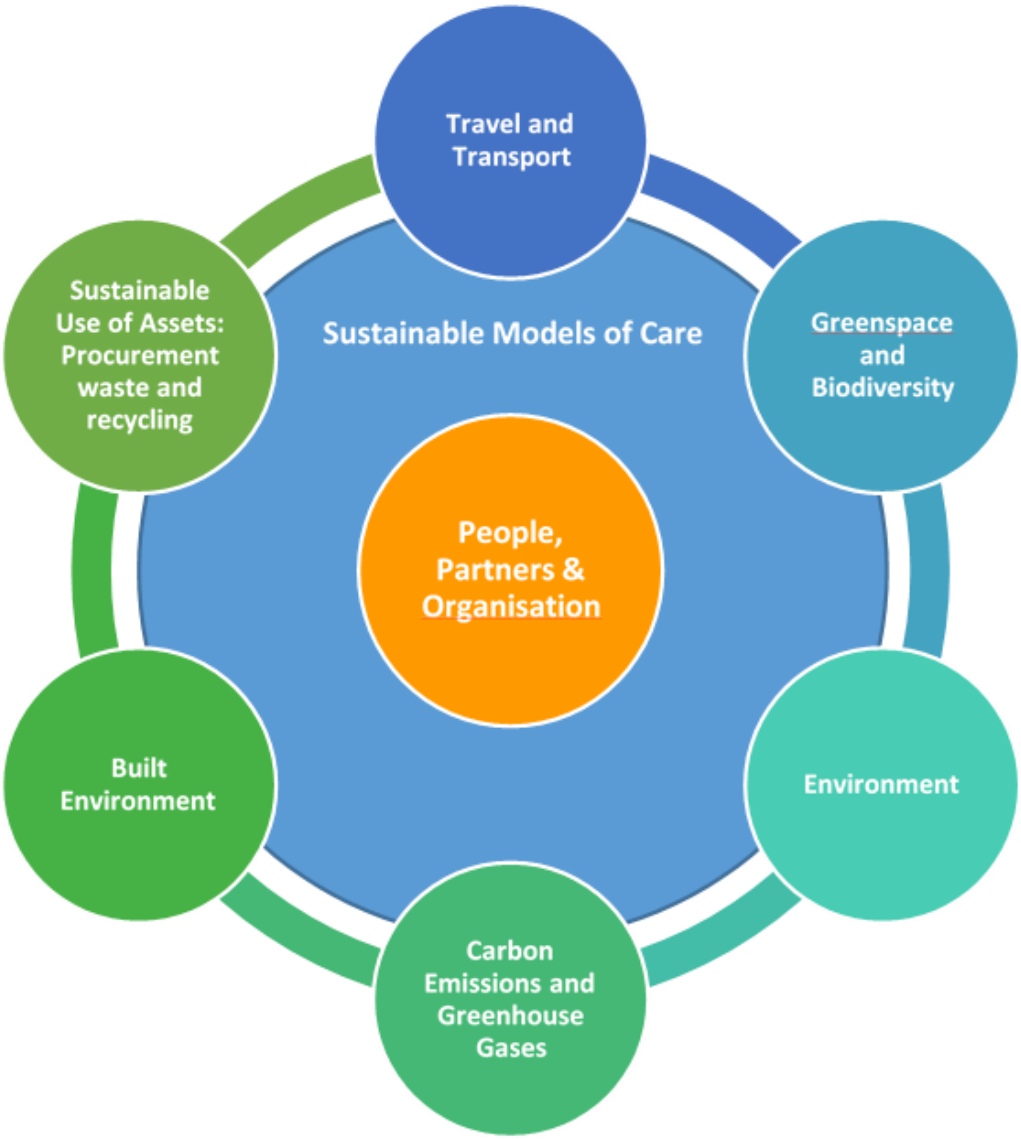
Our NHS
Our People
Our Planet

NHS Lothian

2020-2021 Carbon Emissions Report



Sustainability Overview

NHS Lothian launched our new **Sustainability Development Framework and Action Plan** in December 2020, to guide our journey to net zero by 2045 and our commitment to the UN Sustainability Goals.

Incorporating a new and broader approach, the Framework not only provides direction on reducing the climate impact of NHS activity but also looks at our role as advocates and partners for wider change

The NHS Lothian Framework gives us a strong vision and clear ambitions. Our urgent task now is to harness the commitment and enthusiasm of our staff, patients and partners to take action for change.

