenship Assessment Model (GCCAM) toolkit.⁷ GCCAM provides a set of tools for reporting for NHSScotland and covers: travel; procurement; facilities management; workforce; community engagement; and buildings. Published alongside the policy, the revised Sustainable Development Strategy for NHSScotland by Health Facilities Scotland (HFS) provides guidance for NHSScotland Boards on the interpretation and implementation of the policy.⁸

Against this backdrop, the Scottish (Managed) Sustainable Health Network (SMaSH) is a new network, supported by the Scottish Public Health Network (ScotPHN), (www.scotphn.net/projects/current_projects/sustainable_health_network) with a vision of being:

‘An active public health network which works collaboratively with wider partners to lead and motivate change at a pace and scale that improves sustainability, and in a way which maximises health and equity.’

An aim of SMaSH is to highlight the role the health sector has to play in sustainable energy and resource use, reductions in environmental vulnerability, and realising the potential for health co-benefits. (For membership of the SMaSH steering group see Appendix 1.) Current activity is centred on developing specific tasks for the network to progress the sustainable health agenda. As a starting point to inform this activity, the network requested a baseline of the GHG emissions and energy use in Scotland's health sector. This paper documents the availability of current published data that can inform this baseline.

Aim

The aim of this project was to review, and critically appraise, currently available, published information/data on GHG emissions and energy use in Scotland's health sector to provide a baseline that can help inform future work and current processes.

This briefing summarises the review and provides information for the Scottish health sector on:

- what data are currently available on GHG emissions and energy use
- what the data cover
- the strengths and limitations of the current data
- any gaps in the current data.

It is envisaged that this would be of interest to help:

1. highlight the proportion of GHG emissions from different parts of the health sector
2. contribute to informing the creation of a more sustainable health service in Scotland
3. support the SMaSH network to identify priorities and work with key partners and others seeking to address the same challenges.

Methods

A search for appropriate sources of information/data for Scotland from 1990 was undertaken. This search included coverage of publications presenting UK data from which the Scottish data can be inferred. A snowballing technique was used to identify sources and involved contacting key informants within Scotland and scanning key websites:

- Health Facilities Scotland (HFS)
- Scotland's Environment on the Web (SEWeb)
- Scottish Government
- Scottish Neighbourhood Statistics
- Sustainable Development Unit NHS England
- Department for Environment, Food and Rural Affairs (Defra)
- Department of Energy and Climate Change (DECC)
- Organisations with a public health observatory function
- ONS environmental accounts.

Documents of potential use were identified and the robustness of the data critically appraised, including assessment of:

- i. the frequency of the data report
- ii. the extent of coverage of the health sector by the data
- iii. whether, and if so what, GHGs emissions (classified into three broad Scopes, 1, 2 and 3)^c and energy use were covered
- iv. what analyses were performed and how this was undertaken, including whether this included actual measurements or estimates
- v. the strengths, limitations and assumptions of the data and methodology.

^c see Results section for an explanation of what these are

Results

Despite identifying many reports relevant to the remit, the majority covered GHG and energy emissions for Scotland or the UK generally and were not specific for the health sector or they discussed what should be assessed ideally. A limited number of relevant documents which covered the data currently collected annually for the health sector in Scotland were identified. These were:

1. 2010–11 Annual National Environmental Report for NHSScotland, produced by HFS, the latest report published in February 2012.⁹

This presents NHSScotland's annual environmental performance with current values and trends over periods of up to 25 years. The data from each Board, for hospitals only, cover energy and water consumption and cost, trade effluent and wastewater production and cost, clinical and non-clinical waste arising and costs. This report starts Phase 2 of HEAT Target E8 reporting in relation to energy consumption and CO₂ emissions.

