

Annual NHS Scotland Climate Emergency & Sustainability Report 2024

August 2024

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Introduction

NHS Scotland aims to reduce its greenhouse gas emissions to net zero by 2040 and achieve net-zero emissions from its supply chain by 2045.

“The most pressing reasons for urgent climate action are the impacts not in the future, but right now, on health. The climate crisis is a health crisis”¹

Most people nowadays are aware of the need to create more environmentally friendly systems and processes. Key issues such as greenhouse gas emissions, plastic waste, threats to our wildlife and the threats to human health from pollution, are often leading news stories.

More often overlooked are the tremendous efforts being made, across all areas of society, to find ways of working, living and flourishing within the constraints of an environment that is susceptible to human impact.

Health care and services in Scotland and across the globe have a substantial environmental impact, either directly from carbon emissions released from burning fossil fuels for heat and power, or indirectly, through their use of goods and materials. This report highlights achievements by NHS Scotland towards providing environmentally sustainable care and becoming a net-zero health service by 2040. It shows the main areas of work being taken forward by NHS Scotland to reduce the negative environmental impacts of healthcare delivery, and to make positive changes to our local environments, benefitting the health and wellbeing of local communities as well as improving biodiversity.

It is encouraging to see that in the areas of building energy, which is the largest single source of greenhouse gas emissions for NHS Scotland, and transport and medical gases, significant progress is being made by our Health Boards. For building energy, much more now needs to be done, but the achievements so far should make us hopeful in realising that further progress can be made.

The second biggest direct source of greenhouse gas emissions in the NHS is the propellant used in inhalers. As detailed in the report, measures are now being promoted to support better patient healthcare while reducing environmental impact; a good example of work which emphasises patient empowerment and self-care, lean clinical pathways and low-carbon alternatives.

This year’s report shows how NHS Scotland is working to reduce its environmental impact and adapting its infrastructure and services to the address risks presented by climate change. It also shows that many changes the NHS seeks to deliver have other potential benefits in the short and medium term. These include improving health outcomes, clinical services and financial performance. The report includes data for the financial year 2022-2023 (April 2022 to March 2023) and provides an

¹ Quote from Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organisation - [WHO issues urgent call for global climate action to create resilient and sustainable health systems](#)

update on activity which has been carried out since the publication of the last report (published in July 2023).

The year 2022-2023 was the first in which objectives relating to climate change and the environment were put into Scottish Health Boards' Annual Delivery Plans and Medium Term Plans, ensuring that environmental sustainability and adaptation become core business for our Health Boards.

Emissions Overview

NHS Scotland consists of 22 Health Boards, responsible for around 1000 buildings, some of which are incredibly challenging to transition to low-carbon energy systems, given their operational requirements. Its emissions sources include building energy, medical treatment, and its use of goods and materials.

During the year 2022-2023:

- emissions from energy to heat and power buildings fell again (from 427,000 tCO₂e in 2021-2022 to 407,000 tCO₂e);
- the NHS's electric fleet continued to expand with electric vehicles now making up 33% of NHS cars; and
- NHS Scotland won the European Sustainable Healthcare Project of the Year award for its work on reducing emissions from medical gases, a project which was started by the grassroots group Green Anaesthesia Scotland and supported by the NHS National Green Theatres Programme.

The highest direct sources of greenhouse gas emissions for NHS Scotland come from energy for heat and light in NHS buildings. Our goals remain to:

- reduce greenhouse gas emissions from our buildings by at least 75% by 2030 compared to a 1990 baseline; and
- to use renewable heating systems by 2038 for all NHS-owned buildings; and
- for all our estate to have net-zero emissions by 2040 or earlier.

NHS Scotland deserves credit for collectively meeting all of its annual energy targets relating to heating and powering buildings, but that is expected to become more difficult going forward. This is because much of the reduction in emissions up until now has been due to the decarbonisation of the grid and a reduction in electricity consumption, which are not expected to proceed at the same rate going forward. Boards, therefore, must find innovative solutions to reduce their energy emissions.

The second biggest source of NHS emissions included in the 2040 net-zero target is from propellant inhalers, that is, “pressurised Metered Dose Inhalers” (pMDIs), used for asthma and other respiratory conditions. There are alternatives to propellant inhalers such as “Dry Powder” inhalers (DPIs) and “Soft Mist” inhalers (SMIs). Where appropriate, and informed by patient needs, using these can lead to improved treatment.

The use of goods and materials, including medicines, is estimated to account for approximately 60% of emissions generated by NHS Scotland. We want to maximise our contribution to reducing supply chain emissions across health services to net zero by 2045 through effective, environmentally informed procurement and minimisation of waste.

The table below shows the progress Health Boards have made toward net zero across a number of areas. We are working to better quantify emissions and table footnotes give details of the effect of some of this work. Apparent increases in

emissions for some categories such as non-medical F-gases, fleet and business travel, may be due to more accurate reporting rather than actual increases.

Table 1: NHS Scotland 2040 Net-Zero Target Emissions 2019-2020 to 2022-2023

Where not all Health Boards have reported, the number of Health Boards reporting is given in brackets after the emissions figure.

Emission source	2019/20 (tCO2e)	2021/22 (tCO2e)	2022/23 (tCO2e)	% change 2021/22 - 2022/23	% change 2019/20 - 2022/23	Data Source
Building Energy Use(i)	450,429	426,543 (ii)	406,941	- 5%	- 10%	NHS NSS – National Energy Management System
Non-medical F-gas use	140(6)	5747(8)	1698(8)	-70%	1113% (iii)	Health Board Reports
Medical gases	32,047	26,832	26,682	- 0.6%	-17%	Scottish Government
Metered dose inhaler propellant	85,155 (iv)	81,285	84,340	+4%	-1%	Public Health Scotland
NHS fleet use and business travel (v)	32,307	39,748	42,554	7%	30%	Health Board Reports
Waste	3,009	6840 (16)	7833 (16)	16%	154%	Health Board Reports
Water	3,397 (16)	1489 (15)	1259 (15)	-16%	-64%	Health Board Reports
Total Recorded Emissions	606,484	588,051	570,977	-2.9%	-5.9%	
Carbon sequestration	0	542(2)	542(2)	0%	NA	Board Reports
Net-Emissions	606,484	587,509	570,455	-2.9%	-5.9%	

(i)These figures do not include Diesel Engine Road Vehicle Fuel (DERV). The figure for DERV was included in the 2021/22 report but should not have been, because DERV is mainly used for vehicles, not building energy. Please note also, the figures for building energy in the above table differ from those in Part 2, Table 1a, which was derived from the individual NHS Board climate change and sustainability reports submitted at the start of 2024. Building energy usage reported in the above table includes well-to-tank emissions.

(ii)The figure given in the 2021/22 report was 422,687. However, that figure has been revised upwards following an internal review.

(iii) This large percentage may be due to better reporting.

(iv) These vary from the figures given in the 2021/22 report due to a recalculation, which is based on the exclusion of Soft Mist Inhalers from the original pMDI calculations.

(v) Not all Boards report transport data, so the real figures will be higher than those reported in this table. The increase in reporting over time, particularly business travel, partly accounts for the 30% increase between 2019/20 and 2022/23.

PART 1 – PROGRESS ACHIEVED

Leadership and Governance

NHS Scotland is part of a concerted drive to decarbonise health systems across the globe, including working with UK partners. The World Health Organisation's Alliance for Transformative Action on Climate and Health (ATACH) has over 80 countries and areas, including the UK, that have made commitments at Ministerial level to strengthen climate resilience and/or reduce the emissions of their health systems.

NHS Scotland Climate Emergency and Sustainability Board

The NHS Climate Emergency & Sustainability Board (CE&S Board) brings together leaders from across the Scottish Government, NHS Scotland and the wider public sector to ensure that NHS Scotland becomes a net zero, environmentally sustainable organisation. It takes an oversight role in supporting NHS Scotland to becoming a more climate change resilient organisation.

Energy Transition Board

The NHS Scotland Energy Transition Board (ETB) was established in 2023 to assist NHS Scotland to decarbonise its energy use and reports to the CE&S Board.

Scottish Water and NHS Scotland Committee on Climate Change and Environment

The committee was established in 2023 to identify and take forward opportunities for Scottish Water and NHS Scotland to co-operate in achieving their legal duties to contribute to the achievement of Scotland's greenhouse gas emission reduction targets, Scotland's climate adaptation programme and to further the conservation of biodiversity.

Leading By Example: Medical Gases and International Recognition

NHS Scotland is a member of Health Care Without Harm Europe (HCWH), an organisation which exists to create a sustainable healthcare sector - one that does no harm to patients or our planet. In 2023, NHS Scotland won Health Care Without Harm's European Sustainable Healthcare Project of the Year award for its work in reducing the climate impact of anaesthetic gasses. Following Scotland's example, HCWH has been encouraging other countries across Europe to make similar changes to reduce climate emissions from anaesthesia.

Annual Delivery Plans and Medium Term Plans

Annual Delivery Plans (ADPs) are the mechanism by which Health Boards set out their priorities for delivery in the coming year. Medium Term Plans (MTPs) focus on a three-year period. 2022-2023 was the first year in which time-related, climate change and environmental objectives were put into these plans.