The **Biodiversity Audit and Natural Capital Assessment** which is the first of its kind in Scotland, was completed in April 2021 and provides a comprehensive analysis of the NHS Lothian estate to guide action and a baseline from which to measure our future progress

5 webinars were delivered by the Sustainability Group during the last year and attended by over **350 people**. These included events on Greenspace and Biodiversity, Sustainability and Pharmaceuticals, and The New Normal – sustainability and COVID 19 recovery. A monthly series of webinars is planned for the coming year

NHS Lothian is a founder signatory of the **Edinburgh Climate Compact**, which will support the radical reduction in Edinburgh's greenhouse gas emissions and contribute to a green recovery for the city

NHS Lothian emissions for 2020/21 are **67,758** Tonnes CO_2, a reduction of **2,883** from 2019/2020.

Over **350 staff** have signed up to our Sustainability Network and site-based events were held at the WGH and RIE before lockdown Consultation session have been held with NHS volunteers and young people's groups

Our work on **Anaesthetic gases** is leading nationally on reporting standards and mitigation measures. This year's significant improvement has been driven by highly engaged clinical teams with access to sound evidence

A **Sustainability Communications Strategy** has been developed and continuously improved during the year, providing a guide for communication with staff and wider partners and the public during this challenging year

111 Electric Fleet Vehicles on the road and **2 eBikes**, an increase of 71 vehicles from last year, with 49 charge points installed.

Phase 1 of the Western General Energy Infrastructure project on-site, starting our Carbon Pathway transition for a major acute site.

Purpose of this Report

Managing and reducing our emissions is essential to reduce our impact on the environment, effectively manage resources, contribute to actions on climate change and show leadership.

This 2020/21 Carbon Emissions Report gives detail on emissions associated with the operations of NHS Lothian. The Scottish Government has adopted an ambitious new target to reduce emissions by 75% by 2030 – the toughest statutory target of any country in the world. While only buildings data is available over this period, a reduction of 63% is positive.

Annual reporting has been required since 2007/08 when a Carbon Management Plan was developed to formalise our strategy and activities in reducing carbon emissions. Activity on emissions has historically focused on utilities (buildings), waste and transport.

Carbon Emissions Overview

Addressing carbon emissions and greenhouse gases is fundamental to addressing climate change and delivering services in a sustainable manner. Establishing targets and systems that provide continuous monitoring is paramount to shaping our actions and tracking our progress. NHS Lothian has calculated and reported emissions from traditional energy and fuel sources since 2008. We continue to improve the collection and utilisation of data to better understand the hotspots, opportunities, impacts and trends. We also recognise the need for understanding and engaging on the wider impact of our operations, through our partners and supply chain.

Our Aim: Contribute to national net-zero targets through reducing carbon emissions and other Green House Gases.

We continue to recognise the wider contribution that services have on the environment and need to broaden our scope of measurement. For the first time, the 2018/19 report included emissions from Anaesthetic Gases and these emissions are included in the current report.

The addition of a wider range of emissions sources in our reporting increases the challenge but is essential if we are to embed sustainability across the whole organisation and harness the enthusiasm and determination of the widest range of our staff. The current report shows a dramatic reduction of emissions from anaesthetic gases by 15% compared to last year achieved as a result of the enthusiasm and leadership shown by clinical staff. The current report represents a further step.

This year we are the first board in Scotland to include an estimate of the carbon sequestered by our estate in the report.

Overall there has been a reduction in emissions from last year, by 2,883 Tonnes of CO_2, with reductions across anaesthetic gases, waste and travel. There have been increases in emissions from buildings, with continued impact of the double running of the RHSC and RYCYP & DCN sites. Added to this the WGH aged plant is contributing and highlights the importance of the Energy Infrastructure project that is ongoing.

Glossary

RIE – Royal Infirmary of Edinburgh

CO_2 – Carbon Dioxide

RHSC – Royal Hospital for Sick Children

RYCYP & DCN – Royal Hospital for Children and Young People

WGH – Western General Hospital

SJH – St John's Hospital

kWh – Kilowatt Hours (measurement of energy)

