



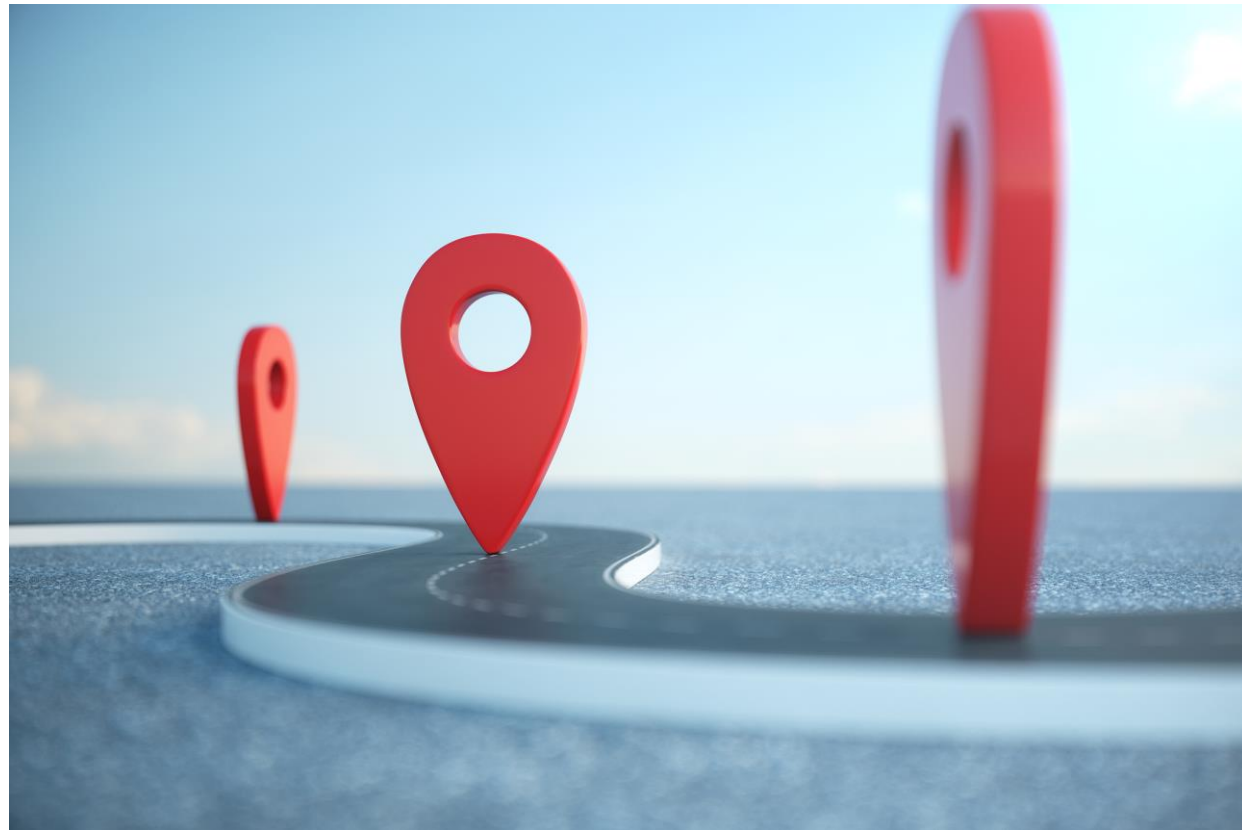
Carbon Neutral Group Carbon Assessment Report for
Liverpool Heart and Chest NHS Trust


Liverpool Heart and Chest Hospital
NHS Foundation Trust



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WELCOME

Carbon Neutral Group has the pleasure in presenting our Carbon Footprint baseline Report to the team at Liverpool Heart and Chest Hospital NHS Foundation Trust, (LHCH) . This report forms a key part of our communication strategy with you, a strategy which is designed to promote effective two-way communication throughout the baseline process with those charged with governance and ESG reporting.

The report shows highlights each of the emission factors that were in scope for the project. The report highlights and breaks down each emission area with the corresponding carbon footprint. The report has used data provided by LHCH for the period of March 2018 until April 2022.