Climate Change Adaptation

Scotland's climate is changing faster than expected according to research published by the James Hutton Institute in December 2023². According to this research:

- “Between 1990 to 2019, February and to a lesser extent April have become wetter, particularly in the west, by up to 60%, exceeding the projected change by 2050 of 45-55%.”
- “Scotland is on track to exceed “a 2°C increase in temperature by the 2050s, with the months from May to November experiencing up to 4°C of warming over the next three decades (2020-2049).”
- “The number of days of consecutive dry weather – an indicator for drought and wildfire risk – are also expected to increase in drier months, such as September.”

Climate change exacerbates existing health risks and introduces new challenges, ranging from the spread of infectious diseases to the intensification of heatwaves and extreme weather events that will impact the health of the population, healthcare assets and services. NHS Scotland plays a pivotal role in safeguarding the life and health of communities by developing climate-resilient health systems capable of responding to these evolving threats.

NHS Boards have carried out Climate Change Risks Assessments (CCRAs) to identify the risks that could impact their healthcare assets and services and developed high-level Adaptation Plans with measures to address the risks identified.

Of NHS Scotland's 22 NHS Boards:

- Twenty NHS Boards have completed Climate Change Risks Assessments; and
- Fifteen NHS boards have developed high-level adaptation plans.

A first analysis of Climate Change Risks Assessments by NHS Assure shows prevalent climate hazards, including higher average temperature, extended periods of hot weather, cold spells, combined climatic effects, flooding, heavy downpours and driving rain. These hazards pose significant threats to critical healthcare infrastructure such as hospitals, GP surgeries, community health centres and other core services.

As climate change intensifies, addressing these risks becomes imperative to enhance the resilience of Scotland's healthcare system and ensure its ability to provide uninterrupted and effective services to the communities it serves. Recognising this urgency, NHS boards have identified adaptation measures such as enhancing critical site access, reassessing monitoring systems, formulating contingency plans and implementing renewable energy and nature-based solutions.

² [Scotland's climate changing faster than predicted | The James Hutton Institute](#)

Example: Resilience and Adaptation – NHS Ayrshire & Arran

NHS Ayrshire & Arran is part of a multi-agency group, the Ayrshire Local Resilience Partnership (ALRP). This is made up of organisations such as Scottish Fire and Rescue Service, Police Scotland, Scottish Ambulance Service, the Scottish Environmental Protection Agency, the Met Office, Scottish Water and transport operators such as CalMac and Prestwick Airport.

The ALRP has a severe weather plan and this outlines the actions to be taken depending on the level of warning received. The ALRP will also co-ordinate volunteer groups if required during severe weather, for example the 4x4 vehicle volunteer group. West of Scotland Regional Resilience Partnership (WoSRRP) would delegate priority of these services to those with the greatest need.

Environmental Management Systems

An Environmental Management System (EMS) is an efficient way to reduce the environmental impacts of NHS Boards, comply with legislative requirements and find operational efficiencies. It comprises policies and procedures for:

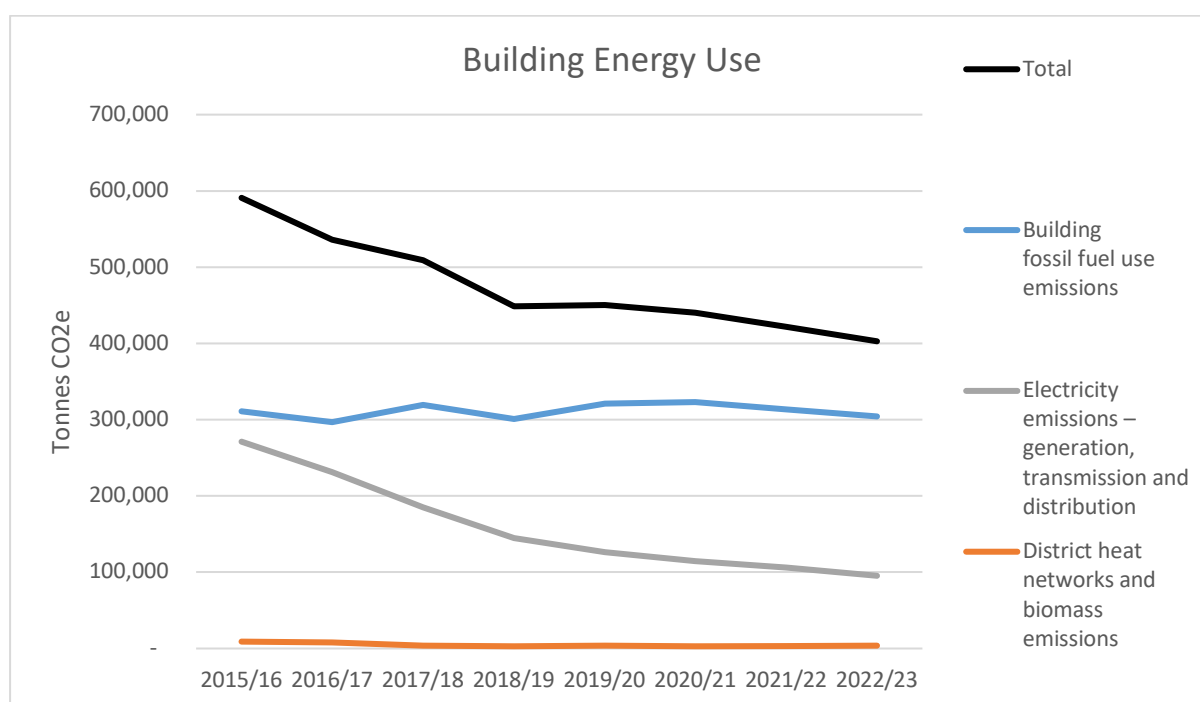
- the management of resource use;
- energy and water consumption;
- waste generation;
- carbon emissions; and
- effectively supporting local biodiversity.

To support the development of EMS in Boards, a toolkit for EMS implementation is being developed at a national level, on a 'Once for Scotland' basis. Training sessions, on using the national EMS tool, and an EMS implementation workshop by the Institute of Environmental Management and Assessment (IEMA) were delivered in 2023 to help build knowledge and skills to use the tool and build confidence to implement EMS. Further training sessions and workshops for the staff involved in implementation are being planned.

Building Energy

Building energy emissions, from heating, lighting, and hospital activity, are the largest single source of direct climate change emissions for NHS Scotland. The NHS uses electricity to power its buildings, equipment and (increasingly) its vehicles. It also needs to heat and cool its buildings. Greenhouse gases are emitted through the burning of fossil fuels for heat at NHS sites and also in the generation of electricity supplied through the national grid.

Figure 1: Building fossil fuel use, district heat networks and biomass, and electricity have changed over the last eight years. These figures include emissions released from burning the fuels and by the processes of extracting and supplying the fuels to the NHS (“well to tank emissions”).



NHS Scotland’s total heat and power emissions have reduced by 31% between 2015-16 and 2022-23. Emissions have fallen much more quickly than energy use. This is largely due to the decarbonisation of the grid, for example, using gas instead of coal for electricity generation, and improvements to energy efficiency.

The NHS Scotland Energy Transition Board (the ETB) has been set up to:

- Coordinate national support, including funding, to Health Boards for building energy decarbonisation; and
- Coordinate and oversee, at a strategic level, a programme of major energy decarbonisation projects for the NHS.

The 20 NHS sites with the largest climate change emissions made up over 60% of total NHS building emissions in 2022/23. These sites are being treated as strategic priorities as they are critical to decarbonising the NHS.

Some of these sites present early opportunities for moving to renewable heating systems because they are modern, energy efficient buildings and there are promising potential renewable heat sources on site or nearby. Other sites will require long-term investment to modernise them before they move to renewable heating systems.

Table 2: Greenhouse Gas Emissions for Top 20 Emitting NHS Sites 2022/23

Health Board	Site	Emissions, tCO₂e
NHS Grampian	Foresterhill Health Campus, includes Royal Cornhill Hospital	35,600
NHS Greater Glasgow & Clyde	Queen Elizabeth University Hospital Campus	28,700
NHS Tayside	Ninewells Hospital	24,300
NHS Greater Glasgow & Clyde	Glasgow Royal Infirmary	18,000
NHS Lothian	Royal Infirmary of Edinburgh	14,600
NHS Lothian	Western General Hospital	13,600
NHS Highland	Raigmore Hospital	15,500
NHS Lothian	St Johns Hospital & Howden Health Centre	11,900
NHS Greater Glasgow and Clyde	Gartnavel Health Campus	11,000
NHS Fife	Victoria Hospital	10,200
NHS Forth Valley	Forth Valley Royal Hospital	8,800
National Waiting Times Centre	Golden Jubilee National Hospital	8,100
NHS Dumfries & Galloway	Dumfries & Galloway Royal Infirmary	7,100
NHS Greater Glasgow & Clyde	Royal Alexandra Hospital	7,000
NHS Lanarkshire	Wishaw District General Hospital	6,500
NHS Lothian	Royal Hospital For Children & Young People, Edinburgh	5,700
NHS Ayrshire & Arran	Crosshouse Hospital Campus including Ayrshire Maternity	6,100
NHS Borders	Borders General Hospital	5,300
NHS Greater Glasgow and Clyde	Monklands District General Hospital	5,100
NHS Tayside	Perth Royal Infirmary	4,900

Sustainable Transport

Transport is a significant contributor to emissions in Scotland, making up over 25% of total emissions. The table below shows that reported greenhouse gas emissions from combined NHS fleet and business travel have increased from 32,648 tCO₂e in 2019/20 to 42,450 tCO₂e in 2022/23, a 30% increase. Reporting of fleet and business travel emissions has improved since 2019/20 and the higher figures do not necessarily mean an increase in actual emissions.

