

Executive Summary:

Barts & the Royal London NHS Trust

2007 carbon footprint



Project Partners:

Barts and The London 
NHS Trust


London

 **CenSA**
Centre for Sustainability Accounting



London Procurement Programme

ARUP

Overview

As part of a regional London NHS carbon footprint research project, a full consumption-based footprint and intervention study was undertaken with Barts and the London NHS Trust – the first Trust level study in England. The aim was to use develop and test a Trust level footprint methodology based on that used to calculate the national and regional footprints, thus ensuring data is fully comparable between national, regional and Trust levels. By quantifying possible Trust actions in carbon and cost savings

The study showed the overall emissions for BLT were **172,580tCO₂**, which equates to:

- **4.5%** of all **NHS London** Trusts emissions
- **0.9%** of **NHS England** emissions.
- **21.5 tonnes** of CO₂ per BLT **staff member**

In addition, the overall footprint breaks down as follows:

- **Building Energy - 88,500tCO₂** (electricity and gas consumption: 51% of the total)
- **Procurement - 77,459tCO₂** (the embedded emissions within the goods and service purchased by the Trust: 45% of the total)
- **Travel - 6,620tCO₂** (movement of staff, visitors and patients: 4% of the total)

These results show the importance of considering procurement emissions which make up nearly half the overall footprint, and are not considered by traditional carbon footprinting techniques.

Opportunities to save costs and carbon were then investigated for various interventions in relation to building energy and procurement sectors, as summarised below:

Intervention sector	Trust actions	Estimated annual savings	
		Expenditure	Carbon reductions
Building energy	<ul style="list-style-type: none">• Install CHP at Royal London• Connect Citigen district heating• Optimise lighting controls	£550,000	14,000 tCO ₂
Procurement	<ul style="list-style-type: none">• Improve waste segregation• Install best practice ICT systems	£650,000	1,100 tCO ₂

Table 1 – Summary of Barts and the London study interventions and associated savings

Overall, this pilot Trust study provides important results for NHS Trusts:

1. The consumption-based footprint and intervention methodology has been used for the first time with an NHS Trust, and the results have demonstrated the validity of the technique which could be applied more widely by other NHS Trusts.
2. Barts and the London is a large NHS trust with a consequently high total carbon footprint, but this also means opportunities for carbon and costs savings are significant: the high level studies in the building energy and procurement sectors suggest the total footprint can be reduced by nearly 10%, whilst also providing savings over £1M in expenditure.

Background

Following publication of the NHS Carbon Reduction Strategy for England, “*Saving Carbon, Improving Health*”, carbon footprinting was recognised as fundamental to monitoring and managing carbon reduction, and an issue the local NHS could benefit from support with. Consequently the Regional Public Health Group – London and NHS London commissioned Arup to develop a methodology that elucidates the 60% associated with procurement utilising the detailed procurement data available in London.

The study employs a consumption-based approach examining embedded emissions from the travel, building energy and procurement sectors, and is thus compatible with the methodology adopted for the national level footprint, allowing clear comparisons to be made. It aimed to create a regional baseline carbon footprint assessment (for the year 2007) encompassing all NHS organisations in London. In addition, a need was identified for a pilot trust-level footprint study, to investigate the feasibility of applying the consumption-based technique locally.

In order to meet these twin aims, the overall project scope was split into two parts:

- **London NHS Trusts carbon footprint study (2007):** baseline assessment of the total regional London NHS Trusts carbon footprint.
- **Carbon footprint study of Barts & the London NHS Trust (2007):** undertake the first consumption-based footprint study for an NHS Trust in the London region. The key analysis results and findings are contained in this Executive Summary.

The overall aim of the Barts and the London study was therefore to develop an effective pilot project such that the methodology and the results could be of benefit to other Trusts. To achieve this, the following two project objectives were set out:

1. Quantify the first total consumption-based carbon footprint for Barts and the London (BLT) NHS Trust within the London region, to provide an assessment of the baseline (2007) footprint and identify carbon ‘hotspots’.
2. Review possible interventions leading to the quantification of both carbon and cost savings.