The measuring & reporting approach that has been taken by Carbon Neutral Group has followed Defra's Guidelines on how to measure and report greenhouse gas emissions. Emissions are reported in tonnes of CO2 equivalents (CO2e).

This report contains matters which should properly be considered by the Team as a whole to help and guide any carbon reduction strategies. We expect that the LHCH Team will refer such matters together with any recommendations, as it considers appropriate.

We look forward to discussing this plan with you in the future and to receiving your input to the findings.

G Curtis

George Curtis

17/09/2022



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EXECUTIVE SUMMARY

In October 2020, the NHS became the world's first health service to commit to reaching carbon net zero, in response to the profound and growing threat to health posed by climate change. Each Trust has been tasked to create their own Green Strategy. Before this strategy can be put into practice, a baseline assessment has to be undertaken to show the current Carbon Footprint created and emitted by the Trust. This report is the baseline assessment for Liverpool Heart and Chest Hospital NHS Trust.

This report outlines the greenhouse gas emissions for arising from the activities of LHCH during the period aligning to the financial years of 2018-22. The requirement was to breakdown the first two emission Scopes, with a focus on Scope 3 at a later stage.

The findings from this exercise have all been broken down into subsections areas within each scope. This will help identify the high risk areas for the Trust and highlights where the team needs to focus time and attention as they strive towards their Net Zero goals.

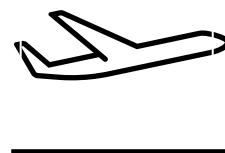
The calculations to create the Carbon Emission figures are based on the guidelines provided by the UK Government GHG Conversion Factors for Company Reporting, the Department for the Environment, Food & Rural affairs as well the Department for Business, Energy & Industrial Strategy.

The date of the factors used in the report all align with the relevant year's government report for 2018-22.

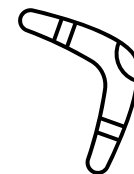
We have taken assumptions on items where the data hasn't been available and these are commented on within the sections.



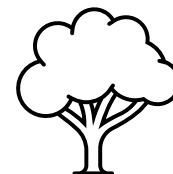
**3,152.52 tonnes of carbon
where produced by LHCH in the
financial year of 2021 -22**



**This is the equivalent
of a LHCH team
member doing 476
return trips from
Liverpool Airport to
Sydney, Australia**



**Offset your Carbon
Footprint by planting
3152 trees**



SECTION 1

Scope 1



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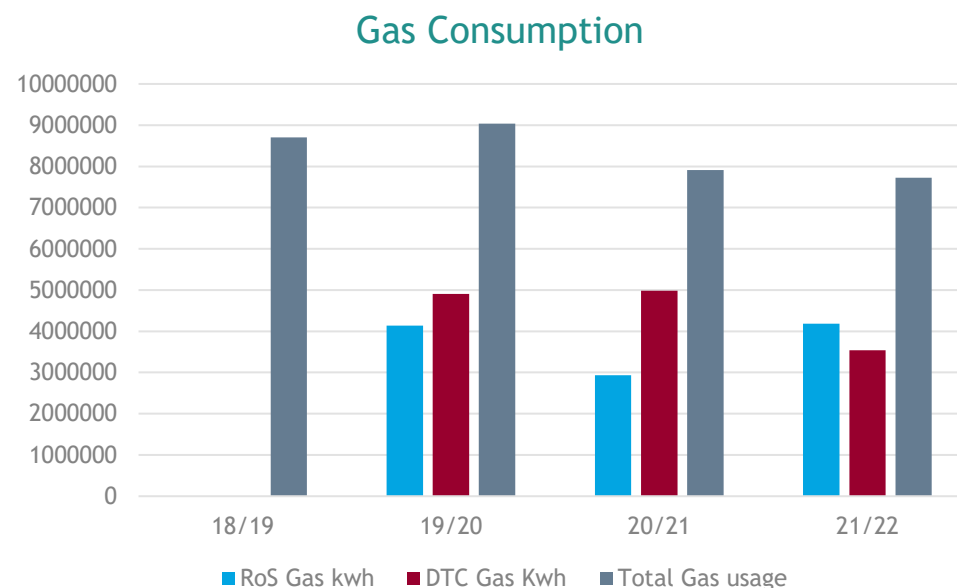
SCOPE 1

Gas Consumption

The total gas consumed by the Trust over the stated period does show a steady decrease. The data for 2018/19 isn't available for the buildings however we do have an overall figure. In 20/21 and 21/22 LHCH had an unexpected drop in gas consumption throughout the challenging pandemic period.