Table 3: NHS Scotland Reported Fleet and Business Travel emissions 2019/20, 2021/22, 2022/23 (Source – Health Board Annual Climate Emergency and Sustainability Reports 2022/23)

Where not all Health Boards have reported, the number of Health Boards reporting is given in brackets after the emissions figure.

Source of emissions	2019/20 (tCO ₂ e)	2021/22 (tCO ₂ e)	2022/23 (tCO ₂ e)	% Change since 2019/20
Fleet	26,507	29,737	30,547	+15%
Business travel	6,142 (9)	9,821 (12)	11,904 (16)	+94%
Total	32,650	39,558*	42,451	+30%**

* This differs from the figure for 2021/22 given in the 2023 report due to further data gathered since then.

**The increase in emissions is partly due to more Boards reporting and improved reporting.

Decarbonising the Fleet

In line with the NHS Scotland Climate Emergency and Sustainability Strategy, NHS Boards are working to decarbonise their fleets, focussing first on cars and light commercial vehicles (up to 3.5 tonnes). The table below shows the composition of the fleet for the whole of Scotland as of 23 May 2024. All 18 Health Boards which have a fleet have submitted a return.

Table 4: Fleet Composition as of May 2024

	Total Number of All Types of Vehicle	Zero Tailpipe Emissions (i.e. full EVs, no hybrid)	% EVs April 2024
Cars	2228	1009	45%
LCV*	1933	414	22%
HVs**	649	8	1%

* Light Commercial Vehicles

**Heavy Vehicles

Recent figures show significant progress can be made in a relatively short period of time. Since 2019, NHSScotland has received upwards of £16 million of funding from Transport Scotland by way of the Switched on Fleets programme, allowing Health Boards across Scotland to invest and grow a supporting network of EV chargers and

vehicles. There are now over 900 charging points across the NHS Scotland estate, a marked increase from April 2022, when the number of charge points was 538. Initiatives like solar charging and battery storage are planned to help support our energy transition work.

At the time of writing, over a third of the 3000+ NHS Scotland fleet, excluding Scottish Ambulance Service, has transitioned to electric vehicles. Several Boards have fleets where the majority of vehicles are now electric:

- NHS Forth Valley
- NHS Lanarkshire
- NHS Lothian
- NHS Shetland
- NHS Tayside
- NHS Orkney

Whilst it remains to be seen what the dominant technology will be for decarbonising heavy commercial vehicles in a healthcare setting, trials of 16-tonne fully electric vehicles are currently underway within NHS Greater Glasgow & Clyde to test the suitability of a fully electric solution. We also continue to investigate the opportunities for “stepping-stone” technologies such as hydrotreated vegetable oil (HVO) and alternative technologies such as hydrogen fuel cells.

Realistic Medicine and Effective Prescribing

Realistic Medicine

Health and care systems across the world are thinking about how they can deliver Value-Based Health and Care (VBH&C), which focusses on achieving the best value clinical outcomes from the patient's perspective. By reducing waste and switching to more effective medication programmes, VBH&C can also help tackle the global environmental crisis.

Realistic Medicine is a practice that can improve the resilience of our health and care system by reducing waste and potential harm. It also redirects resource that is currently wasted to higher value and more sustainable care. The Chief Medical Officer published his annual report Realistic Medicine in June 2023. This series of reports sets the strategic direction for the practice of Realistic Medicine. The latest report sets out the climate emergency's impact on the NHS, and how a value-based healthcare approach can help to mitigate the worst effects.

Effective Prescribing

Effective prescribing can reduce medicine waste and achieve better outcomes for patients. NHS England estimates that the production of medicines and chemicals used by the NHS are responsible for 20% of total NHS emissions.

The Scottish Government and NHS Scotland has published updated Scottish Quality Prescribing Guides covering Respiratory, Polypharmacy, Diabetes, Antidepressants, Benzodiazepines & z drugs³.

Improved outcomes for patients can be achieved through a person-centred medication review, which can help optimise disease control. A recent EU-funded cross border project, led by the Scottish Government, evaluated the multidisciplinary collaborative approach to deliver pharmacist-led, person-centred medicines reviews, using the 7-steps methodology. 6,481 patients engaged in reviews in primary care, secondary care, outpatient clinics and care homes.

This demonstrated various positive impacts to patient outcomes, care and safety and benefits to the wider healthcare system. An average of 11 interventions were made per patient, with 82% classified as clinically significant and 4% potentially preventing major organ failure or similar. 94% of interventions made were accepted, with the average number of medications reduced from 12 to 11 and 92% of reviews resulted in more appropriate medication use. See: [iSIMPATY summary and evaluation report](#)

An example of where better prescribing can significantly reduce greenhouse gas emissions is in respiratory care. Pressurised Metered Dose Inhalers (pMDIs) contributed around 84,000 tCO₂e of emissions in 2022/23, largely driven by the use of short-acting reliever inhalers. Person centred reviews and better prescribing focussing on prevention can help prevent over-use of inhalers. Clinicians can help

³ A type of hypnotic drugs similar to the benzodiazepine medicines.

reduce the environmental impact of inhalers (and improve asthma management) by helping patients to optimise inhaler technique, ensuring adherence with preventer medicines, and reducing reliance on short acting beta agonists.

Unfortunately, as shown in the Part 2 Table 3, emissions from propellant inhalers increased by 3,266 tCO₂e between 2021-22 and 2022-23, an annual increase of 4%. The Quality Prescribing Guide for Respiratory was published in April 2024 and can support more improvements to prescribing: [Respiratory conditions - quality prescribing strategy: improvement guide 2024 to 2027 - gov.scot \(www.gov.scot\)](https://www.gov.scot/resources/publications/2024/04/24-00010.pdf)

Some Facts about inhalers

- There were approximately 4.5 million pMDI inhalers prescribed in Scotland in 2020/2021.
- A 70% reduction could save 63,000 tCO₂e emissions each year, approximately 15,750 trips around the world in a Ford Focus.
- Person centred prescribing has the potential to create significant cost savings, by helping the patient onto a more appropriate treatment regime that can save unnecessary use of medicines and avoid hospitalisations associated with the use of sub-optimal medications.
- UK has high proportion of pMDI use (70%) compared to Scandinavia (10-30%). If NHS Scotland prescribed the same proportion of DPIs as Sweden, 55,000 tCO₂e would be saved annually.

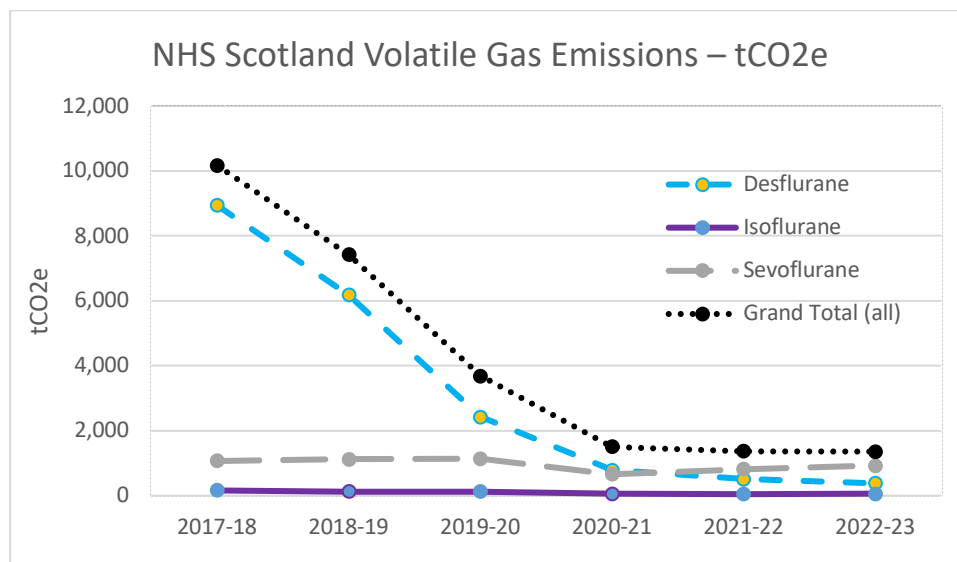
Medical Gases

Medical gases are an essential part of any modern health service but some are significant greenhouse gases. The Scottish Government and NHS Scotland are working together to reduce their climate impact. In 2023, Green Anaesthesia Scotland won the inaugural European Sustainable Healthcare Project of the Year from Health Care Without Harm and the Sustainability Award at the Scottish Public Service Awards.

