Delivering a Net Zero NHS

Competition for development funding

NHS England
NHS Improvement
SBRI Healthcare

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SBRI HEALTHCARE

The AHSN Network

NHS

Contents

Executive Summary

Climate change is a health emergency, and the growing crisis presents a global challenge. Innovation is key to developing technologies to address this complex problem, and investment now will accelerate action and reduce the costs of decarbonisation across the sector. Through addressing climate change, we will improve the health of the population now and into the future.

In 2020 the UK's National Health Service became the first health system in the world to commit to getting to net zero carbon. Two ambitious yet feasible targets were set:

1. Net zero scope 1 & 2 emissions by 2040, with an ambition for 80% reduction by 2028–2032.
2. Net zero scope 3 emissions by 2045, with an ambition for 80% reduction by 2036–2039.

Shifting to a net-zero health system presents unique challenges and meeting this commitment will involve every setting of care reducing emissions without compromising on the quality of care that is delivered. The impact of the COVID-19 pandemic on these commitments varies - from challenges, such as the impact on vulnerable populations who are already most at risk from the effects of climate change, to opportunities, such as the shift to more sustainable care pathways. Through the digital transformation and move to telemedicine, patients now receive care closer to home, reducing care miles and emissions.

This competition seeks to address the challenge of meeting the NHS net zero targets, considering the systemic complexity, the supply chain and product lifecycle associated with all innovations proposed as well as the impact that these solutions will have on carbon emissions.

The ambition is to find innovative solutions that will reduce carbon emissions through four challenge areas:

a. Reducing emissions from care miles
b. Reducing emissions from surgical pathways
c. Reducing nitrous oxide emissions
d. Tools to support low-carbon decision making

Applicants are asked to consider the whole carbon footprint life cycle of their innovation and articulate clearly how they will measure impact on carbon emissions and how the innovation will meet the NHS net zero goals.

Although there has been significant progress in the adoption of new tools and technologies in the NHS to meet net-zero, there is still plenty of work to do. The pandemic has accelerated changes in ‘digital first’ programmes boosting support for optimal patient management and care out of hospitals. If the NHS is to reach its goal of becoming the world’s first net-zero carbon healthcare system, the continued and appropriate use of technology is 'critical' to the NHS' future. There is no reason to delay how the NHS taps into technology, and ensures it seizes opportunities sooner rather than later is key to tackle the mounting threat of climate change and ensure that healthcare can be environmentally sustainable in the future.

Applicants should take into account the baseline they need to innovate from, having taken into consideration the forced changes brought by the COVID-19 pandemic. This competition is open to supporting the development and evaluation of technologies and solutions, including those introduced during the pandemic.

Delivering a Net Zero NHS

The challenge – Sustainability in the UK

Climate change is a global health emergency. Governments have growing pressure to address the rising threat of climate change and bring sustainability to the forefront of its agenda. The UK is aligned to the Paris Agreement of limiting the rise in global temperatures to 1.5 degrees Celsius, in a global effort to substantially reduce carbon emissions and is committed to the delivery of the UN sustainable development goals.