The site as a whole saw a reduction in Gas use during the financial year of 2020/21. This is due to the Trust having a reduced activity in its operating theatres and catheter procedures. With less operations and procedures taking place due to the global pandemic, there wasn't the same demand for heating. As the pandemic started to ease, we have seen the demand for these operations get back to normal and in 2021/22 the gas demand was back to the pre pandemic levels.

	Years in Scope			
	18/19	19/20	20/21	21/22
RoS Gas kwh	N/A	4,132,872	2,929,816	4,182,411
DTC Gas Kwh	N/A	4,903,219	4,985,355	3,542,159
Total Gas usage	8,701,080	9,036,091	7,915,171	7,724,570



*Diagnostic Treatment centre (DTC)

*RoS - Rest of Site

SCOPE 1

Gas Consumption Carbon Impact

As expected the carbon footprint for the buildings and the Trust follows the same pattern as the consumption. The total gas consumption by the Trust over the period of the analysis does show a steady decrease. The older Hospital building had a steady gas use and with it, a higher carbon footprint.

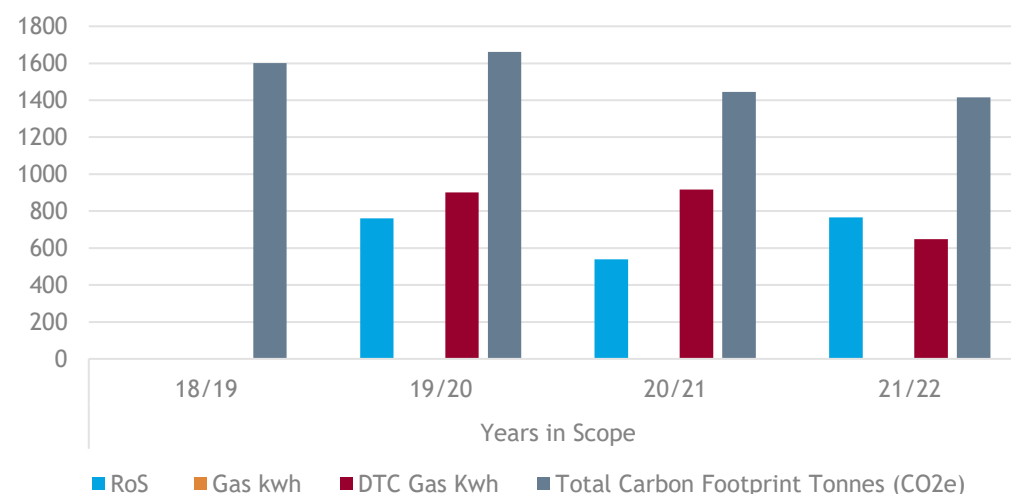
We can see that in the FY 21/22 that the new build was more heavily utilised. This is reflected in the usage in the previous page and the corresponding jump in the carbon footprint.

During the calculation process, we factor in the GHG Conversion Factors and the Gas CO2e factors and the small improvements that the calculations give compared to the previous years. This improvements could be due to better and more efficient ways that the grid are obtaining and distributing the gas.

With gas being the primary manner in which the Trust is heated, the recommendation is to investigate methods to further insulate both buildings or review as and when the heating is on.