BLT study: carbon footprint results

The total BLT consumption-based carbon footprint for 2007 was calculated to be 172,580tCO₂. The breakdown for the three emissions sectors of travel, building energy and procurement are shown below:

Sector	2007 CO ₂ emissions	
	tCO ₂	% of total
Travel	6,620	4%
Building energy	88,500	51%
Procurement	77,459	45%
Total	172,580	100%

Table 2 - 2007 London NHS Trusts CO₂ emissions: Primary sector breakdown

The BLT footprint breakdown is shown overleaf, alongside the NHS England and London NHS Trusts results. Procurement and building energy are the largest sectors. Overall, BLT emissions are equivalent to:

- 0.9% of the total NHS England emissions
- 4.5% of all London NHS Trust carbon emissions
- 21.5 tCO₂ per BLT staff member.

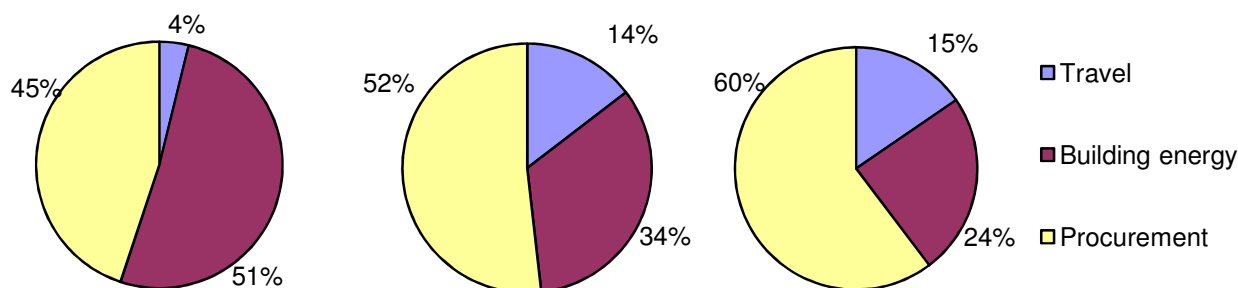


Figure 1: 2007 BLT (LHS); London NHS Trusts (Middle) and NHS England (RHS) footprint breakdown

In addition, the following 4 sub-sectors were found in the analysis to have the largest emissions, accounting for over 80% of the total footprint:

Main sector	Sub-sector	2007 CO ₂ emissions	% of total footprint
Building energy	Grid electricity	55,330	32%
	On-site gas consumption	33,170	19%
Procurement	Medical Instruments /equipment	32,559	19%
	Business services	18,177	11%

Table 3 – the four largest BLT emissions sub-sectors

The “Greenhouse Gas Protocol” (also known as the GHG Protocol - refer to www.ghgprotocol.org) is the most commonly used standard methodology for emissions reporting worldwide, and categorises emissions as being Scope 1, 2 or 3, as outlined below

- **Scope 1 emissions:** direct GHG emissions occurring from sources owned or controlled by the Trust. Examples include vehicle fleet emissions and on-site emissions from boilers.
- **Scope 2 emissions:** GHG emissions from the off-site generation of grid electricity.
- **Scope 3 emissions:** all other indirect emissions, which are a consequence of the Trust’s activities but occur from sources not owned or controlled by the Trust. Examples include ‘upstream’ emissions from the production and transportation of purchased goods, and ‘downstream’ emissions from the use and disposal of the Trust’s products and services.

Traditional carbon footprinting techniques consider only scope 1 and 2 emissions as categorised under the GHG Protocol. The BLT study therefore shows the importance of considering the Scope 3 (indirect) emissions as they account for nearly half the overall footprint as shown below:

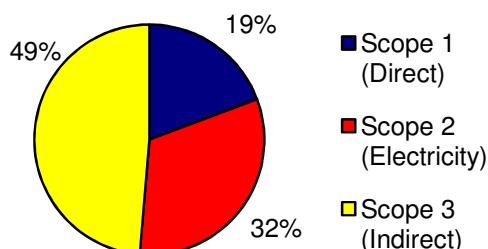


Figure 2: BLT footprint split by Scope 1, 2 and 3 emissions sectors as defined by the GHG Protocol.

Opportunities for savings: building energy

As shown earlier building energy comprises over half of the total footprint value, with electricity providing the largest sector. As the existing estate is being regenerated through a current PFI project, the focus of future actions related to measures that can be taken which can have an effect on the new build programme were examined.