Volatile Anaesthetics

In 2017/18, volatile anaesthetic gases made up over 10,000 tCO₂e of NHS Scotland's annual emissions. By 2022/23, this had fallen to less than 1,400 tCO₂e.

Figure 2: Volatile Gas Emissions



Data source: Hospital Medicines Utilisation Database (HMUD), Public Health Scotland (PHS)

Most of the decrease is due to the reduction in the use of desflurane, a greenhouse gas with a very high global warming potential. Desflurane is more expensive than the alternative volatiles with a lower global warming potential, and you need three times as much to achieve effective anaesthesia, so the switch has saved money for NHS Scotland. The adoption of low-flow anaesthetic techniques has also contributed to the decrease in emissions.

The use of desflurane is now so low that it is no longer be procured nationally by NHS National Services Scotland. Health Boards can still purchase desflurane directly themselves, where required.

Volatile Capture technology is presently being reviewed by the Scottish Health Technologies Group to understand the value it confers in light of now lower emissions of sevoflurane a climate pollutant with a short atmospheric life.

Nitrous Oxide and Entonox

Nitrous oxide is an ozone depleting substance and a potent greenhouse gas with a 100-year global warming potential of 298 times that of carbon dioxide. It is used in general anaesthesia and for pain relief (in combination with oxygen, under the brand name Entonox, commonly known as “gas and air”). It is an important source of pain relief, and particularly important for pain management in maternity services.

Nitrous oxide emissions are largely caused by leaks from piped medical gas systems. Its use as an anaesthetic agent is limited mostly to dentistry, obstetric emergencies, and paediatric gas inductions. Efforts to date focus on minimising system loss. Many piped supply systems have been found to be redundant and often a smaller portable supply will suffice.

Nitrous Oxide

Annual emissions for anaesthetic N₂O have fallen by 3,884 tCO₂e (37% over the past six years up to, and including, 2023/24). The table below sets out N₂O emissions by Health Board for the baseline year (2018/19) against the last two years of available data with a percentage rating which takes account changes since the baseline. As can be seen there is significant variation in performance by Health Board, although for Scotland as a whole the trend in emissions is downward.

Table 5: NHS Scotland N₂O Emissions, 2018/19, 2022/23 & 2023/24

Health Board	2018-19 (Baseline)	2022- 23	2023-24	Percentage change from baseline
National Waiting Times Centre	190	60	52	-73
NHS Ayrshire & Arran	544	284	335	-38%
NHS Borders	253	257	45	-82%
NHS Dumfries & Galloway	251	103	191	-24%
NHS Fife	315	326	433	+37%
NHS Forth Valley	285	502	51	-82%
NHS Grampian	1,682	1,399	981	-42%
NHS Greater Glasgow & Clyde	2,576	2,105	1820	-29%
NHS Highland	444	226	203	-54%
NHS Lanarkshire	807	345	395	-51%
NHS Lothian	1,959	771	713	-64%
NHS Orkney	34	15	15	-56%
NHS Shetland	33	83	11	-67
NHS Tayside	940	884	1188	+26%
NHS Western Isles	63	114	59	-6%
Grand Total	10,375	7,474	6,491	-37%

To the best of the Scottish Government's knowledge, by February 2024:

- a) 35 N2O piped systems had been decommissioned or minimised;
- b) 12 systems were scheduled for decommissioning;
- c) 12 high emitting hospitals have not submitted N2O minimisation plans; and
- d) 21 systems require investigation.

Three key concerns have been highlighted to clinical, pharmacy and facilities teams:

1. Cylinders should be used until depleted including manifold stocks;
2. Oversupply of this agent should be avoided; and
3. Excellent security and monitoring need to be in place as this is a recreational drug.

Entonox

Entonox accounted for 16,579 tCO₂e in 2023/24 making it the largest source of medical gas emissions in NHS Scotland. Unlike N₂O for general anaesthesia, Entonox continues to be commonly used for pain relief. NHS Scotland aims to ensure that Entonox is available for pain relief while also minimising the gas which escapes to the atmosphere.

Initial analysis at a hospital level shows wide variation in the Entonox emissions per maternity from 14,056 kgCO₂e (an outlier) to 200 kgCO₂e with a national average of 287 kg CO₂e.

A promising start was made in 2023/24 to mitigating Entonox emissions. While it is still too soon to draw definite conclusions, we know that midwifery and facilities teams across Scotland are taking steps to reduce gas loss from delivery systems and that emissions were 7% lower in 2023/24 than the previous year.

A technical brief on Entonox mitigation has been issued by the Scottish Government and is available here: <https://www.publications.scot.nhs.uk/publication/7937>

The following table sets out changes in Entonox uses since the baseline year of 2018/19.

Table 6: NHS Scotland Entonox Emissions, 2018/19, 2022/23 & 2023/24

Health Board	2018-19 (Baseline)	2022- 23	2023-24	Percentage change from baseline
National Waiting Times Centre	2	45	81	+3950%
NHS Ayrshire & Arran	800	632	681	-15%
NHS Borders	379	292	186	-51%
NHS Dumfries & Galloway	471	384	310	-34%
NHS Fife	1,177	971	939	-20%
NHS Forth Valley	914	837	651	-29%
NHS Grampian	2,430	2,624	2,005	-17%
NHS Greater Glasgow & Clyde	3,872	3,605	3,694	-5%
NHS Highland	747	676	743	0%
NHS Lanarkshire	1,602	1,462	1,465	-9%
NHS Lothian	2,649	3,316	2,809	+6%
NHS Orkney	57	71	77	+35%
NHS Shetland	81	72	41	-49%
NHS Tayside	1,318	1,535	1,555	+18%
NHS Western Isles	64	55	69	+8%
Scottish Ambulance Service	1,336	1,277	1,272	-5%
Grand Total	17,899	17,851	16,579	-7%

National Green Theatres Programme

The National Green Theatres Programme (NGTP) was formally launched in March 2023 and aims to reduce the carbon footprint of clinical theatres across NHS Scotland. The carbon saving actions from NGTP demonstrate that positive changes are achievable in terms of the products and items that are used. Key elements are:

- Working with clinicians, subject matter experts and professionals to develop realistic actions that reduce carbon emissions; and
- Supporting Health Boards to implement, measure and report on these improvements.

Informed by the learning from NHS Highland’s Green Theatre Project, NGTP aims to develop and spread actions that can reduce carbon emissions across a number of areas.

Fig 3: Outline of Green Theatres Work



The programme is underpinned by a co-design approach, focussed on working with clinicians, subject matter experts and national partners to share learning and best practice and design solutions.

NGTP has developed two types of “Carbon Saving Actions” - “Actions for Implementation” and “Actions for Adoption”.

Actions for Implementation

Actions for implementation are carbon saving actions which Health Boards are being supported to implement with requirements to validate and report on improvements throughout the programme.

Potential opportunities per annum equate to annual savings of 20,422 tonnes of tCO₂e and £5.8 million of cash⁴. The following table shows the main savings that could be achieved.

Table 7: Opportunities for carbon savings under the Green Theatres programme.

Carbon Saving Actions	Carbon Saving Opportunity (tCO ₂ e per annum)	Case Saving Opportunity (£ per annum)
Switch off out of hours Heating Ventilation Air Conditioning (HVAC)	6,692	3,932,500
Decommissioning of Nitrous Oxide (N ₂ O) manifolds	6,486	0*
Removing Desflurane liquid	6,421	834,249
Embed waste segregation	353	473,809
Automated switch off out of hours of Anaesthetic Gases Scavenging Systems (AGSS)	232	270,509
Embed Rubbing not Scrubbing	133	40,959
Installation and implementation of alternative surgical fluid collection and disposal system	75	0*
Change peri-operative paracetamol from intravenous to oral	38	53,079
Rationalising fluid giving sets and warming devices	12	257,070
Total	20,442	5,862,175

*Cash saving have not been provided, these may be updated in the future subject to availability of information.

Actions for Adoption

Actions for adoption are to raise awareness of other carbon saving actions that can contribute to reducing carbon emissions. These are actions that may be: progressed through other national work streams and, or may be difficult to measure. Health Boards are encouraged to consider how they are adopting these actions. They are as follows:

- Embed telephone and video clinics, reducing carbon footprint from staff travel, particularly in rural areas, where public transport options are limited;
- Enable active transport, which can improve mental and physical wellbeing for patients and staff as well lowering the carbon cost; and
- Introduce cold metal sticks to replace Ethyl Chloride spray to test for sensory function in regional anaesthesia.

⁴ It should be noted that some of the cash savings may require some investment to be achieved.

Year Two

In its second year, the NGTP will continue to develop actions for implementation and actions for adoption whilst supporting Boards to make improvements relating to theatres. It will also look at how it can work more closely with circular economy principles, and opportunities for the introduction of reusable devices and textiles as well as the reprocessing and remanufacturing of items.

Waste, Procurement, and Circular Economy

Waste doesn't just represent used products which need to be removed, but money left on the table and emissions left in the system. To manage waste effectively requires embracing the circular economy, changing processes, re-using where possible and recycling where that is not possible. It involves changing procurement processes to ensure sustainability and re-use, and ultimately, monetary value going back into the NHS. It is at the heart of all our investment decisions.