EV – Electric Vehicles

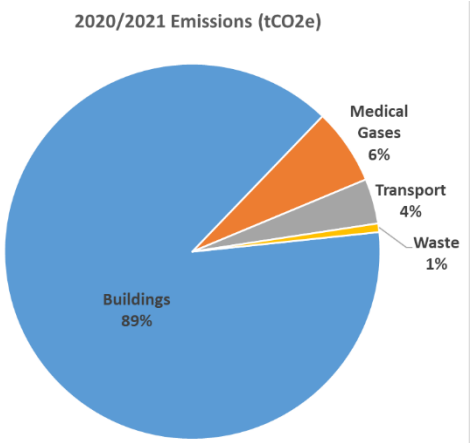
T – Tonnes

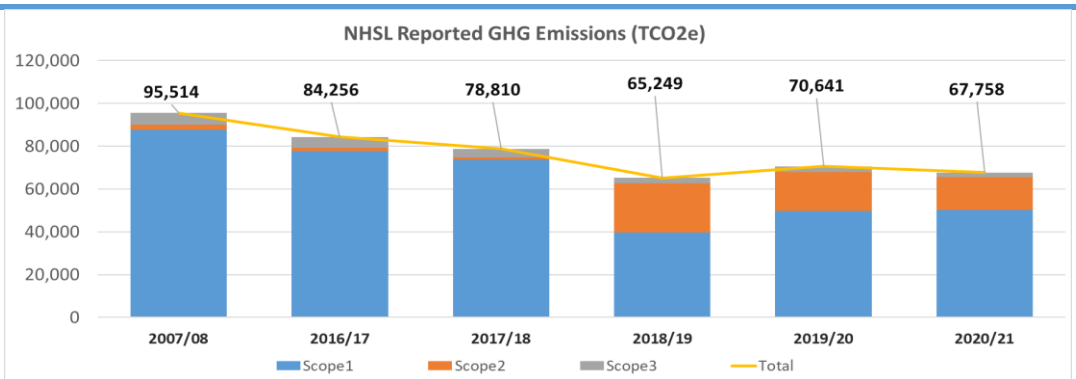
Kg – Kilograms

Carbon Emissions

Key Stats

- Overall decrease of **2,883** Tonnes CO_2 from 2019/2020 report.
- Overall reduction of **103,029** Tonnes CO_2, 63%, from 1989/1990 national targets baseline (buildings only).
- **Buildings** - reduction of 843 Tonnes CO_2 (-1.4%)
- **Medical Gases** - reduction of 811 Tonnes CO_2 (-15.3%)
- **Transport** – decrease of 1,136 Tonnes CO_2 (-30%)
- **Waste** – decrease of 20 Tonnes CO_2 (-3.7%)





Year	2007/08	2016/17	2017/18	2018/19	2019/20	2020/21
Scope 1	87,800	77,569	73,744	39,786	49,814	50,273
Scope 2	2,302	1,611	1,059	22,783	18,057	15,373
Scope 3	5,412	5,076	4,007	2,680	2,770	2,112
Total	**95,514**	**84,256**	**78,810**	**65,249**	**70,641**	**67,758**
Annual Performance						
Reduction %		5.2%	6.5%	17.2%	-8.3%	4.1%
Reduction TCO2		-4,663	-5,446	-13,561	5,392	-2,883
Baseline Performance						
Reduction %		11.8%	17.5%	31.7%	26.0%	29.1%
Reduction TCO2		-11,258	-16,704	-30,265	-24,873	-27,756

Commentary

- Buildings are the most significant emissions source, based on current emissions scope. The high proportion of emissions associated with the major acute sites (RIE, WGH and SJH) account for 62% of the total buildings emissions, the top 10 account for 92%.
- Medical gases added to 2018/2019 submission, not previously reported. Contributing 6.5% of our CO_2 emissions. There has been year on year reductions in emissions this year which has been a real success. This is attributed to the highly engaged staff group that have pioneered the change activities.
- Waste figures show a decrease of 20 TCO_2. Progress has been made but concerns remain over data quality. While a small contributor to carbon, this is an important area for action from a sustainability perspective.
- Transport emissions have decreased by 1,136 Tonnes CO_2. Approximate mileage reduction of 9.3 million km. Covid-19 impacts on services and changes to ways of working have driven the change, and sets a new baseline.
- NHS Lothian is the first board in Scotland to deliver a biodiversity, climate change and nature-based health benefits assessment of the natural capital assets (habitats) of their estate. We have established a base line of carbon sequestration, air quality regulation and biodiversity.

Buildings

Key Stats

- Buildings - reduction of **843** TCO_2 (-1.4%)
- Gas consumption increased by over 10.9 million kWh's (2,000 TCO_2, +4.7%)
- Electricity consumption has reduced by over 4.2 million kWh's (1,067 TCO_2, -6.0%)
- The **three largest sites** (RIE, WGH & SJH) accounts for **62%** of buildings emissions, the ten largest account for 92%.
- The three largest sites are equivalent to **16,328** average homes electricity and **12,620** gas consumption.
- The total across all sites are equivalent to **22,916** average homes electricity and **20,025** gas consumption