2. Carbon footprint of NHSScotland (1990–2004), produced in a piece of commissioned research for HFS.¹⁰

This report aimed to provide an understanding of the total consumption-based carbon footprint of NHSScotland 1990–2004, using the best available data at the time and a peer-reviewed methodology. It recognised that NHSScotland's full carbon impact covers a wider sphere of influence than energy emissions from buildings and also includes emissions from travel and supply chain emissions contained within purchased goods and services. The report provided a measure of the carbon footprint of NHSScotland from a consumption perspective, which sought to include all carbon emissions associated with the consumption of particular goods or services in the UK, wherever they occur geographically. Emissions produced throughout the industrial supply chain to provide goods and services purchased by the government in order to deliver healthcare and support services throughout NHSScotland, whether produced in the UK or abroad, were taken into account. It therefore covered Scope 1, 2, and 3 carbon emissions (see below for explanation of emission Scopes). Carbon emissions were calculated using modelled, estimated and actual data.^d

A further document which paves the way for future improved public body sustainability reporting was identified together with an associated briefing note reviewing the current data that NHSScotland Boards could report on to meet this guidance:

3. Public Sector Sustainability Reporting – Guidance on the Preparation of Annual Sustainability Reports. Financial year 2011–12, produced by the Scottish Government in January 2012.¹¹

Guidance to assist Scottish public bodies (excluding public corporations or local authorities) when reporting on sustainability, commencing 2011–12 financial year,

^d This report is now considered out-of-date and HFS has concerns about the methodology used to determine Scope 3 emissions, especially for the monitoring of trends (see Table 1 for the methodological limitation, many noted by the report itself). However, it remains the only document in the public domain thus far that has attempted to quantify a total carbon footprint for NHSScotland and remains a useful overview.

alongside their annual reports and accounts. Whilst non-mandatory, this guidance aims to encourage and support a consistent and comparable approach to the publication of sustainability information. It suggests minimum reporting requirements which are expected to be met, but organisations are encouraged to report beyond these covering the economic, social and environmental factors that are most material to the organisation and how these relate to policy, procurement and operations. Guidance is provided on additional voluntary reporting beyond the suggested minimum.

4. Briefing Note to the SMaSH Steering Group: 25th June 2012 Sustainability Reporting within NHSScotland,¹² produced by HFS.

This briefing by HFS reviews data that NHSScotland Boards could report on for the NHSScotland Annual National Environment Report to meet the minimum requirements of the Scottish Government issued Public Sector Sustainability Reporting Guidance of January 2012. The review covers current data availability, sources of data and quality of data.

A summary of the review and critical appraisal of these documents is provided in Table 1.^e

The terminology used for GHG emissions varies between the documents. The Greenhouse Gas protocol offers clarity. It defines direct and indirect emissions as:

- Direct GHG emissions – emissions from sources owned or controlled by the reporting entity^f
- Indirect GHG emissions – emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

^e A literature review for journal articles was not included in the search strategy, journal articles were not seen to offer routine data sources to rely on for monitoring purposes but they do offer lessons for the future. The journal article: Duane B, Hyland J, Rowan JS, Archibald B. Taking a bite out of Scotland's dental carbon emissions in the transition to a low carbon future. *Public Health* 2012;126(9): 770–7 was, however, noted by a key source and represents a good example of carbon emission analysis for area of clinical practice, a national dental service in NHS Fife. It highlights data gaps particular to the Community and Salaried Dental Service (and dental sector more widely) and critiques uncertainties in the carbon accounting process.

A quick subsequent PubMed and OVID Medline search identified the following paper: Wootton R, Tait A, Croft A Environmental aspects of health care in the Grampian NHS region and the place of telehealth. *J Telemed Telecare* 2010;16(4): 215–20. This notes limited data on CO₂ emissions for the NHS in the Grampian region and NHSScotland as a whole and estimates travel emissions for Grampian. It proposes that telehealth might be useful in reducing staff travel, would have some impact on visitor travel but appears promising for reducing outpatient travel. The authors advocate for better data on travel obtained via survey.