Waste

In 2023-2024, the focus has been on securing data on waste, undertaking a gap analysis and building sustainability requirements into waste management service contracts. A baseline review was undertaken by the Resource Management Association Scotland (RMAS) of Health Board waste management performance in relation to the 2025 waste targets originating from The Waste (Scotland) Regulations 2012. In summary, ahead of the 2025 target year.

- Six territorial Health Boards have achieved reductions in their general waste of 15%;
- 12 territorial Health Boards now send less than 5% of their general waste to landfill; and
- Six territorial Health Boards have reduced their food waste by 33%.

NHS Scotland has made strong progress on reducing food waste, with almost half of all boards meeting the 33% reduction in food waste target before the 2025 deadline. The management of food waste is a critical component of a health board's net zero strategy and through the NHS Scotland Catering Services Expert Group, all boards are being supported to collect data and put in place regional and local food waste solutions.

Twelve Health Boards have met the 2025 target on diversion from landfill. The new national waste framework contract, (which came into effect 01 April 2024), should support further change but there remains real challenge in some rural and island Health Boards, where compliance may be limited by local waste management options.

Across Scotland, Health Boards have struggled to meet the 70% recycling target, with a huge range in performance reflecting the scale of challenges we face. Recycling performance in NHS Scotland ranges from 19% to 61%, with an average rate of 34%. NHS Assure, working with Health Boards, RMAS and Zero Waste Scotland have created Waste Route Maps for each geographic board to help with progress. As part of the Health Board Waste Management Route Maps, guidance was provided with respect to competency and staff numbers required to effectively manage waste on NHS sites.

Table 8: 2023 NHS General Waste and Food Waste Data.

	Reduce general waste by 15% by 2025	No more than 5% of general waste to landfill by 2025	Reduce food waste by 33% by 2025	2023 Recycling Rate
NHS Ayrshire and Arran	Met	Met	Met	26%
NHS Borders	Not met	Met	Insufficient data	41%
NHS Dumfries and Galloway	Not met	Met	Not met	36%
NHS Fife	Not met	Met	Not met	40%
NHS Forth Valley	Met	Met	Insufficient data	23%
NHS Grampian	Met	Met	Met	44%
NHS Greater Glasgow and Clyde	Not met	Met	Met	19%
NHS Highland	Met	Not met	Met	37%
NHS Lanarkshire	Met	Met	Met	61%
NHS Lothian	Not met	Met	Met	23%
NHS Orkney	Insufficient data	Met	Insufficient data	Lacking data
NHS Shetland	Insufficient data	Met	Insufficient data	Lacking data
NHS Tayside	Not met	Met	Not met	38%
NHS Western Isles	Met	Not met	Insufficient data	22%

Examples of Good Practice

In 2023-2024, as part of the NHS Scotland Circular Economy Programme, work was undertaken with a number of Health Boards to identify opportunities to increase both the quantity and quality of recycling.

NHS Tayside: Plastics Recycling

An 8-week trial was undertaken by NHS Tayside at Ninewells Hospital. This trial focused on the collection of high-quality plastic waste from four clinical areas. The plastic collected was non-infectious and was not contaminated. It was therefore suitable for recycling without any pre-treatment. NHS Tayside sought to identify the viability of source segregation of plastic in clinical areas and to gain an understanding of the value of the material collected. The trial focused on high quality products and packaging, those made from two types of high-grade plastics: HDPE (High-density polyethylene), PP (Polypropylene) and PET (Polyethylene terephthalate). These high-quality plastics are readily recyclable with high market demand and represent lost financial value in the economy.

The trial was successful. A significant volume of plastic was collected, and feedback from the clinical staff was positive, with the teams involved requesting to keep the plastic collection in place. In particular, the role of the Board's Waste Management Officer was a crucial one. Providing clear instructions, supporting these with poster campaigns and colour coded bins was essential, making it as easy as possible for staff to recycle effectively. While the trial came at zero additional cost to the NHS, the data from the trial suggests that the quality of plastic is such that a rebate on collection will be likely for Health Boards.

The results of the trial demonstrated both the economic and environmental impact of high-quality plastic segregation. This trial fed into the development of the Waste Route Maps for each board and informed the new national waste framework contract (which went live from April 2024). Guidance is currently being produced by NHS Assure, to be implemented by boards, to ensure metrics and reporting will be in place to track financial and carbon savings.

Image 1: Types of plastic waste used in the trial; PET and HDPEs.



Image 2: Types of plastic waste used in the trial; mixed film and small rigids.



Image 3: Poster used for plastics recycling.



NHS Highland: Paper Towels

Paper towels may not seem like a widespread commodity within hospitals, but they represent around 17% of waste sent to landfill in the NHS (by weight). This was identified as part of the work on Waste Route Maps. NHS Assure supported Portering Leads at NHS Highland to segregate paper towels and develop this as a separate waste stream. This was collected by a local contractor, Northern Recycling, and mixed with the collection of food waste on site, processed by Keenan Recycling. Contamination levels were found to be minimal, with the majority of segregated material suitable for composting.

Image 4: Poster used to encourage paper towel recycling.



Both projects have resulted in the national waste framework contract including these items to be collected separately.

Procurement

Medicines, medical equipment and other elements of NHS supply form around 62% of carbon emissions generated by the NHS per activity area. As part of our work to make the NHS net zero, it is vital that environmental sustainability forms a part of procurement considerations and that we work with suppliers to encourage them to develop more environmentally sustainable products and supply chains.

NHS National Procurement has been reviewing their suppliers' Net Zero Plans to understand supply chain aspirations for net zero for their key healthcare products. They have focussed on suppliers with the highest annual spend and have identified 121 suppliers who have a Net Zero Plan in place. This covers £1.01bn and 77.5% of spend. Utilising input from NHS England's Evergreen system and market investigation, net zero dates for these suppliers have been incorporated into an interactive dashboard where NHS procurement staff can view them.

National Procurement are collaborating with the other NHS and healthcare partners in England, Wales, and Northern Ireland to align practices and approaches to supplier engagement.

Sustainable Construction and Demolition

The overall impact of the Healthcare Built Environment on the net zero targets for NHS Scotland is significant and it is therefore critical that greenhouse gas emissions are reduced to as close to zero as possible within our estate. There is a challenge in realising that position whilst maintaining the myriad of competing requirements in such a complex built environment, and there is a lack of data to determine what that position looks like.

To help make improvements to future updates of the Sustainable Design and Construction Guide (SHTN 02-01), and provide more detailed guidance on how to achieve net zero in healthcare, NHS Scotland Assure have commissioned research to determine 'What Good Looks Like' with a specific focus on:

- reducing overall energy use demand within differing areas of construction;
- viable Zero Direct Emissions Heating solutions for the healthcare estate;
- limiting the amount of embodied carbon in healthcare construction; and
- increasing circularity in healthcare construction.

The research will be based on current best practice healthcare environments, and it is expected that outputs will help inform an update to the Sustainable Design and Construction Guide during 2024-2025.

Greenspace and Biodiversity

NHS Scotland is a custodian of significant areas of greenspace. Improving NHS Scotland greenspace is a low-cost way to develop healthy environments at the heart of communities, to help mitigate against predicted climate change effects such as summer heatwaves and increased rainfall in winter⁵.

Grasslands Management

Since the 1950s, 97% of the UK wildflower meadows have been lost, which has had a detrimental effect on the variety of plants, mammals, invertebrates, and fungi that depend upon them. In February 2024, a report was published by NHS Scotland Assure to support Health Boards to improve the management of their grassland areas and create wildflower meadows. The approach set out in the report can have the following benefits:

- Supports the creation of diverse habitats.
- Supports pollinators such as bees.
- Reduces flood risk.
- Can result in cost savings.

The report is available here: [Grassland Management Report, February 2024](#)

Image 5: Midpark Hospital in Dumfries' with both formal grass lawn and species rich tall grassland wildflower areas (Image credit: ERZ Landscape Architects)



⁵ [2-page Executive Summary - climate trends-projections-extremes implications for Natural Capital and Policy 12-7-23.pdf \(hutton.ac.uk\)](#)

Greenspace Project Funding

The Scottish Government provides an annual budget of £300K each year for NHS Scotland greenspace projects. The money has been used to support projects which directly or indirectly support biodiversity while also benefitting staff, patients, and local communities. For 2023-2024 money was allocated to support the following projects:

- Supporting use of, and access to, greenspace at Queen Margaret Hospital within NHS Fife, alongside a habitat survey and actions to improve biodiversity;
- At Stirling Health Care Village within Forth Valley, supporting biodiversity, improving access to greenspace, and improving the quality of the greenspace;
- Within NHS Highland, at Raigmore Hospital, design and planning to further support greenspace, biodiversity and connections to wider areas. This includes professional design input and a whole campus habitat survey; and
- At Ninewells Hospital within NHS Tayside, work to progress the design of a 24-hour accessible Neonatal courtyard garden for parents/staff.