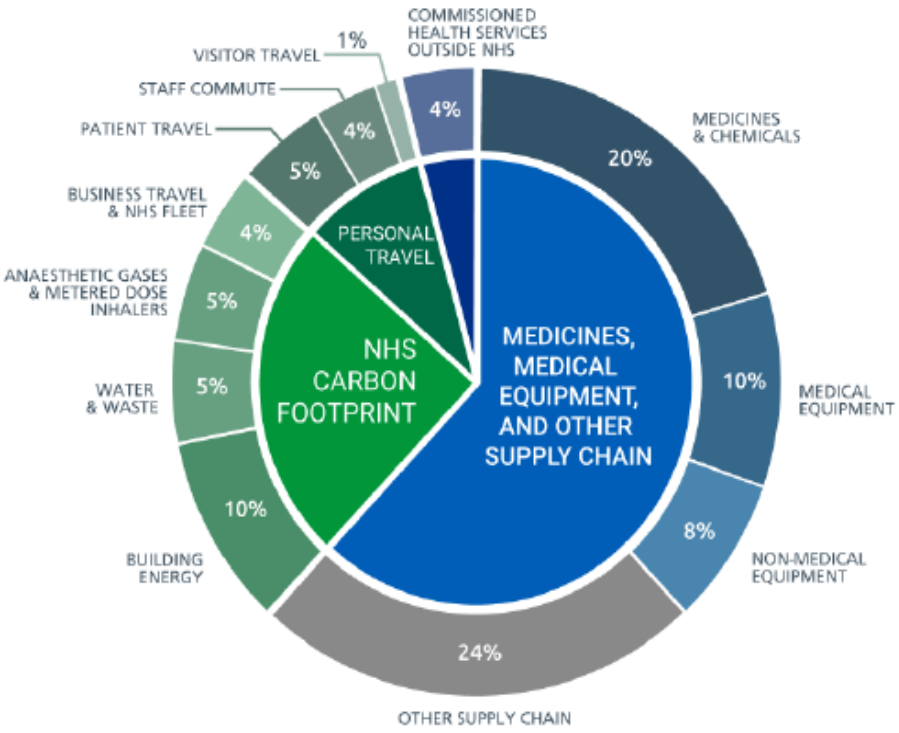
In 2019, the UK committed to a target of net zero emissions by 2050 as recommended by the Climate Change Committee. The government is to set in law the world's most ambitious climate change targets to cut emissions by 78% by 2035 compared to 1990 levels, which would bring the UK more than three-quarters of the way to its target. Nearly a third of the UK's largest businesses have pledged to eliminate their contribution to carbon emissions by 2050 and these commitments continue to grow.

Investment in net zero is rising rapidly in response to the world's climate challenge. A £1 billion fund, the Net Zero Innovation Portfolio, has been recently launched to support the UK's ten point plan to accelerate commercialisation of low-carbon technologies, systems and business models in power, buildings, and industry. Venture capital investment in UK Net Zero companies is rising, with the highest total number of net zero companies in Europe. Recent investment from British Bank's regional funds highlights growing commitment to the UK's low carbon and green economy, by helping businesses reduce their carbon footprint and develop new technologies to tackle climate change.

High pollution days have been linked to hundreds of extra out-of-hospital cardiac arrests and hospital admissions for stroke and asthma and almost 30% of preventable deaths in England are due to non-communicable diseases attributed to air pollution. Nearly 18 million patients go to a GP practice in an area that exceeds the WHO's air pollution limit. A third of new asthma cases might be avoided by cutting emissions, whilst also preventing the rise of conditions including Lyme disease and encephalitis from increasing temperatures and risk of increasing vector-borne diseases. Major heat waves have contributed to additional strain on the NHS, increasing hospital admissions from conditions such as heat stroke, heart attacks and strokes.