	Years in Scope			
	18/19	19/20	20/21	21/22
RoS	N/A	760	539	766
Gas kwh	N/A	901.5	916.7	648.8
DTC Gas Kwh	N/A	901.5	916.7	648.8
Total Carbon Footprint Tonnes (CO2e)	1,600.7	1,661.3	1,445.4	1,414.8

Gas Consumption Carbon Footprint



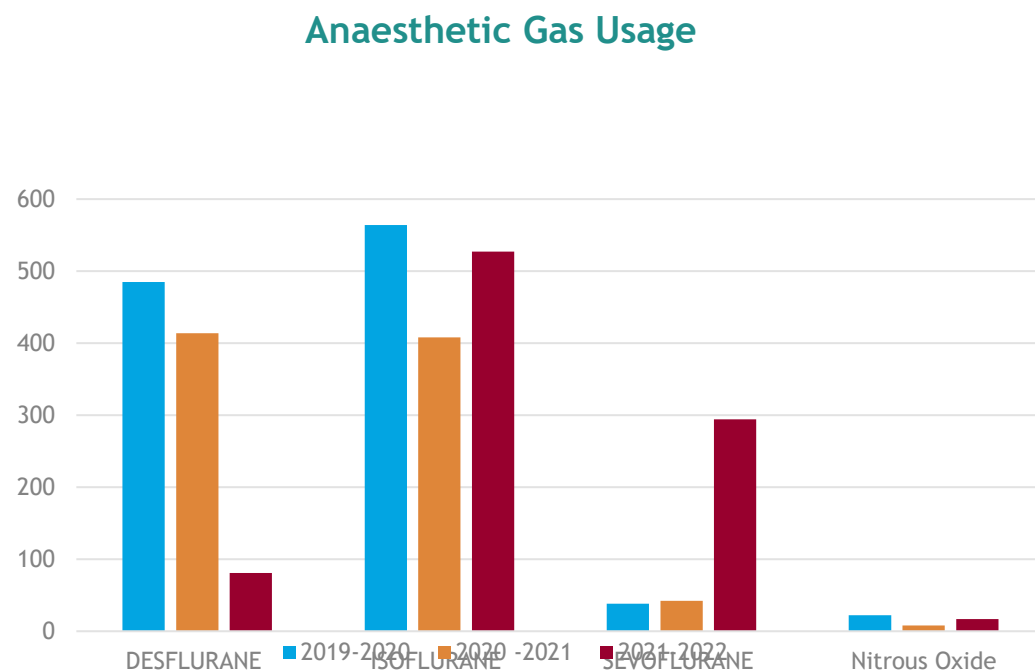
SCOPE 1

Anaesthetic Gas Findings

The anaesthetic gases used by the Trust has been a key area of proactive change and the rewards that this change has brought. Overall the consumption of anaesthetic gases has decreased but not by an amount that is reflected in the Carbon Footprint. The Trust has moved away from Desflurane and to Isoflurane and an increased use of Sevoflurane. Sevoflurane use has gone from 38 bottles in FY 19/20 to 294 in the FY 21/22.

The Nitrous Oxide cannisters are factored in as a whole unit each time. The reason for this is that if a Trust returns the bottles with any gas inside, the supplier has to empty out all the gas from the pressurised cannister.

	Years in Scope		
Type of Anaesthetic Gas	2019-2020	2020 -2021	2021-2022
DESFLURANE (1 x 240mL)	485	414	81
ISOFLURANE (1 x 250mL)	564	408	527
SEVOFLURANE (250mL)	38	42	294
Nitrous Oxide	22	8	17
Total Bottles Used	1109	872	919



SCOPE 1

Anaesthetic Gases Carbon Impact

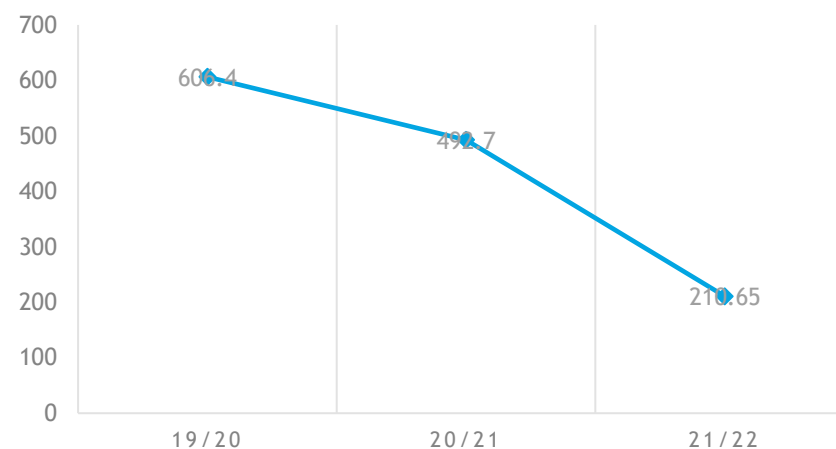
Across the NHS, anaesthetic gases are commonly used as a part of everyday surgeries. These gases alone, are responsible for over 2% of all NHS emissions.