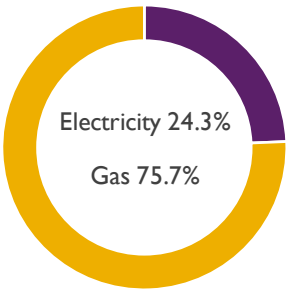
Energy Consumption				2019-2020		2019-2021	
	2018/19	2019/20	2020/21	Variation	% Change	Variation	% Change
Electricity	76,460,580	70,671,451	66,455,966	-5,789,129	-7.6%	-4,215,485	-6.0%
Gas	174,886,735	229,425,868	240,304,959	54,539,133	31.2%	10,879,091	4.7%
Water	833,796	1,494,105	1,091,963	660,309	79.2%	-402,142	-26.9%

NHS Lothian: All sites

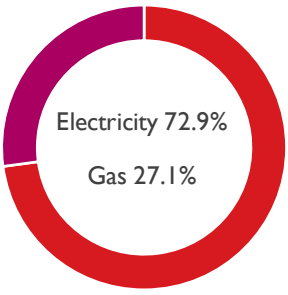
Utility Overview: Apr-20 - Mar-21

	Energy Usage (kWh/Mth)		Energy Cost (£/Mth)		CO_2 Emissions (TonnesCO_2/Mth)	
Month	Electricity	Natural Gas	Electricity	Natural Gas	Electricity	Natural Gas
Apr-20	6,329,257	21,116,588	£924,013	£369,154	1,462.8	3,867.7
May-20	6,259,954	17,739,052	£913,895	£310,109	1,446.8	3,249.1
Jun-20	6,302,847	15,048,357	£920,157	£263,071	1,456.7	2,756.3
Jul-20	6,376,503	13,268,331	£930,911	£231,953	1,473.7	2,430.2
Aug-20	6,255,515	13,385,118	£913,247	£233,994	1,445.8	2,451.6
Sep-20	6,501,499	15,581,698	£949,159	£272,394	1,502.6	2,853.9
Oct-20	6,696,349	20,350,872	£977,605	£355,768	1,547.7	3,727.5
Nov-20	7,008,369	24,150,367	£1,023,157	£422,189	1,619.8	4,423.4
Dec-20	6,969,206	26,358,798	£1,017,440	£460,796	1,610.7	4,827.9
Jan-21	6,260,063	27,275,497	£913,911	£476,822	1,446.8	4,995.8
Feb-21	6,697,611	23,921,762	£977,789	£418,193	1,548.0	4,381.5
Mar-21	6,112,649	23,593,374	£892,390	£412,452	1,412.8	4,321.4
Total	**77,769,822**	**241,789,814**	**£11,353,676**	**£4,226,895**	**17,974.2**	**44,286.2**