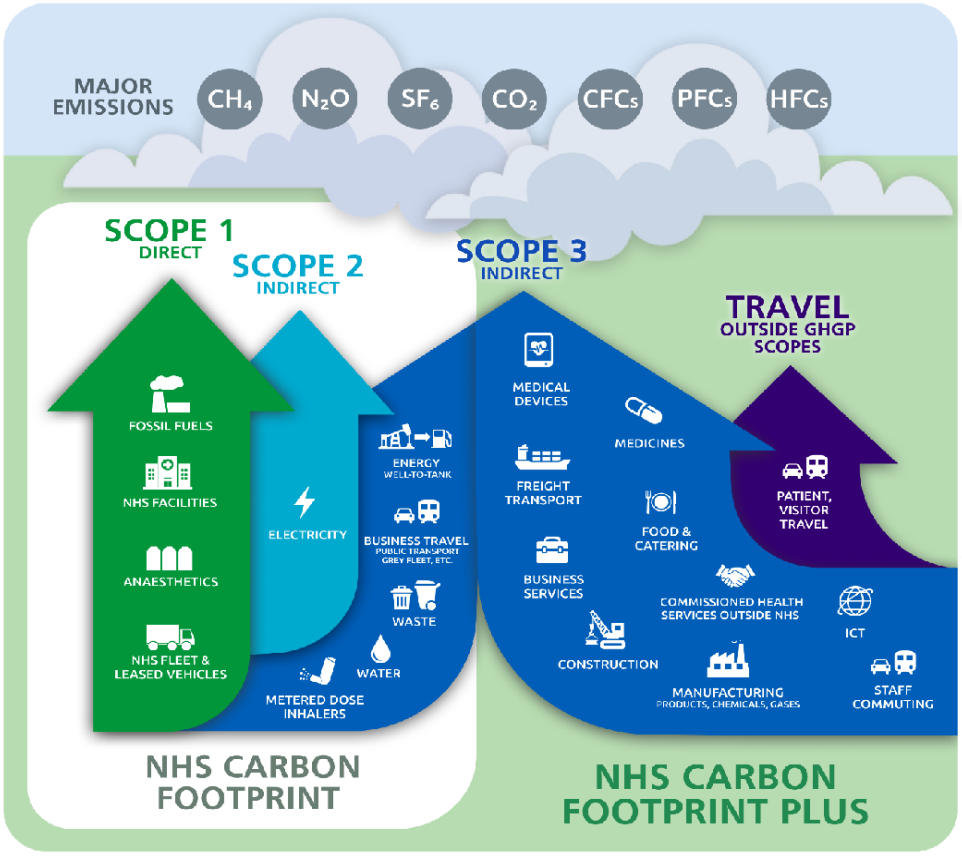
Building a greener NHS: Reaching Net Zero

Over the last 10 years, the NHS has taken notable steps to reduce its impact on climate change in response to national targets. It has cut down its own carbon footprint by 62% compared to the 1990 baseline. However, as the largest employer in Britain, the NHS is responsible for 4% of the nation's carbon emissions and has a crucial role if the UK is to reach its net zero targets. In 2019, the carbon footprint of the NHS totalled 25 megatonnes, with 62% from the supply chain, 24% from the direct delivery of care, 10% from staff commute and patient and visitor travel, and 4% from private services outside the NHS.



The NHS has shown fantastic leadership in being the world's first national health system to make a net zero commitment, with the launch of 'the Greener NHS programme' to set an ambitious, evidence-based pathway to reach its net zero ambitions. The programme includes two clear and feasible targets:

1. Net zero scope 1 & 2 emissions by 2040, with an ambition for 80% reduction by 2028–2032.
2. Net zero scope 3 emissions by 2045, with an ambition for 80% reduction by 2036–2039.



The [Delivering a Net Zero report] outlined initiatives to help reach these targets, which include:

- Modes of delivery: New ways of delivering care at or closer to home, meaning fewer patient journeys to hospitals
- Transport and travel: Greening the NHS fleet, including working towards road-testing a zero-emissions emergency ambulance by 2022, and building electric charging infrastructure
- Reducing waste of consumable products and switching to low-carbon alternatives where possible
- Supply Chain: Working closely with suppliers to ensure they are decarbonising their own processes and providing clear, long-term signals about the direction of travel
- Medicines: Reducing the use of the high carbon emitting anaesthetic desflurane and optimising the use of inhalers and substituting with low carbon alternatives where clinically appropriate.
- The Estate: Making sure new hospitals and buildings are built to be net-zero emission and optimising use of the retained estate
- Training: Building awareness on climate change mitigation and adaptation into staff training and education programmes

In support of the NHS's Net Zero agenda, NHS Trusts and hospitals are declaring a Climate and Health Emergency (CHE) and committing to ambitious net zero targets, supporting these closely with local sustainability management plans and initiatives. Identifying technologies that accelerate progress towards the NHS's net zero targets is high on the agenda.