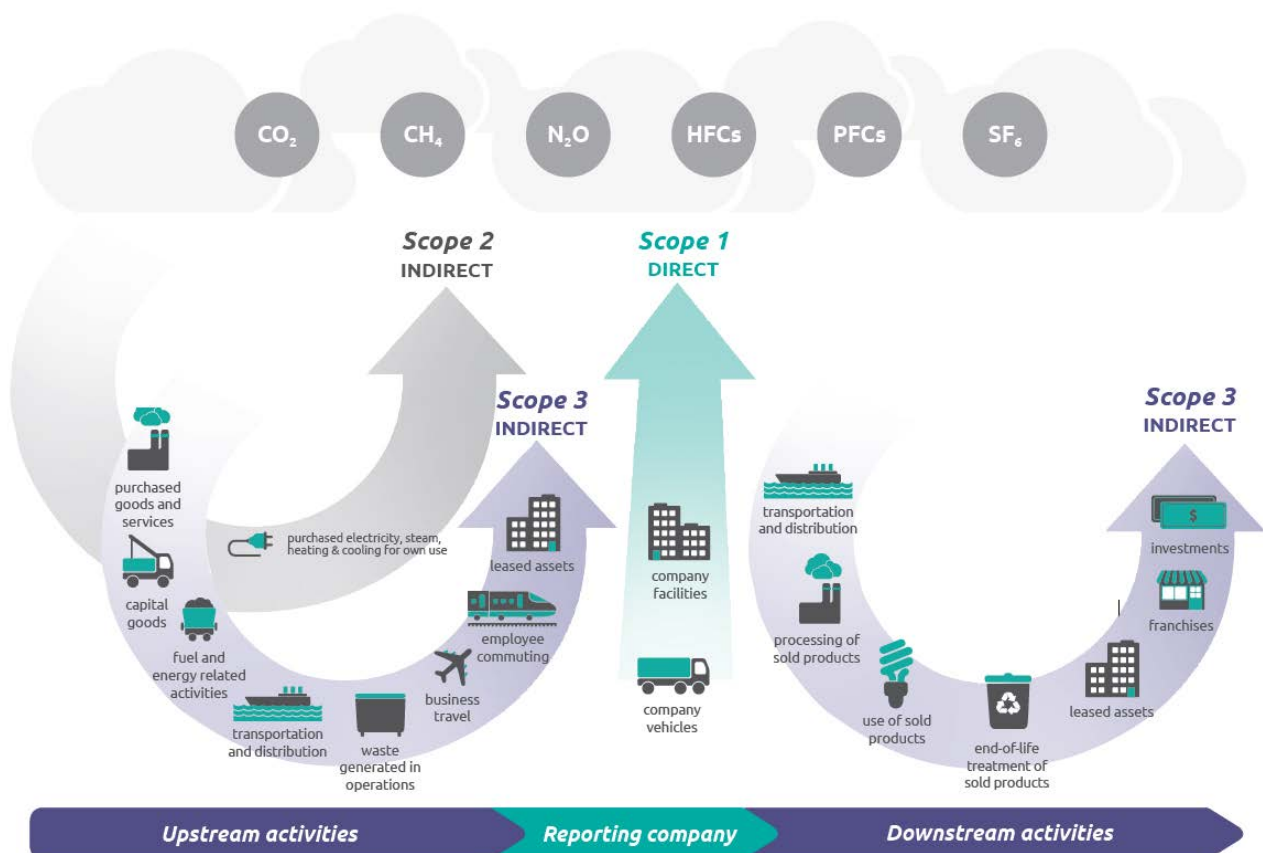
^f For example, fuel combustion in boilers; vehicles, plant and machinery such as fleet vehicles (including those on finance leases)

It further categorises these into three broad Scopes, see Figure 1:

- Scope 1: all direct GHG emissions
- Scope 2: indirect GHG emissions from consumption of purchased electricity, heat, steam and cooling for own use (energy indirect)
- Scope 3: other indirect emissions, such as the extraction and production of purchased materials, consumables and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity,⁹ electricity-related activities (e.g. transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Scope 3 sources specific to the health sector include:
 - pharmaceuticals
 - medical instruments/equipment
 - patient and visitor travel
 - clinical waste.