Digital National Mapping of the NHS Estate

The NHS Scotland outdoor estate has been mapped using a tool developed by Public Health Scotland. This tool has different applications such as providing a visual map of flooding risk and opportunities for siting solar panels or wind turbines. Work is underway to fill in the digital map with the habitat types within the NHS estate. This is to help ensure that the best use can be made of the estate for reducing greenhouse gas emissions, making the NHS more resilient to adverse weather, improving biodiversity, enhancing the experience of the sites for staff, patients, visitors, and members of the local community.

PART 2 – DATA FROM SCOTLAND’S HEALTH BOARDS

1. Building Energy Emissions

Table 1a – Overall Building Energy Use Emissions (tCO2e) for NHS Scotland									
Source: NHS National Services Scotland - National Energy Management System									
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Change 2015/16 to 2022/23
Building fossil fuel use	310,657	296,808	319,482	300,682	321,266	323,097	313,164	304,105	-2%
District heat networks and biomass	9,045	7,693	3,975	3,233	3,374	3,212	3,196	3,350	-63%
Electricity generation transmission and distribution	271,198	231,391	185,420	144,723	126,089	114,184	105,824	95,365	-65%
Total	591,290	535,892	508,877	448,638	451,089	440,493	422,184	402,782	-32%

Table 1b - NHS Greater Glasgow & Clyde Building Energy Use Emissions (tCO₂e)				
Source: NHS Greater Glasgow & Clyde Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	78,154	63,361	61,936	-21%
District heat networks and biomass emissions	5,558	5	4	-100%
Electricity emissions	83,061	29,010	28,578	-66%
Totals	166,773	92,376	90,518	-46%

Table 1c - NHS Lothian Building Energy Use Emissions (tCO₂e)				
Source: NHS National Services Scotland - National Energy Management System				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	46,878	47,812	44,001	-6%
District heat networks and biomass emissions	0	72	86	N/A
Electricity emissions	41,755	17,633	16,144	-61%
Totals	88,633	65,517	60,231	-32%

Table 1d - NHS Grampian Building Energy Use Emissions (tCO2e)				
Source: NHS Grampian Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	38,589	35,120	34,296	-12%
District heat networks and biomass emissions	67	87	65	-4%
Electricity emissions	22,647	5,667	4,826	-79%
Totals	61,303	40,874	39,187	-36%

Table 1e - NHS Tayside Building Energy Use Emissions (tCO2e)				
Source: NHS Tayside Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	32,179	39,314	37,119	15%
District heat networks and biomass emissions	0	0	0	N/A
Electricity emissions	23,358	4,564	4,164	-82%
Totals	55,537	43,878	41,283	-26%

Table 1f - NHS Lanarkshire Building Energy Use Emissions (tCO2e)				
Source: NHS Lanarkshire Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	16,409	15,761	15,689	-4%
District heat networks and biomass emissions	0	0	0	N/A
Electricity emissions	15,528	10,054	8,817	-43%
Homeworking		3,569	1,126	N/A
Totals	31,937	29,384	25,632	-20%

Table 1g - NHS Highland Building Energy Use Emissions (tCO2e)				
Source: NHS National Services Scotland - National Energy Management System				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	21,444	20,346	20,851	-3%
District heat networks and biomass emissions	650	975	902	39%
Electricity emissions	13,639	6,260	5,710	-58%
Totals	35,733	27,581	27,463	-23%

Table 1h - NHS Ayrshire & Arran Building Energy Use Emissions (tCO2e)				
Source: NHS Ayrshire & Arran Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use *	15,795	14,566	12,158	-23%
District heat networks and biomass emissions				
Grid electricity*	16,420	7,463	6,917	-58%
Totals	32,215	22,029	19,075	-41%

*Includes WTT emissions and power T&D, grid losses, WTT generation, WTT grid losses

Table 1i - NHS Fife Building Energy Use Emissions (tCO2e)				
Source: NHS Fife Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	16,041	14,899	15,211	-5%
District heat networks and biomass emissions	354	167	66	-82%
Electricity emissions	11,969	5,329	4587	-62%
Totals	28,364	20,395	19,864	-30%

Table 1j - NHS Forth Valley Building Energy Use Emissions (tCO2e)				
Source: NHS Forth Valley Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use (gas)	10,575	9,344	9,472	-10%
District heat networks and biomass emissions	N/A	N/A	N/A	N/A
Grid electricity (does not include transmission and distribution emissions)	11,562	4,979	4,632	-60%
Totals	22,138	14,323	14,104	-36%

Table 1k - NHS Dumfries & Galloway Building Energy Use Emissions (tCO2e)				
Source: NHS National Services Scotland - National Energy Management System				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	7,399	11,179	11,499	55%
District heat networks and biomass emissions	193	145	124	-36%
Electricity emissions	6,274	3,024	2,659	-58%
Totals	13,866	14,348	14,281	3%

Table 1l - NHS Golden Jubilee Building Energy Use Emissions (tCO2e)				
Source: NHS National Services Scotland - National Energy Management System				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	5,423	4,802	4,990	-8%
District heat networks and biomass emissions	0	0	0	N/A
Electricity emissions	6,920	3,420	3,133	-55%
Totals	12,343	8,222	8,123	-34%

Table 1m - NHS Borders Building Energy Use Emissions (tCO2e)				
Source: NHS Borders Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	4,681	5,226	5,220	12%
District heat networks and biomass emissions	130	83	69	-47%
Electricity emissions	4,341	1,872	1,659	-62%
Totals	9,152	7,181	6,948	-24%

Table 1n - NHS National Services Scotland Building Energy Use Emissions (tCO2e)				
Source: NHS National Services Scotland Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	1,499	2,811	2,158	44%
District heat networks and biomass emissions	N/A	N/A	N/A	N/A
Electricity emissions	4,391	2,765	1,678	-62%
Totals	5,890	5,575	3,836	-35%

Table 1o - Scottish Ambulance Service Building Energy Use Emissions (tCO2e)				
Source: Scottish Ambulance Service Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	1,446	1,390	1,251	-13%
District heat networks and biomass emissions	N/A	N/A	N/A	N/A
Electricity emissions	2,161	979	931	-57%
Totals	3,607	2,369	2,182	-40%

Table 1p - NHS Western Isles Building Energy Use Emissions (tCO2e)				
Source: NHS Western Isles Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	2,118	2,454	2,414	14%
District heat networks and biomass emissions	N/A	N/A	N/A	N/A
Electricity emissions	712	686	668	-6%
Totals	2,830	3,140	3,082	9%

Table 1p - The State Hospital Building Energy Use Emissions (tCO2e)				
Source: The State Hospital Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	833	1066	1015	22%
District heat networks and biomass emissions	57	29	25	-57%
Electricity emissions	1425	553	508	-64%
Totals	2315	1648	1548	-33%

Table 1r - NHS Shetland Building Energy Use Emissions (tCO₂e)				
Source: NHS National Services Scotland - National Energy Management System				
	2015/16	2021/22	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	547	522	419	-23%
District heat networks and biomass emissions	792	696	715	-10%
Electricity emissions	1148	538	456	-60%
Totals	2487	1756	1590	-36%

Table 1s - NHS Orkney Building Energy Use Emissions (tCO₂e)				
Source: NHS Orkney Annual Health Board Climate Emergency and Sustainability report 2022/23				
	2015/16	2021/22*	2022/23	% change 2015/16 to 2022/23
Building fossil fuel use emissions	1509	767	645	-57%
District heat networks and biomass emissions	0	0	0	N/A
Electricity emissions	690	1070	957	39%
Totals	2199	1838	1602	-27%

*During this period, NHS Orkney opened the new Balfour Hospital which uses heat pumps (powered by electricity) as its primary source of heat. This explains the significant decrease in fossil fuel emissions and the increase in electricity emissions. As the electricity supply decarbonises, electricity emissions should decrease.

2. Medical Gas Emissions

Table 2a - N2O emissions (including Entonox) by Health Board, tCO2e				
Source – Scottish Government				
Health Board	2018/19 (baseline)	2020/21	2021/22	2022/23
NHS Golden Jubilee (National Waiting Times Centre)	192	315	91	105
NHS Ayrshire & Arran	1344	1480	1257	916
NHS Borders	632	489	548	549
NHS Dumfries & Galloway	722	500	565	487
NHS Fife	1493	1542	1465	1297
NHS Forth Valley	1199	1188	1090	1339
NHS Grampian	4112	3337	3985	4023
NHS Greater Glasgow & Clyde	6448	5524	5065	5710
NHS Highland	1191	885	1258	902
NHS Lanarkshire	2409	1943	2016	1807
NHS Lothian	4608	4179	4272	4087
NHS Orkney	90	69	109	86
NHS Shetland	114	75	100	155
NHS Tayside	2259	2237	2231	2419
NHS Western Isles	127	111	202	169
Scottish Ambulance Service	1336	1133	1211	1277
Total	28,276	25,007	25,465	25,328

Table 2b: Volatile gas (desflurane, sevoflurane and isoflurane) emissions by Health Board, tCO2e