The NHS has committed to decarbonising the supply chain through more efficient use of supplies, low carbon substitution and product innovation and finally by ensuring that suppliers of the NHS are decarbonising their processes themselves. The NHS started a supplier engagement programme aimed at driving carbon emissions reduction through the review of carbon reductions plans with a selection of suppliers, including small and medium enterprises. The NHS has gone one step further and announced they will no longer purchase from suppliers that do not meet or exceed specific net-zero target commitments by the end of the decade.

The NHS Long Term Plan targets

The NHS Long Term Plan published prior to the 'Delivering a Net Zero NHS' set a number of priorities to ensure the system becomes more sustainable, and to ensure it leads by example in sustainable developments and reduces its use of natural resources in line with government commitments. These include:

- **Reduced carbon emissions**
  - A shift to lower carbon inhalers
  - Transforming anaesthetic practice
  - Improving efficiency and adopting new innovations to reduce waste, water and carbon
  - Improvements throughout the NHS supply chain

- **Improved air quality**
  - Reduced air pollution from all sources. Specifically, by cutting business mileages and fleet air pollutant emissions by 20% by 2023/24, with at least 90% of the NHS fleet will use low-emission engines by 2028
  - Phasing out primary heating from coal and oil fuel
  - Redesigned care and greater use of 'virtual' appointments to reduce travel needs

- **Improved use of land, buildings and equipment.**
  - Widespread implementation of LED lighting
  - Smart energy management

- **Upgraded technology and access to digitally enabled care**
  - Convenient access to digital-first primary care options for patients
  - Fundamental re-design of outpatient services, removing up to 30 million outpatient appointments and unnecessary patient travel, including better support to GPs, online booking systems and digital appointments

Net Zero Supply Chain

In the [Delivering a Net Zero report], NHS England and NHS Improvement committed to reaching net zero across all scopes of emissions, including the supply chain, by 2045. In order to deliver this commitment, the NHS will shift approaches to no longer procure from suppliers that do not match the NHS net zero ambition.

Greener NHS and the sustainable procurement team are using the "5Rs of sustainable procurement" to provide high-level procurement guidance based on circular economy principles.

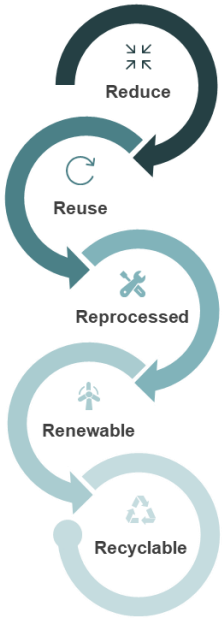
1. Reduce: Can you do without the product?

2. Reuse: Can you buy reusable products instead of single use?

3. (Buy) Reprocessed: Can you buy reprocessed or refurbished?

4. (Buy) Renewable: What is the product made of?

5. (Buy) Recyclable: Is the product recyclable?



Competition challenge: Delivering a Net Zero NHS

The competition, scoped in consultation with stakeholders working in provision of care across the spectrum, focuses on **Reducing NHS Emissions**.

Applicants are expected to respond to the specific challenge and provide details as to how their innovations meet the brief and support the NHS net-zero commitment, whilst being mindful of the broader impact of their innovation on sustainability within the chosen care pathway. The impact of reducing carbon emissions in one part of the system should be carefully considered so that it does not increase emissions and resource requirements in other parts of the system.

The applications **must** include satisfactory details on the following areas:

1. **Supply chain**

- A full lifecycle assessment of the proposed innovation, considering how the supply chain is involved.
- How materials were sourced, and the transport and logistics involved in the manufacture and delivery of the product. NB: products sourced and manufactured in the UK will receive additional weighting.
- How carbon emissions will be managed at each stage, including upstream and downstream implications.
- Assessment of the product lifecycle that would support a Phase 2 application.
- Address one or more areas of the "5Rs of sustainable procurement" (as defined above).