Amongst anaesthetic gases, desflurane is one of the most common, but also one of the most harmful. It has 20 times the environmental impact of other less harmful greenhouse gases and using a bottle has the same global warming effect as burning 440 kg of coal.*

The change in anaesthetic gases has had a dramatic impact on the footprint in this part of the scope. With the usage of Desflurane dropping from 485 to 81 bottles, the carbon footprint has dropped for that item from **463.83 to 77.46** tonnes CO₂e. The overall Carbon Footprint for the gases has decreased by almost 2/3.

	Years in Scope		
Type of Anaesthetic Gas	19/20	20/21	21/22
Desflurane Tonnes	463.83	395.93	77.46
Isoflurane Tonnes	119.18	86.21	111.36
Sevoflurane Tonnes	2.98	3.14	6.06
Nitrous Oxide Tonnes	20.41	7.42	15.77
Total Carbon Footprint, Tonnes CO₂e	606.4	492.7	210.65

ANAESTHETIC GASES CARBON FOOTPRINT



The calculations of the Carbon footprint are obtained with the guidance of the Royal College of Anaesthetists and the Association of Anaesthetists.

*referenced from <https://www.england.nhs.uk/greenernhs/whats-already-happening/putting-anaesthetic-generated-emissions-to-bed/>

SCOPE 1

Refrigerant Findings and Carbon Impact

From the data provided, the Trust used 8.5 litres of refrigerant over a three-year period. This refrigerant is used for all air conditioning units and refrigeration storages in the Trust. The associated footprint for the 8.5 litres was 14.44 tonnes of CO₂e.

The third-party team that provided the data did acknowledge that the data may not be complete due to the complications during the pandemic. This could mean that not all units were working or were regularly maintained. The assumption was made that the same amount of refrigerant was used each year. This may not have been the case.

The recommendation here, is that refrigerant gases are some of the most carbon heavy and once the third party starts to maintain and report accurately that this area of the NHS footprint may start to rapidly rise. As soon as the data is available for the most recent financial year, we should review it and check the associated carbon footprint.

Refrigerant Type	Amount Used	Carbon Footprint Tonnes CO ₂ e	Refrigerant Type
R407C	7.0 kg	13.43	R407C
R32	1.5kg	1.014	R32