To assist in understanding and presentation of the review findings in Table 1, the terminology of Scope 1, 2 and 3 has been used to align with that used in the new Scottish Government reporting guidance.¹¹

Figure 1: Overview of the GHG Protocol Scope and emissions across the value chain
 (Source: www.ghgprotocol.org/files/ghgp/public/scopes_diagram.pdf)



⁹ Includes official business travel relating to that directly paid for by an organisation. Does not include business travel recharged by contractors

Table 1: Overview of current data from identified documents

	2010–11 Annual National Environmental Report for NHSScotland	Carbon footprint of NHSScotland (1990–2004)	Public sector sustainability reporting (and HFS briefing for SMaSH)	
Frequency	Annual full public report, although data collected monthly from Boards and reported quarterly to the Scottish Government (summaries)	One-off analysis using data, models and estimates	Non-mandatory annual reporting from 2011–12 onwards	
Health sector covered	Hospitals only (~85% of the healthcare estate)	Hospital-only energy data (~85% of the healthcare estate)	Whole NHSScotland Board estates	
Coverage	Scope 1	✓ partial, covers fuel emissions	✓ partial, covers building emissions and travel	
	Scope 2	✓	✓ partial, covers electricity	
	Scope 3	X ^μ	✓ partial, covers procurement ^ρ and travel	✓ partial, covers official business travel and commentary on progress in achieving more sustainable procurement methods ^μ
	Energy use	✓	X	✓
Analysis	<ul style="list-style-type: none"> ▪ CO₂ emissions in tonnes CO₂ from energy data converted using CO₂ emission factors, with trends 1989–90 to 2010–11 ▪ Energy use in gigajoules (GJ) as: <ul style="list-style-type: none"> - absolute energy consumption - climatically adjusted energy consumption^β with trends - national energy efficiency performance indicator in GJ/100m^{3ξ} 	<ul style="list-style-type: none"> ▪ CO₂ emission in tonnes from energy data converted using carbon intensities and emission factors, with trends 1990–2004 ▪ follows NHS England 2008 consumption-based footprint using estimates from Scottish Government Input–Output (I–O) tables[¶] and actual collected data where available: <ol style="list-style-type: none"> i. Scope 1 and 2 emissions <ul style="list-style-type: none"> - building energy[§] based on Boards annual hospital energy consumption data, available 1989–2007 - travel estimates based on I–O tables ii. Scope 3 emissions <ul style="list-style-type: none"> - travel estimated using Scottish National Travel Survey with known/estimated numbers of staff, patients and visitors - procurement and business travel estimates based on I–O tables 	<ul style="list-style-type: none"> ▪ CO₂ emission in tonnes of CO₂ equivalent (CO₂e), from baseline information converted using conversion and emission factors ▪ renewable energy and energy produced on-site to be separate beside non-renewable energy with a total amount of energy use in kWh ▪ shared buildings – estimates of energy consumption where data are unavailable ▪ details of performance normalised by performance metrics. As a minimum, this should be the organisation’s total financial outturn as the minimum (e.g. carbon emissions per £ expenditure). Performance metrics still to be agreed for NHSScotland 	