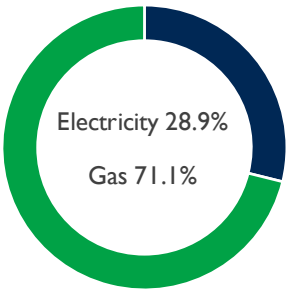
Usage Breakdown



Cost Breakdown



CO_2 Breakdown



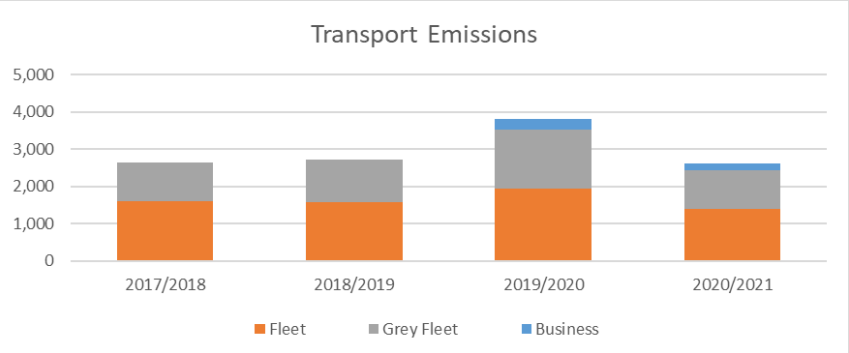
Commentary

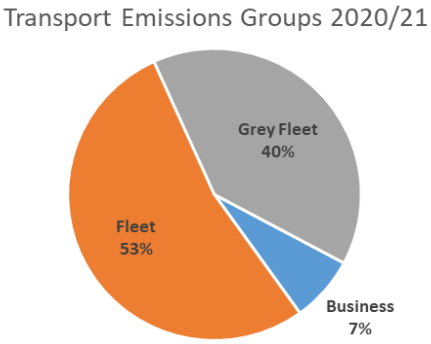
- The reduction in carbon emissions from buildings of 843 TCO_2, is due to a reduction in emissions from electricity based on lower demand and lower grid carbon factor, while there has been an increase in demand and associated emissions from natural gas.
- The difference in figures for electricity and gas shown in the two tables is due to a difference in invoiced utilities and reportable emissions. In-line with international standards we deduct energy consumption associated with external organisations operating within our property boundaries. The vast majority is apportioned to the University of Edinburgh who have large footprints at the RIE and WGH. Other partners include City of Edinburgh Council and West Lothian Council, all of which report their emissions under the same regulations.
- There is likely an impact of Covid-19 on energy consumption but this cannot be fully understood, due to complexity in the operational patterns of demand. There is an expected reduction in some areas due to lower service use but this could be counteracted by changes in ventilation, increased IT server demands and hot water consumption for cleaning.
- Electricity consumption is shown to have reduced year on year. Even with increased floor area, the change is positive. A high proportion is due to the effective operation of the Combined Heat and Power system at St John's Hospital. Other factors will include improvements to lighting through maintenance replacements, more efficient IT and more recently the increase in working from home.
- Gas has significantly increased over this period, in part due to the Combined Heat and Power system at St John's Hospital, as this system generates electricity on-site using network supplied gas. These systems provide substantial energy cost savings but due to the continued reduction in the grid electricity factor there is now a negative impact on carbon.
- Double running of RHSC and RHCYP buildings are contributing to higher emissions. Both sites within top 10 energy consumers, but there is an expected improvement in future years when the RHSC is decommissioned.
- The table above shows the high proportion of emissions associated with the major acute sites. The RIE, WGH and SJH account for 62% of the total buildings emissions. The 10 shown above account for 92%.

Transport

Key Stats

- Transport - decrease of **1,136** TCO_2 (-30%)
- 111 Electric Fleet Vehicles on the road, an increase of 71 vehicles from last year and 2 new eBikes.
- 49 EV Charge points installed, an increase of 45 from last year.





Transport	Consumption		Emissions (tCO2e)			
			2019/20	2020/21	Variation	% Reduction
Diesel (Fleet)	433,513	litres	1,562	1,089	473	30.3%
Car - petrol (Grey fleet)	3,207,893	km	799	559	240	30.0%
Car - diesel (Grey fleet)	1,506,986	km	409	254	156	38.0%
Petrol (Fleet)	132,842	litres	378	291	87	23.0%
Average Car* (Grey fleet)	1,224,082	km	364	210	154	42.3%
Car - hybrid (Grey fleet)	58,799	km	9	7	2	18.6%
Taxi - Business	3,476	km	123	1	123	99.4%
Train - Business	302,305	km	87	12	74	85.6%
Air - Business	10,798	km	56	3	53	95.0%
Bus - Business	76,932	km	39	9	29	75.9%
EV's - Business	18,898	kWh		4	-4	n/a
EV's - Fleet	41,343	kWh		10	-10	n/a
Taxi - Business	785,147	km		166	-166	n/a
Total			**3,825**	**2,616**	**1,210**	**31.6%**
* Unknown Fuel						