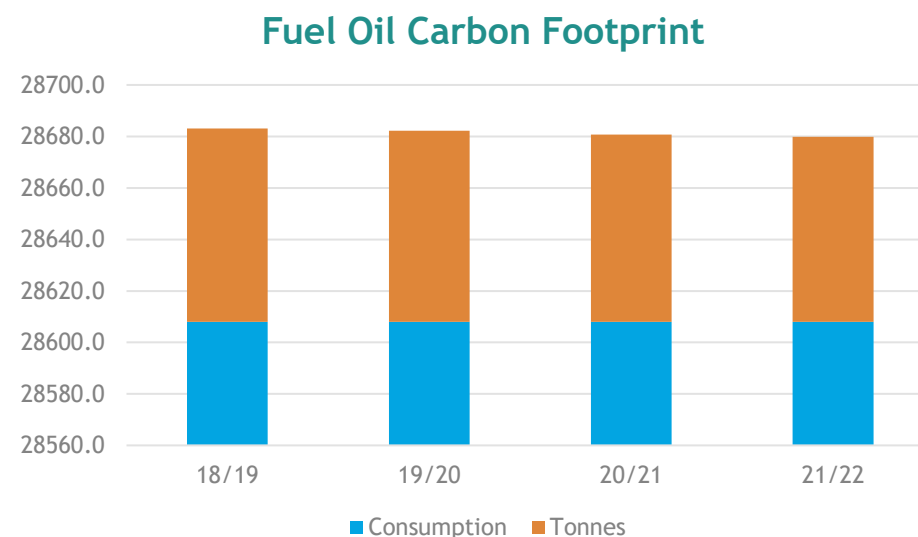
SCOPE 1

Fuel Oil Use Consumption Findings and Footprint

To cover the scope requirement for the Fuel Oil use, we have been reviewing the Trust diesel generators. The Trust has two pairs of Diesel generators. The generators are tested to make sure that if the Trust has a power issue then the generators will automatically turn on and provide power. To ensure that this happens, they diesel generators are tested weekly for 20 minutes each time and in total for the month they are in use for just over 3 hours per month.

As the generators are used for the same amount of time each trial run they use roughly the same amount of diesel. Each time they are tested and ran, they use diesel and therefore emit a carbon footprint. The findings for this usage are below.

	Years in Scope			
	18/19	19/20	20/21	21/22
Diesel Consumed per annum approx. (litres)	28,608.0	28,608.0	28,608.0	28,608.0
Carbon Footprint Tonnes CO2e	75.2	74.2	72.8	71.9



SCOPE 2

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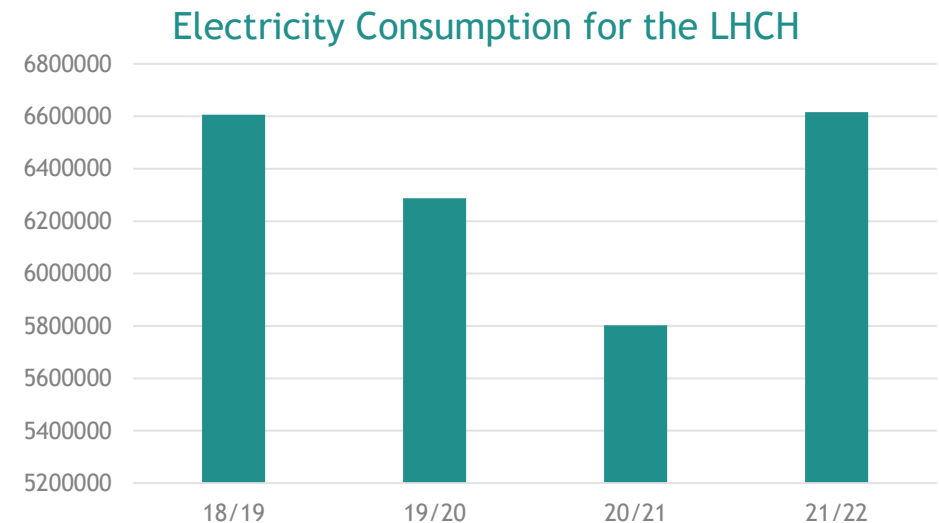


SCOPE 2

Electricity Consumption Findings

The consumption of Electricity by LHCH has fluctuated each year. This may have been as a result of Covid 19 and that the hospital had pressures and resourcing that it hadn't had before. During the period that we have researched we can see that overall the electricity usage was steady. The only change was in FY 20/21. In this year we can see a fall in electricity usage. The main for this is that during this time X occurred.

	Years in Scope			
	18/19	19/20	20/21	21/22
Electricity Usage Kwh	6,606,605	6,287,078	5,802,506	6,616,101.7