<p>Strengths, limitations and assumptions of the data and methodology</p>	<ul style="list-style-type: none"> ▪ actual data ▪ limited to hospital sites so only covers ~85% of NHSScotland’s built estate ▪ Scope 1 and 2 CO₂ emissions <ul style="list-style-type: none"> i. reported as actual amounts but the degree day^β (average) for each year is provided to show correlation ii. although electricity is purchased via a Scottish Public Sector National Contract (which includes an amount of renewable energy generation), this is not included within CO₂ conversions – only renewable energy generated on site is subject to lower conversion factors iii. burning of wood chips and pellets is deemed carbon neutral but some CO₂ is emitted in their production. This is recorded for biomass fuels iv. unknown if the woodchips were produced sustainably v. same CO₂ emission per unit of energy used for all energy sources since 1989–90, but the amount emitted per source has changed ▪ Energy use <ul style="list-style-type: none"> i. climatic adjustment, to account for the weather factor (degree days), as well as absolute values provided ii. efficiency performance indicator accounts for changes in the size of NHSScotland’s estate 	<ul style="list-style-type: none"> ▪ modelled, estimated and actual data ▪ Scope 1 and 2 Building energy emissions <ul style="list-style-type: none"> i. data considered acceptable ii. estimated from hospital data, which is only ~85% of the built estate iii. absolute data used with no climatic adjustment or any account taken of the size of NHSScotland’s estate ▪ Scope 3 Travel <ul style="list-style-type: none"> i. no reliable travel datasets from, for example, travel surveys conducted by Boards, but estimation of patient, staff and visitor data from national survey data is considered acceptable ii. data estimated for years between surveys ▪ Scope 2 and 3 I–O tables <ul style="list-style-type: none"> i. 3–4 years delay in I–O data ii. no I–O table sector for NHSScotland, estimates are based on expenditure on healthcare, which covers human health and veterinary activities iii. I–O analysis provides aggregated results and UK-average estimate for sectors iv. emissions for 1990–1997 are estimated from UK I–O tables v. 1998–2004 Scottish I–O procurement breakdown is proportioned by UK expenditure which has implications if Scottish and English carbon reduction policies and measures change differently vi. carbon intensities assume an average CO₂ emission per unit of sectoral output and are UK-based ▪ Methodology <ul style="list-style-type: none"> i. Peer-reviewed scientific method, however, the reliability of this has now been questioned by HFS and others ii. financial year data aligned to calendar year 	<ul style="list-style-type: none"> ▪ to be actual and estimated data ▪ Scope 1 and 2 emissions to show absolute use but are not to be weather corrected or to take account of changes in the size of NHSScotland’s estate ▪ sequestration of CO₂ on NHSScotland estates is unaccounted for, but is miniscule ▪ Variation in reporting will occur as: <ul style="list-style-type: none"> i. organisations normalise performance results using methods they choose ii. organisations decide the methodology for estimates iii. could be variation in how data are allocated for a shared service/facility iv. where there is no appropriate conversion or translation factor from the Defra/DECC, other emission factors are to be chosen <p><u>HFS review of current data availability:</u></p> <ul style="list-style-type: none"> ▪ Scope 1 and 2 emissions <ul style="list-style-type: none"> i. data provision is good ii. emissions are not calculated using Defra/DECC factors, conflicting with the Guidelines iii. focuses on hospital sites and omits many Special Health Boards and some non-clinical premises ▪ Scope 3 data for official business travel are problematic, little is available and current reporting systems do not provide ▪ Sustainable procurement data are problematic, little is available, there is no requirement for reporting and it is currently challenging to obtain
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- ^μ water and waste consumption are covered but this is not converted into GHG Scope emissions
- ^ρ production and transportation of goods and services purchased by NHSScotland
- ^β energy consumption adjusted to take into account base load (component of hospital energy consumption which is not subject to climatic variation) and degree days (measure of the severity and duration of cold weather. One degree day = period 24 hours in which the average outside temperature was below a set baseline temperature by 1 °C. For NHSScotland reporting, a base temperature of 18.5 °C is used)
- ^ξ takes into account the heated volume i.e. size of NHSScotland's estate and was climatically adjusted
- [≠] these detail expenditure flows between different sectors of the economy and expenditure by final demand, including government spend and are categorised into sectors with a carbon intensity allowing a high-level estimate of procurement based emissions. However, this method is not appropriate for ongoing analysis and comparisons.
- [§] on-site fossil fuels and electricity

Discussion

This review identified two reports documenting routine annual data on GHG emission and energy use in Scotland's health sector:

1. 2011–2012 Annual National Environmental Report for NHSScotland,⁹ produced by HFS
2. Public sector sustainability reporting – Guidance on the preparation of annual sustainability reports. Financial year 2011–12,¹¹ produced by the Scottish Government in January 2012, with an associated briefing note by HFS to the SMaSH Steering Group¹² reviewing the current data of NHSScotland Boards available for these annual sustainability reports.^h

A third, one-off report documented how this GHG emission data with other nationally available data, input-output tables and the Scottish National Travel Survey, could be used to create a total consumption-based carbon footprint of NHSScotland: Carbon footprint of NHSScotland (1990–2004).¹⁰

A strength of the data is the coverage of Scope 1 and Scope 2 emissions and energy usage. These are the easier variables to measure but even while being good the data mainly focus on hospital sites (85% of NHSScotland) and thus omit many Special Health Boards and some non-clinical premises. Consequently figures for the whole NHSScotland estate need to be estimated. Shared facilities can also pose a problem for these data as independent measurement can be problematic. As a result, data can either be missing or apportioned, which can lead to variation in how organisations do this. Sequestration (removal of CO₂ by sinks) on NHSScotland estates remains unaccounted for, although this is likely to be minimal.

The major limitation of the available data is the poor coverage of Scope 3 emissions. These are thought to make up the bulk of GHG emissions for NHSScotland. The difficulty in obtaining Scope 3 data results in their almost complete exclusion from conventional accounting frameworks. Obtaining comprehensive, robust data from external contractors and partners is a major challenge. It is from these players that data on sustainable procurement is largely obtained. Before this is possible, however, a robust methodology needs to be identified by which this can be done in a cost-effective and uniform way across these providers.

It should be noted though that current data collection is governed by meeting HEAT target requirements. At present these do not require reporting on Scope 3 emissions, nor on non-hospital sites. HFS is working with the Scottish Government to revise the HEAT target, see current data developments.

Further limitations surround the methodologies used, which involve conversion factors to obtain emission figures and assumptions, for example, especially as some data are estimated. Limitations are inherent in:

- i. conversion factors – their average nature, their need of updating to account for changing and differing amounts of CO₂ emission per unit of energy from different energy sources and their absence in some cases

^h NHSScotland Boards and Scottish Government have yet to agree the final method of complying with the public sector sustainability reporting requirements.

- ii. extrapolations and interpolation of data
- iii. estimates for missing data
- iv. absolute data – whilst showing actual amounts these do not account for climatic differences between years or geographical areas or changing size of NHSScotland's built estate
- v. I–O methodology:
 - a. there is no specific I–O sector for NHSScotland, estimates are based on expenditure on healthcare, which covers human health and veterinary activities
 - b. averages are used for sectors
 - c. present relatively highly aggregated results and UK average estimate for industrial sectors
 - d. carbon intensities assume an average amount of CO₂ emission per unit of sectoral output and are based on UK data
 - e. Scotland's I–O procurement breakdown is proportioned by UK expenditure, an issue when policies differ between countries as the methodologies cannot take this into account sufficiently
 - f. some of Scotland's I–O emissions are estimated from UK I–O tables
 - g. procurement data are not as accurate as obtaining carbon footprints for items directly from manufacturers
 - h. not considered suitable at Board level
- vi. guidance allowing organisations to choose their methodologies for estimates and emission factors in some cases will lead to variations between organisations' reports
- vii. use of data collected directly for the health sector considered more reliable than the use of estimates from national data, but this data are frequently missing.

Finally, even when data are available, care is required in the interpretation of trends. For example, analyses in the report creating a carbon footprint for NHSScotland¹⁰ showed that changes in Scope 1 and 2 energy emissions may have been favourable over recent years. This decline could be attributed to a reduction in heating demandⁱ coupled to the use of less carbon-intensive sources of heating energy.^j However, the absence of Scope 3 emissions, given that they are the largest contributor and include factors which are likely to have been increasing (e.g. prescribing of pharmaceuticals), makes it difficult to know the overall trends for the health sector in Scotland.