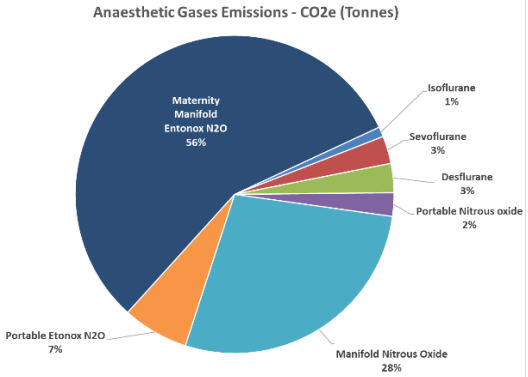
Commentary

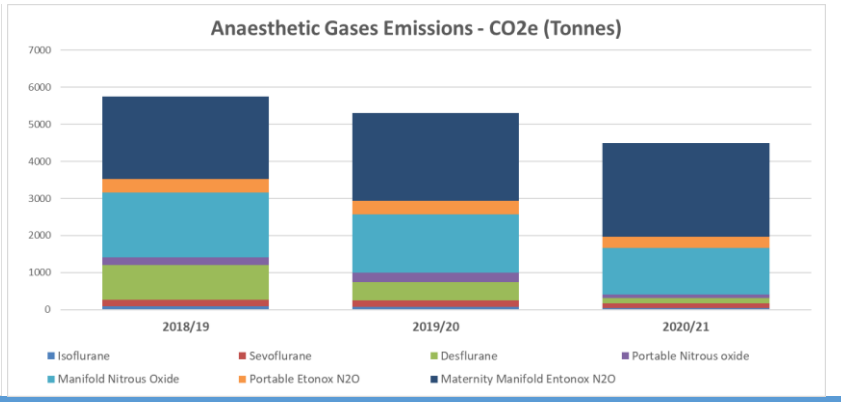
- Overall there has been a significant decrease in transport emissions, across most identified groups.
- There has been a significant decrease in the mileage and associated emissions from Grey Fleet of approximately 2,912,181 km. A reduction of travel across the grey fleet would be expected due to the impact of Covid-19, but a decrease of 33% can also be attributed to measures such as increased use of video conferencing and Near-me consultations that need to be maintained.
- The table above shows a comparison of emissions against 2019/20 for comparison against the previous year. Transport data is collated through a variety of sources, including expenses returns and is therefore based on available indicators to convert costs to distance. Further investigation is being undertaken to check the data, and improve for future reports and trend analysis.
- COVID 19 has brought rapid progress in the roll out of technology and organisational development to support remote working and consultations.
- Significant progress on transition of the fleet to Electric Vehicles and support infrastructure.

Anaesthetic Gases

Key Stats

- Medical Gases - reduction of **811** TCO_2 (-15%)





	CO2e			2019-2020		2020-2021	
Gas	**2018/19**	**2019/20**	**2020/21**	**Variation**	**% Change**	**Variation**	**% Change**
Isoflurane	87.2	72.5	45.8	-14.7	-16.8%	-26.7	-36.8%
Sevoflurane	182.3	179.3	125.5	-3.1	-1.7%	-53.7	-30.0%
Desflurane	929.3	492.6	133.1	-436.7	-47.0%	-359.5	-73.0%
Portable N2O	207.7	243.1	107.3	35.4	17.1%	-135.8	-55.9%
Manifold N2O	1747.2	1582.4	1248.0	-164.7	-9.4%	-334.5	-21.1%
Portable Entonox	369.5	361.1	300.7	-8.4	-2.3%	-60.3	-16.7%
Manifold Entonox	2229.7	2372.1	2532.1	142.4	6.4%	160.0	6.7%
TOTAL	**5753**	**5303**	**4493**	**-450**	**-7.8%**	**-811**	**-15.3%**
N_2O	4554	4559	4188	4.7	**0.1%**	-370.6	**-8.1%**

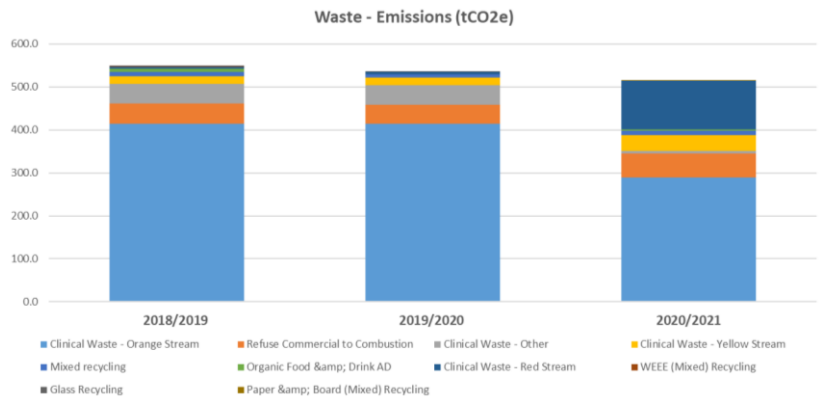
Commentary

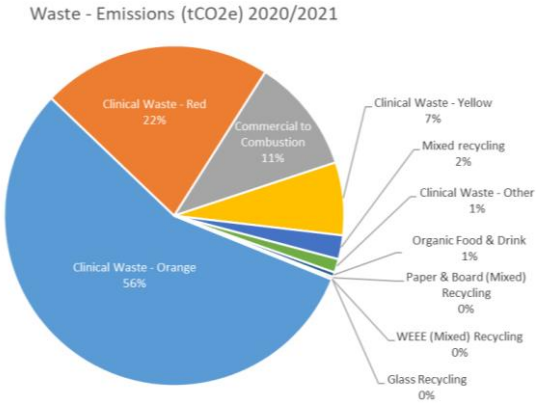
- The significant reduction in emissions associated with Medical Gases has again been driven by the clinical teams through engagement of local and national networks.
- Further investigation is required to understand the impact of clinical events on the consumption, to determine actual efficiency savings.
- The success is attributed to a highly engaged group based on sound evidence and recognition of the high environmental impact of anaesthetic gases.
- The key activities have been focused on minimising the use of Desflurane through use of lower emission alternatives with no clinical impact. This has resulted in a 15.3% reduction from the previous year. There is also a substantial reduction in emissions from Nitrous Oxide. Evidence and feedback will be sought to understand the activities and communicate the success throughout NHSS and beyond.
- Further improvements are considered possible and being investigated across multiple service lines, with the changes realised over the last 12 months there is a high level of confidence in further reductions.
- Data for 2018/19 corrected due to errors in gas emissions factors advised by national agency.