SCOPE 2

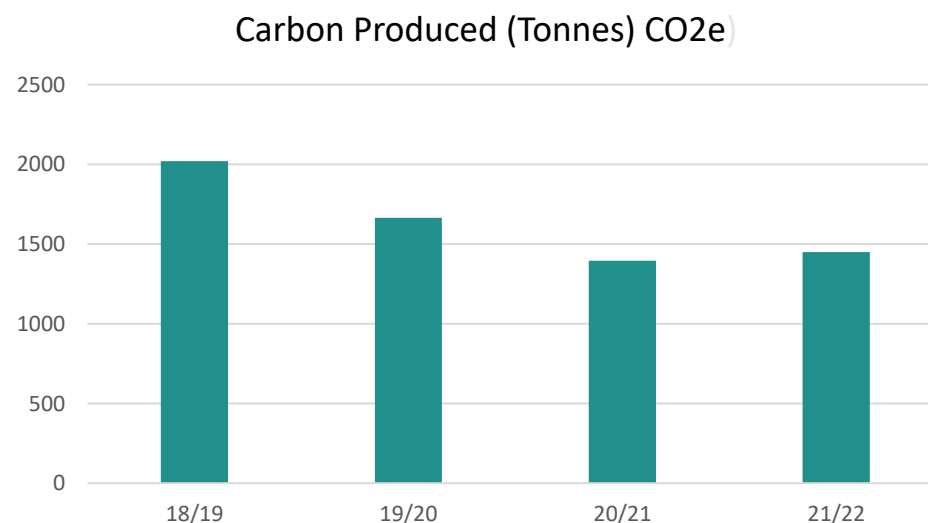
Electricity Consumption Carbon Impact

The consumption of Electricity by LHCH has been constant, apart from the FY 20/21. The use of electricity will have a direct impact on the Trusts carbon footprint. As the diagram shows, overall trend of the footprint is down despite a slight increase in FY 21/22. The footprint is reducing despite the usage being constant is a point of interest. The reason for this is down to the overall electricity production. We have seen over the past years a decrease in carbon emitting fuels used to create power such as coal and a move towards renewable energy, i.e. wind or solar. This move has had a positive impact on the carbon footprint for electricity as a whole.

In the 2019 GHG Conversion Factors, there was a 10% decrease in the UK Electricity CO2e factor compared to the previous year. In the 2020 update, the CO2e factor decreased (compared with 2019) again by 9%. In the 2021 update, the CO2e factor has again decreased by 9% (in comparison to the 2020 update).*

2018 boilers were replaced for more efficient for the cath labs and theatres which had a knock on impact for 19/20

Years in Scope				
	18/19	19/20	20/21	21/22
Electricity Usage	6,606,605	6,287,078	5,802,506	6,616,101.7
Carbon Created (Tonnes) CO2e	2,020.96	1,664.55	1,396.24	1,450.69



*Reference from the Greenhouse Gases report and conversion factors

SCOPE 1 & 2 FINDINGS

Carbon Footprint Report & Summary

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SCOPE 1 & 2 - FINDINGS

Summary and Totals

LHCH has started its journey to Net Zero. Part of this is the firstly to understanding the Trusts Carbon Footprint. The goal of this work is that if you know your higher risk or emission producing's areas, then these can be addresses first to help lower the overall emissions produced by the Trust.

The first part of the journey is for the Trust to focus on the Scope 1 & 2 emissions. The below table breaks down each of the elements of the scopes with the carbon footprint per item. This breakdown gives the Team at the Trust the information on what areas to target next on their Net Zero Journey. Overall the Trusts Carbon Footprint is reducing however the two main emission areas, Gas and Electricity, only have minor reductions over this period of time.

The key win for the Trust is the change of gases in in the Anaesthetics. This change has been dramatic and a clearly noticeable in reducing the overall footprint.

An area to watch is the refrigeration.

- The key win for the Trust is the change of gases in in the Anaesthetics. This change has been dramatic and a clearly noticeable in reducing the overall footprint.
- A key area to watch is the refrigeration. This is a high emissions risk area. If the third party has not been able to service the units due to covid then we may see a spike in their footprint over the next year.

	Reporting Years			
	18/19	19/20	20/21	21/22
Scope 1				
Gas Total	1600.7	1661.3	1445.4	1414.8
RoS	N/A	760	539	766
DTC	N/A	901.5	916.7	648.8
Diesel Oil	75.2	74.2	72.8	71.9
Refrigeration	N/A	4.5	4.5	4.5
Anaesthetic Gases	N/A	606.4	492.7	210.65
Scope 2				
Electricity Tonnes	2,020.96	1,664.55	1,396.24	1,450.69
Total Carbon Footprint Scope 1 & 2 Tonnes CO2e	3,696.76	4,010.92	3,421.61	3,152.52