The clear message from this review is that action is required to improve data quality and completeness, especially for Scope 3 emissions. To this end, work is already underway to bring about several improvements to current reporting, which should assist in filling this data need to some extent and contribute to improved data in future years. The next section outlines these changes already taking place.

ⁱ through greater energy efficiency and a reduction in the NHSScotland estate

^j coal and oil phasing out in preference for gas, which has a lower carbon intensity and a decrease in electricity carbon intensity

Current data developments

The remit of this project was to review current data availability. However, the advent of the Scottish Government's new Public Sector Sustainability Reporting Guidance and developments in progress by HFS working closely with the Scottish Government around this required reporting alongside the support provided for the health sector by HFS, mean that future data availability will be improved. This will remove many of the limitations identified with existing data in Table 1.^k

These data developments include those which will be incorporated into the 2011–12 data for the Annual National Environmental Report for NHSScotland currently being compiled by HFS. This report will:

- be renamed the Annual National Sustainability Report for NHSScotland
- meet the current public sector sustainability reporting requirements
- be healthcare estate-wide, not just hospital sites
- will provide emissions calculated using current Defra/DECC factors.

Other possible changes that HFS noted could be made to reporting systems, which would improve other aspects of current data, include:

- a change in contractual arrangements with the company providing travel agency services to the Boards to ensure that mileage and/or GHG emissions data are recorded. This would involve discussions with National Procurement
- changes to information captured routinely on the e-Expenses system for the Boards, greater interrogation of data and protocols for data analysis should enable increased accuracy in the calculation of GHG emissions for private car use as part of the working day.

As noted in the introduction, current data collection is governed by HEAT target reporting. This remains the main measure against which the environmental performance of NHSScotland Boards is assessed. The HEAT target reporting methodology is currently under review by HFS and the Scottish Government, mainly in response to the new Public Sector Sustainability Reporting requirements. HFS and the Scottish Government are working on a proposed revision to the HEAT targets relating to energy consumption and GHG emissions so that they align better with Public Sector Sustainability Reporting requirements. However, a revision will not be possible until the end of the current HEAT target cycle (2014/15).

^k NHSScotland Boards and Scottish Government have yet to agree the final method of complying with the public sector sustainability reporting requirements. Once pan-NHSScotland methods are agreed and taken forward this will remove methodological variability between NHSScotland Boards.

Future steps

This briefing has been produced to inform SMaSH. It is envisaged that it will stimulate thinking and comment from the network with a view to deciding the next steps. Possibilities could include:

1. modelling to estimate Scope 3 emissions and identify hotspots, which would require the identification of agreed consistent methodology
2. calculation/estimation of the carbon footprint of different clinical option service models and care pathways.

References

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Appendix 1: SMaSH steering group membership

Chair – Jackie Hyland	Consultant in Public Health Medicine, NHS Fife
Jessica Baker	Clinical Lecturer in Public Health, University of Glasgow
Sheila Beck	Principle Public Health Advisor, Evidence for Action, NHS Health Scotland
Peter Cawston	General Practitioner, NHS Greater Glasgow and Clyde
Ann Conacher	Scottish Public Health Network Coordinator
Lynn Cree	Environmental Health Adviser, Health Protection Scotland
Ron Culley	Team Leader – Health and Social Care, Convention of Scottish Local Authorities
Doug Flint	Sustainable Development Manager, Health Facilities Scotland
Gillian McCartney	Senior Scottish Public Health Network Administrator (Secretariat)
Gerry McCartney	Public Health Consultant, Public Health Observatory Division, NHS Health Scotland
Phil Mackie	Scottish Public Health Network Lead Consultant
George Morris	Environment and Human Health Policy Adviser
George Tarvit	Sustainable Scotland Network
Lorraine Tulloch	Policy and Strategy Manager Good Places Better Health, Scottish Government
Jan Webb	Professor of Sociology, University of Edinburgh
Gary Wilson	Employee Director, NHS Health Scotland

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