Waste

Key Stats

Waste - reduction of **20 TCO_2** (-2%)





Waste	Emissions (tCO2e)			
	2019/20	2020/21	Carbon Reduction	% Reduction
Clinical Waste - Orange Stream	414	288	126	30%
Refuse Commercial/Industrial to Combustion	44	56	-12	-29%
Clinical Waste - Other	46	7	40	86%
Clinical Waste - Yellow Stream	17	36	-19	-110%
Mixed recycling	8	12	-4	-47%
Organic Food & Drink AD	0	2	-2	n/a
Clinical Waste - Red Stream	5	113	-107	-1,986%
WEEE (Mixed) Recycling	*	0	0	n/a
Glass Recycling	*	0	0	11%
Paper & Board (Mixed) Recycling	*	1	-1	30%
Totals	**535**	**514**	**20**	**2%**

Commentary

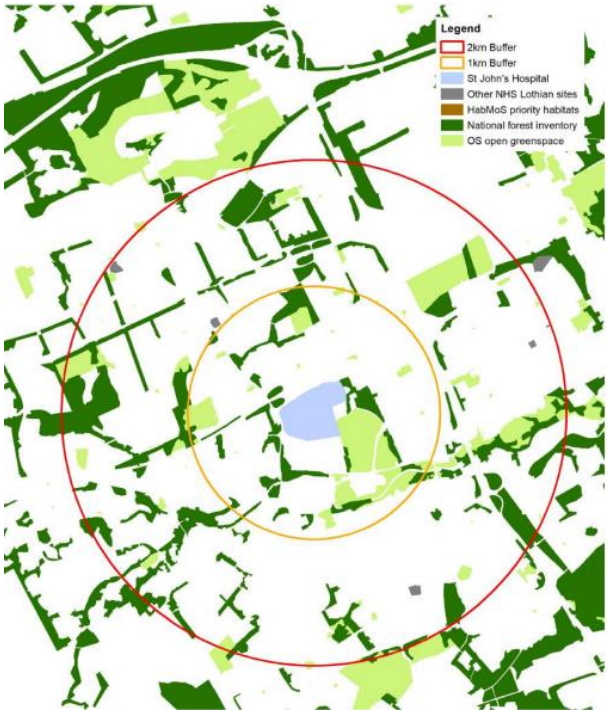
- Clinical Waste remains the highest emissions source, predominately due to intensive treatment method. Clinical waste data for last reporting year is of poor quality, but has significantly improved in 2020/21.
- Waste data continues to be challenging and typically has the lowest certainty and availability. The historic lack of concise data did not allow trend analysis and granular understanding.
- While waste is a very small portion of total emissions, around 0.7%, waste is recognised as a high priority based on feedback from frontline staff during sustainability engagement events.

Greenspace and Biodiversity

Key Stats

- We have established a base line of carbon sequestration, air quality regulation and biodiversity.

Carbon capture	2020/21	
	Annual physical flow	Annual monetary flow £(2020)
Carbon sequestration by greenspace (tCO2e/year)	282	£19,501
Air quality regulation tPM2.5/year	0.98	£225,993
Biodiversity units	484	N/A



Commentary

- NHS Lothian is the first board in Scotland to deliver a biodiversity, climate change and nature-based health benefits assessment of the natural capital assets (habitats) of their estate. The images and table above are drawn from this work.
- The flows of carbon sequestration and air pollution regulation were quantified across the estate and their monetary value estimated
- The valuation of these ecosystem services is key to providing full cost–benefit analyses, most importantly of changes to the estate that may reduce or increase the habitat types that perform the services.
- The values can be affected by changes in the built environment on a site, or simply by new grounds maintenance practices such as reduced mowing. Recommendation are currently being considered on how these flows can be increased.

Areas for Development

Scope 3 Emissions

Greenhouse gas emissions are categorised into three groups or 'Scopes' by the most widely-used international accounting tool, the Greenhouse Gas (GHG) Protocol. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain.