Source: Scottish Government

Health Board	2017/18 Baseline	2018/19	2020/21	2021/22	2022/23
NHS Golden Jubilee (National Waiting Times Centre)	29	24	19	22	26
NHS Ayrshire & Arran	685	569	105	78	76
NHS Borders	70	49	11	16	16
NHS Dumfries & Galloway	111	74	22	27	17
NHS Fife	151	123	56	50	41
NHS Forth Valley	419	171	38	41	41
NHS Grampian	1350	1015	209	222	133
NHS Greater Glasgow & Clyde	3954	2885	497	394	470
NHS Highland	349	154	36	43	43
NHS Lanarkshire	916	901	84	77	108
NHS Lothian	1403	1175	289	308	257
NHS Orkney	22	18	21	10	26
NHS Shetland	25	15	16	14	7
NHS Tayside	669	232	98	55	89
NHS Western Isles	19	17	1	9	7
Total	10170	7423	1502	1366	1356

Table 2c: Desflurane emissions by Health Board, tCO2e					
Source: Scottish Government					
Health Board	2017/18 (Baseline)	2018/19	2020/21	2021/22	2022/23
NHS Golden Jubilee (National Waiting Times Centre)	13	5	6	5	2
NHS Ayrshire and Arran	620	508	79	35	25
NHS Borders	55	33	4	6	5
NHS Dumfries & Galloway	87	52	5	7	1
NHS Fife	95	68	25	9	-4
NHS Forth Valley	365	115	8	0	0
NHS Grampian	1235	897	146	152	58
NHS Greater Glasgow and Clyde	3576	2499	274	112	142
NHS Highland	297	101	0	0	0
NHS Lanarkshire	816	796	34	9	21
NHS Lothian	1128	914	127	158	87
NHS Orkney	20	16	20	7	22
NHS Shetland	22	12	13	11	4
NHS Tayside	591	150	47	-5	12
NHS Western Isles	16	13	-1	5	3
Total	8,937	6,178	787	511	378

Negative numbers represent pharmacy returns.

Table 2d: Piped Nitrous Oxide emissions by Health Boards, tCO2e

Source: Scottish Government

Health Board	2017/18 (Baseline)	2018/19	2020/21	2021/22	2022/23
NHS Golden Jubilee (National Waiting Times Centre)	180	130	290		
NHS Ayrshire and Arran	538	558	699	542	272
NHS Borders	241	344	251	241	246
NHS Dumfries & Galloway	231	118	98	157	98
NHS Fife	188	316	393	217	217
NHS Forth Valley	246	447	197	64	472
NHS Grampian	1,601	1,687	981	1,310	1,274
NHS Greater Glasgow & Clyde	2,509	2,263	2,106	1,706	2,013
NHS Highland	359	364	251	403	148
NHS Lanarkshire	733	320	256	192	251
NHS Lothian	1,750	1,566	1,238	971	455
NHS Orkney	30	54		39	10
NHS Shetland	30	10	10	30	74
NHS Tayside	895	1,095	932	716	848
NHS Western Isles	59	113	64	128	108
Total	9,590	9,385	7,766	6,716	6,486

3. Metered dose inhaler propellant

Table 3a: Emissions from PMDI propellant prescribed and dispensed in primary care						
Source – Scottish Government						
Health Board	Inhaler numbers and emissions	2018/19 (baseline)	2019/20	2020/21	2021/22	2022/23
NHS Ayrshire & Arran	PMDI Total inhalers	334,078	339,877	310,561	320,120	332,804
	CO₂ Equivalent (tCO₂e)	5,766	5,854	5,348	5,508	5,717
NHS Borders	PMDI Total inhalers	103,885	110,470	103,213	104,747	110,710
	CO₂ Equivalent (tCO₂e)	1,794	1,905	1,779	1,803	1,905
NHS Dumfries & Galloway	PMDI Total inhalers	156,713	172,516	159,708	163,961	169,964
	CO₂ Equivalent (tCO₂e)	2,794	3,056	2,828	2,892	2,980
NHS Fife	PMDI Total inhalers	304,315	332,426	307,689	326,654	341,922
	CO₂ Equivalent (tCO₂e)	5,359	5,818	5,381	5,676	5,915

NHS Forth Valley	PMDI Total inhalers	212,979	232,832	219,531	230,742	244,459
	CO₂ Equivalent (tCO₂e)	3,894	4,258	4,020	4,198	4,418
NHS Grampian	PMDI Total inhalers	382,977	411,507	375,105	387,606	407,528
	CO₂ Equivalent (tCO₂e)	7,197	7,751	7,152	7,381	7,725
NHS Greater Glasgow & Clyde	PMDI Total inhalers	1,050,874	1,122,505	1,052,601	1,091,159	1,128,024
	CO₂ Equivalent (tCO₂e)	18,055	19,261	18,066	18,714	19,333
NHS Highland	PMDI Total inhalers	249,335	264,171	234,890	236,437	240,387
	CO₂ Equivalent (tCO₂e)	4,395	4,655	4,154	4,173	4,221
NHS Lanarkshire	PMDI Total inhalers	552,118	594,257	560,166	578,915	618,091
	CO₂ Equivalent (tCO₂e)	9,555	10,255	9,663	9,972	10,631
NHS Lothian	PMDI Total inhalers	694,388	734,674	666,006	676,863	689,928

	CO₂ Equivalent (tCO₂e)	11,855	12,542	11,369	11,554	11,774
NHS Orkney	PMDI Total inhalers	16,716	17,892	14,793	15,045	16,126
	CO₂ Equivalent (tCO₂e)	311	336	285	291	307
NHS Shetland	PMDI Total inhalers	19,231	19,946	17,956	18,461	19,063
	CO₂ Equivalent (tCO₂e)	358	376	346	356	365
NHS Tayside	PMDI Total inhalers	370,026	381,658	356,662	369,440	381,914
	CO₂ Equivalent (tCO₂e)	6,460	6,650	6,213	6,420	6,617
NHS Western Isles	PMDI Total inhalers	22,417	24,637	22,531	23,405	24,593
	CO₂ Equivalent (tCO₂e)	388	428	392	408	428
	Annual Total CO₂ Equivalent (tonnes)	78,182	83,145	76,996	79,346	82,337

Table 3b: Emissions from PMDI propellant prescribed and dispensed in secondary care						
Source – Scottish Government						
Health Board	Inhaler numbers and emissions	2018/19 (baseline)	2019/20	2020/21	2021/22	2022/23
NHS Ayrshire & Arran	pMDI Total inhalers	8874	8343	5995	7160	7573
	CO₂ Equivalent (tCO₂e)	152	142	103	122	129
NHS Borders	pMDI Total inhalers	2444	2287	1618	2070	2157
	CO₂ Equivalent (tCO₂e)	42	39	28	35	37
NHS Dumfries & Galloway	pMDI Total inhalers	2915	3204	2771	2852	2620
	CO₂ Equivalent (tCO₂e)	51	55	48	49	45
NHS Fife	pMDI Total inhalers	6484	6752	5229	6438	7058
	CO₂ Equivalent (tCO₂e)	112	116	90	111	121

NHS Forth Valley	pMDI Total inhalers	5417	5674	4199	5532	5577
	CO₂ Equivalent (tCO₂e)	94	98	74	96	97
NHS Grampian	pMDI Total inhalers	7123	7961	5028	6298	7394
	CO₂ Equivalent (tCO₂e)	127	141	91	112	132
NHS Greater Glasgow & Clyde	pMDI Total inhalers	35985	32735	25992	35141	36522
	CO₂ Equivalent (tCO₂e)	616	559	444	600	624
NHS Highland	pMDI Total inhalers	5999	6474	2902	4142	4362
	CO₂ Equivalent (tCO₂e)	103	111	50	71	75
NHS Lanarkshire	pMDI Total inhalers	11919	12074	10231	12874	13318
	CO₂ Equivalent (tCO₂e)	205	207	176	221	228
NHS Lothian	pMDI Total inhalers	20285	20939	13737	20143	20633

	CO₂ Equivalent (tCO₂e)	346	357	234	343	352
NHS Orkney	pMDI Total inhalers	173	193	166	231	267
	CO₂ Equivalent (tCO₂e)	3	3	3	4	5
NHS Shetland	pMDI Total inhalers	225	307	299	265	309
	CO₂ Equivalent (tCO₂e)	4	5	5	5	5
NHS Tayside	pMDI Total inhalers	9164	9663	6856	8633	8381
	CO₂ Equivalent (tCO₂e)	158	166	117	148	144
NHS Western Isles	pMDI Total inhalers	463	521	381	453	627
	CO₂ Equivalent (tCO₂e)	8	9	6	8	11
State Hospital	pMDI Total inhalers	NA	NA	NA	203	NA
	CO₂ Equivalent (tCO₂e)	NA	NA	NA	3.5	NA

NHS Golden Jubilee (National Waiting Times Centre)	PMDI Total inhalers	NA	NA	NA	526	NA
	CO₂ Equivalent (tCO₂e)	NA	NA	NA	9.0	NA
All Scotland	CO₂ Equivalent (tCO₂e)	2,021	2,010	1,469	1,939	2,003