Following a review of possible measures, the following two priorities emerged based on highest carbon and cost savings:

- CHP at the Royal London site:** the installation and commissioning of a 3MWe CHP unit at the Royal London hospital would currently save £500,000 per year and pay for itself in less than four years. In addition, annual CO₂ emissions savings occur of 9,000tCO₂ (10% of 2007 building energy emissions). Whilst technical barriers exist in relation to the installation of the CHP system, the magnitude of the possible savings are significant.

Key action: undertake a detailed feasibility study relating to the possible CHP unit, investigating issues including potential siting, construction, commissioning, capital costs and procurement options.

- District heating at the Barts site:** Connection to the Citigen district heating scheme could reduce CO₂ emissions by up to 4,000tCO₂ (5% of 2007 building energy emissions). Cost savings would depend on the purchase heat rate from Citigen, and also Citigen's ability to upgrade and connect Barts to the system.

Key action: commence detailed discussions with Citigen in relation to the feasibility of connection, heat pricing and connection costs.

Opportunities for savings: procurement

Over £230M was spent in 2007/08 on the procurement of goods and services within the Trust; more than 20 times that on building energy. Interestingly, whilst the cost of procurement was substantially higher than that of building energy, the proportion of the overall footprint and subsequent emissions were nearly equal.

10 'quick win' items covering 3% of total spend were examined across three sub-sectors: equipment, consumables and services. As the summary table below shows, there is potential to reduce significant costs and carbon emissions:

Sector	Item	Annual Procurement Cost	Estimated savings based on best practice' operations	
			Annual carbon savings (tCO ₂)	Annual cost savings (£)
Equipment	X Ray Equipment	£2,513,934	10	£25,000
	Servers	£1,113,649	660	£150,000
	PCs	£808,554	139	£13,035
	Printers / photocopiers	£762,015	68	£68,000
Consumables	Laser Printer Consumables & Cartridges	£442,684	37	£88,500
	Copier & Printer Paper	£192,596	43	£38,400
	Labels - General Stationery	£154,346	6	£5,000
Services	Clinical waste disposal treatment	£485,071	60	£135,000
	Confidential waste disposal	£331,236	40	£100,000
	Domestic waste disposal - landfill	£67,234	3	£6,720
Totals		£6,804,085	1,067	£629,655

Table 4 – BLT procurement interventions summary

Key procurement actions

- **Waste:** implement the waste hierarchy across the Trust to reduce the domestic, confidential and clinical waste streams.
- **ICT:** conduct a review of all ICT equipment to identify how to move over to best practice, (e.g. the use of 'Follow-me' combined photocopiers/printers)
- **Expenditure review:** a more detailed review of E-class spend should be undertaken to examine in particular 'less essential' expenditure, such as spending on bottled water.
- **Procurement contracts:** the changes in procurement activities outlined above may require negotiating new supply contracts, and so a review of all such contracts (i.e. purchase and leasing) will enable the Trust to understand and plan for any penalty costs that may be incurred.

Summary implications of the BLT study for other Trusts

Overall, the study is the first of its kind to have been completed for an NHS Trust, and yields two important results for the Trust:

- The footprint technique has allowed the calculation of the full consumption-based emissions for the Trust for the baseline year 2007.
- The interventions study identifies opportunities to take action on cutting emissions whilst also reducing expenditure.

Whilst these results are important to the Barts and London Trust, the overall aim of the pilot study was to investigate the applicability and benefits adopting a similar approach by other NHS Trusts in the London region. With this in mind the following conclusions can be drawn:

- **Footprint validity:** the technique has yielded credible emissions values when compared to the London NHS Trusts and NHS England results.
- **Transferability:** Based on the evidence of this pilot study, the methodology for both the footprint calculations and interventions study can be applied to other Trusts which are interested to calculate and examine their full consumption-based emissions in more detail.
- **Data requirements:** To undertake the footprint calculation, data is required relating to travel, building energy and procurement. The key dataset required is the procurement expenditure breakdown – ideally this would be available using the E-class data structure. Expenditure data not available in E-class would need to be separately mapped to emissions categories.