These include;

- Purchased goods and services
- Business travel
- Employee commuting
- Waste disposal
- Use of sold products
- Transportation and distribution (up- and downstream)
- Investments
- Leased assets and franchises

There are a number of benefits associated with measuring Scope 3 emissions. For many companies, the majority of their greenhouse gas (GHG) emissions and cost reduction opportunities lie outside their own operations. By measuring Scope 3 emissions, organisations can:

- Assess where the emission hotspots are in their supply chain;
- Identify resource and energy risks in their supply chain;
- Identify which suppliers are leaders and which are laggards in terms of their sustainability performance;
- Identify energy efficiency and cost reduction opportunities in their supply chain;
- Engage suppliers and assist them to implement sustainability initiatives
- Improve the energy efficiency of their products
- Positively engage with employees to reduce emissions from business travel and employee commuting.

Circular Economy

NHS Lothian Sustainable Development Framework and has a focus area on Sustainable Use of Assets, Waste and Recycling and an action to Engage with National Procurement and Zero Waste Scotland to support changes which accelerate the move to a circular economy in health care.

This annual Climate Change Report seeks to make a start on reporting on the Circular Economy in health care by including data from Warp-it resource re-distribution network of which NHS Lothian is a member and on some indicative commodities.

Warp-it

Our Annual Reuse Report from the portal is as below.

Membership 1,072 in total with 52 new members, 181 active members and 19 partners in current year

Avoided procurement and waste charges	£13,192
Amount of waste diverted	987kg
Amount of carbon emissions avoided	3194 kg CO2

To give some perspective on these figures, in the current year we will replace our birthing beds and bassinettes, offering the equipment to charities through Warp-it.

The Warp-it value of the bassinettes represents a cash saving or charitable donation of £31,116, a carbon saving of 21,900kg CO_2 and avoidance of 8000kg of waste.

This does not represent the full extent of NHS Lothian's activities in relation to re-use – our eHealth and medical physics departments have arrangements in place to donate obsolete equipment to charities and the decommissioning of RHSC has sought to ensure that opportunities for recycling is maximised, however there is currently no organisational overview of practice or accounting for the wider contribution to re-use.

Indicative commodities

Textiles

NHS Scotland disposes of 1,230 tons of textile waste per year, based on NHS Lothian NRAC share of 14.96% would give an estimation of NHS Lothian disposing of 184 tonnes of textiles per year.

Based on the carbon footprint of 9.52kg per tonne of Polyester (most NHS lines are poly) an estimate of our CO_2 foot print for textiles would be 1,752kg CO_2 per annum. Bottom up data on the carbon foot print of our textile products is not currently available.

Linen and scrubs (Laundry orders)

Year	Items	Carbon	Cost	Waste tons	Waste cost
2019-2020	146,190	Not known			
2020-2021	192,310	Not known			

Uniform items including gloves and shoes (two main suppliers)

Year	Items	Carbon	Cost	Waste kg	Waste cost
2019-2020	56,479	Not known	£423K	Not known	Not Known
2020-2021	62,701	Not known	£637K	Not known	Not known

If returned to linen rooms uniforms are shredded and disposed of in the general waste.

Other disposable items

Medicine cups

Year	Items	Carbon	Cost	Waste kg	Waste cost
2019-2020	3,703,800	Not known	£26,678	Not known	Not Known
2020-2021	3,258,600	Not known	£23,554	Not known	Not known

Foam insulated cups

Year	Items	Carbon	Cost	Waste kg	Waste cost
2019-2020	218,000	Not known	£3428	Not known	Not Known
2020-2021	194,000	Not known	£3563	Not known	Not known

Cup plastic water

Year	Items	Carbon	Cost	Waste kg	Waste cost
2019-2020	759,000	Not known	£6,999	Not known	Not Known
2020-2021	3,161,200	Not known	£29,288	Not known	Not known

What next?

This report has outlined the significant progress made this year both in reducing our carbon emissions and in strengthening the organisation to make gains in sustainable development in the coming period. Our Sustainable Development Framework and Action Plan lays out the urgency, scope and focus of the action we need to take. Priorities in the coming year will include

- Producing an NHS Lothian Climate Adaptation and Mitigation Strategy to ensure that NHS Lothian is prepared to deal with the effects of climate change and has plans to in appropriate adaptation and mitigation measures
- Strengthening our staff engagement across NHS Lothian with increased site-based sustainability networking and sustainability support for clinical care networks
- Expanding internal and public facing communications
- Building Lothian wide partnerships and networking with statutory and voluntary organisations to address sustainable development goals in tandem with related areas such as inequalities and COVID recovery
- Building on the progress made with data collection and analysis to provide detailed evidence of action needed and progress made
- Making progress in ensuring that sustainable development outcomes are integrated in all NHS Lothian planning and reporting processes