NA= Not Available

4. Travel and Transport

Table 4a: Health Board fleet greenhouse gas emissions, tCO₂e					
Source: Health Board Annual Climate Emergency and Sustainability Reports 2022/23					
Health Board	2019/20	2020/21	2021/22	2022/23	% change 2019/20 to 2022/23
NHS Ayrshire & Arran*	797	665	1,462	1,461	83
NHS Borders	220	265	248	303	38
NHS Dumfries & Galloway	321	275	317	279	-13
NHS Fife	-	-	502	468	N/A
NHS Forth Valley**	379	453	296	401	6
NHS Grampian	1,026	941	1,084	800	-22
NHS Greater Glasgow & Clyde	-	4,628	1,365	1,278	N/A
NHS Highland	-	-	-	-	N/A
NHS Lanarkshire***	756	739	783	715	-5
NHS Lothian	-	1,402	1,319	1,497	N/A
NHS Orkney	66	67	46	36	-45
NHS Shetland	-	-	-	-	N/A
NHS Tayside	769	754	768	720	-6
NHS Western Isles	-	-	-	-	N/A
NHS Golden Jubilee (National Waiting Times Centre)	-	-	53	53	N/A
The State Hospital	-	8	19	9	N/A
Public Health Scotland	N/A	N/A	N/A	N/A	N/A
Healthcare Improvement Scotland****	20	N/A	0	0	-100
NHS Education for Scotland	N/A	N/A	N/A	N/A	N/A

NHS National Services Scotland	1,584	1,586	1,737	1,606	1
NHS 24	12	-	-	-	N/A
Scottish Ambulance Service	20,557	17,956	19,791	20,974	2

*21/22 and 22/23 figures include WTT emissions for 5 categories – Van class 1, Van average, HGV average, HGV Laiden, Car's petrol small. No pool car data so small petrol car emissions factor used until data improves. EV impact unknown.

**22/23 total includes hired and leased vehicles for the first time

***21/22 figures revised since last year

****20/21 Offices Closed

NA = Not Available

Table 4b – Health Board business travel greenhouse gas emissions, tCO2e					
Source: Health Board Annual Climate Emergency and Sustainability Reports 2022/23					
Health Board	2019/20	2020/21	2021/22	2022/23	% change 2019/20 to 2022/23
NHS Ayrshire & Arran*	1,886	870	1,223	1,147	-39%
NHS Borders	586	358	376	381	-35%
NHS Dumfries & Galloway	714	458	485	473	-34%
NHS Fife	-	-	-	-	N/A
NHS Forth Valley	602	420	439	485	-19%
NHS Grampian	-	-	-	936	N/A
NHS Greater Glasgow & Clyde	-	-	2873	3290	N/A
NHS Highland	-	-	-	-	N/A
NHS Lanarkshire**	-	-	1640	1305	N/A
NHS Lothian	-	1172	1338	1324	N/A
NHS Orkney	-	-	-	-	N/A
NHS Shetland	-	-	-	-	N/A
NHS Tayside	-	-	878	1078	N/A
NHS Western Isles	-	-	-	96	N/A
NHS Golden Jubilee (National Waiting Times Centre)	-	-	-	-	N/A
The State Hospital	-	-	-	4	N/A
Public Health Scotland***	N/A	3	5	25	N/A
Healthcare Improvement Scotland	132	-	-	15	-89%
NHS Education for Scotland	493	58	53	115	-77%
NHS National Services Scotland	974	99	148	165	-83%
NHS 24	118	-	-	-	N/A
Scottish Ambulance Service****	637	473	363	1065	67%

*Includes WTT emissions for all travel activities – ferries, taxis, planes, trains, buses.

**2021/22 figures revised since last year

***Organisation formed 2020, no previous data available

****This increase is attributed to obtaining actual mileage of hire vehicles for the first time, specifically for the Mobile Testing Units used during the Covid periods. This figure should reduce significantly as these vehicles are being taken out of use.

NA = Not Available

Table 4c Composition of NHS Fleet by Health Board, March 2023

Source: NHS National Services Scotland (National Fleet Management System), NHS Ayrshire and Arran, Scottish Ambulance Service

Health Board	Class	EV	Fossil Fuel/Hybrid	Total	% EV
NHS Ayrshire & Arran	Cars	45	161	206	22%
	Light Commercial Vehicles	0	94	94	0%
	Heavy Vehicles	0	8	8	0%
NHS Borders	Cars	11	16	27	41%
	Light Commercial Vehicles	6	32	38	16%
	Heavy Vehicles	0	1	1	0%
NHS Dumfries & Galloway	Cars	1	91	92	1%
	Light Commercial Vehicles	2	33	35	6%
	Heavy Vehicles	0	1	1	0%
NHS Fife	Cars	3	50	53	6%
	Light Commercial Vehicles	25	48	73	34%
	Heavy Vehicles	0	0	0	0%
NHS Forth Valley	Cars	18	34	52	35%
	Light Commercial Vehicles	25	49	74	34%
	Heavy Vehicles	0	0	0	0%
NHS Grampian	Cars	4	177	181	2%
	Light Commercial Vehicles	4	123	127	3%

	Heavy Vehicles	0	13	13	0%
NHS Greater Glasgow & Clyde	Cars	43	71	114	38%
	Light Commercial Vehicles	66	208	274	24%
	Heavy Vehicles	7	23	30	23%
NHS Highland	Cars	42	347	389	11%
	Light Commercial Vehicles	11	217	228	5%
	Heavy Vehicles	0	3	3	0%
NHS Lanarkshire	Cars	0	11	11	0%
	Light Commercial Vehicles	52	22	74	70%
	Heavy Vehicles	0	9	9	0%
NHS Lothian	Cars	150	256	406	37%
	Light Commercial Vehicles	57	110	167	34%
	Heavy Vehicles	0	27	27	0%
NHS Orkney	Cars	22	14	36	61%
	Light Commercial Vehicles	5	0	5	100%
	Heavy Vehicles	0	0	0	0%
NHS Shetland	Cars	13	30	43	30%
	Light Commercial Vehicles	5	10	15	33%
	Heavy Vehicles	0	0	0	0%
NHS Tayside	Cars	81	47	128	63%
	Light Commercial Vehicles	32	48	80	40%
	Heavy Vehicles	1	15	16	6%

NHS Western Isles	Cars	0	6	6	0%
	Light Commercial Vehicles	0	22	22	0%
	Heavy Vehicles	0	0		0%
NHS National Services Scotland	Cars	0	22	22	0%
	Light Commercial Vehicles	3	45	48	6%
	Heavy Vehicles	0	9	9	0%
Scottish Ambulance Service	Cars	223	190	413	54%
	Light Commercial Vehicles	43	245	288	15%
	Heavy Vehicles	0	852	852	0%
	Motorbikes	0	0	0	0%
State Hospital	Cars	0	1	1	0%
	Light Commercial Vehicles	2	5	7	29%
	Heavy Vehicles	0	0	0	0%
Total	Cars	711	1343	2054	35%
	Light Commercial Vehicles	342	1750	2092	16%
	Heavy Vehicles	8	519	527	1%
	Motorbikes	0	0	0	0%

Table 4d: Bike Use in NHS Scotland Health Boards as at March 2023		
Source: Health Board Annual Climate Emergency and Sustainability Reports 2022/23		
Health Board	Bikes	ebikes
NHS Ayrshire & Arran	0	0
NHS Borders	0	0
NHS Dumfries & Galloway	21	19
NHS Fife	0	0
NHS Forth Valley	0	0
NHS Grampian	0	31
NHS Greater Glasgow & Clyde	500	0
NHS Highland	-	-
NHS Lanarkshire	-	-
NHS Lothian	0	27
NHS Orkney	0	0
NHS Shetland	-	-
NHS Tayside	4	12

5. Waste.

Note: For Western Isles, figures given for clinical waste only. N/A=Not available.

Table 5 – NHS greenhouse gas emissions from waste disposal, tCO₂e					
Source: Health Board Annual Climate Emergency and Sustainability Reports 2022/23					
	2019/20	2020/21	2021/22	2022/23	% change 2019/20 to 2022/23
Health Board					
NHS Ayrshire & Arran	325	389	384	445	36.9%
NHS Borders	-	27	37	136	N/A
NHS Dumfries & Galloway	235	200	176	168	-28.6%
NHS Fife	-	715	1089	1150	N/A
NHS Forth Valley	271	650	233	199	-26.7%
NHS Grampian	590	624	545	583	-1.2%
NHS Greater Glasgow & Clyde	148	351	1766	1660	1021.6%
NHS Highland	-	-	-	-	N/A
NHS Lanarkshire	54	51	652	983	1720.4%
NHS Lothian	-	-	967	950	N/A
NHS Orkney	48	39	42	16	-66.7%
NHS Shetland	-	-	-	-	N/A
NHS Tayside	1242	188	627	1210	-2.6%
NHS Western Isles	-	2	1	-	N/A
State Hospital	38	44	37	44	15.7%
Scottish Ambulance Service	13	22	24	74	469.2%
Health Improvement Scotland	6	N/A	-	0.1	N/A
Golden Jubilee	-	-	-	-	N/A
NHS 24	11	-	-	-	N/A
National Services Scotland	28	31	47	38	35.7%
Public Health Scotland	N/A	-	-	-	N/A
National Education Scotland	-	-	-	-	N/A



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