2. **Carbon reduction**

- A detailed methodology and/or framework to outline qualitative and quantitative approaches to assess any reduction in carbon emissions resulting from the innovation.
- Evidence of where benefits of the innovation may impact the potential carbon footprint elsewhere.

There are some tools and literature available that provide some guidance to applicants, although these are not necessarily proven, applicants may want to consider whether they could apply these (see Appendix 1).

Applicants are also asked to consider how the innovation will:

- Provide tangible and direct benefits to the health and care of patients.
- Improve health outcomes, reduce health inequality and drive efficiency.
- Impact the health and care system and how the system may need to change to adopt the innovation and deliver system wide benefits.
- Be accepted by different stakeholders and whether they can be involved in the design of a solution and its development.
- Be affordable to the NHS and wider system such as Integrated Care Systems (ICSs) both immediately and throughout the life of the product and how this will be evidenced.

Category 1: Reducing emissions from care miles

Background and challenges

The NHS Long Term Plan set out a commitment to deliver a new service model for the 21st century, and if the NHS is to reach net zero emissions, that must include a focus on sustainability and emission reductions. Delivering care in community-based settings and closer to home is a priority for the NHS. Boosting out-of-hospital care, providing better patient choice on access to advice and services, increasing efficiency and minimising unnecessary outpatient visits all have the potential to reduce substantial patient travel miles. The carbon impact of moving care closer to home needs to be measured to ensure that reductions in patient travel are not outweighed by increases elsewhere and must be inclusive.

Solutions to reduce carbon emissions as part of this challenge might include systems or technological innovations (digital, device, diagnostic or services) that:

1. Support out of hospital care in either the patient's home or in community settings. This includes innovations that:
    a. Support the development of low carbon community diagnostic hubs, particularly for procedures such as:
        i. Endoscopy.
        ii. Imaging, for example MRI and PET.
        iii. Pathology.
        iv. Physiological Measurement Services.
    b. Increase accessibility and capacity for patient care in community-based and primary care settings.

2. Promote self-management and prevention of disease while reducing carbon emissions:
    a. Self-management solutions to avoid hospital admissions and reduce unnecessary travel to appointments.
    b. Tertiary prevention to reduce the need for high carbon intensive procedures and reduce the frequency of interventions for patients with established disease.

Category 2: Reducing emissions from surgical pathways

Background and challenges

Operating theatres make a significant contribution to the carbon emissions of the NHS and form a component of several care pathways. Additionally, carbon dioxide (CO_2) is often used as an insufflation gas for minimally invasive surgery.

The carbon footprint for surgical procedures excluding anaesthetic gases has been estimated at 24kg CO_2e per hour of surgery, which includes energy (58%), consumables (32%), equipment (5%) and staff travel (5%). Some of the most carbon intensive surgical specialties include trauma and orthopaedics and general surgery (specifically pathways including endoscopic procedures).

The NHS is seeking potential solutions to reduce emissions that:

1. Offer low carbon alternatives to specific carbon intensive equipment and/or products in high emitting surgical specialties such as the ones outlined above.

2. Reduce carbon emissions in operating theatres through:
    a. Reducing the amount of CO_2 used in surgical procedures or acting as a replacement.
    b. Reducing emissions from carbon intensive surgeries, through new approaches or alternative pathways.

3. Reduce length of stay in hospital post-operatively and reduce the need for follow-up appointments.

Category 3: Reducing nitrous oxide emissions

Background and challenges

Anaesthetic gases are among the single-most carbon intensive medicines available, accounting for 2% of emissions at point of use. The NHS Long Term Plan committed to reduce the carbon footprint from anaesthetic gases by 40%, calling for lower carbon alternatives, methods for effective capture, and destruction or reuse of these gases. The NHS has already made significant progress in reducing the amount of desflurane used, with total use at 10.3% in 2020/21 (against a baseline of 23.1% in 2018/19).

Nitrous oxide has a global warming potential around 300 times higher than CO_2 and is used in high volumes across the NHS in surgery, maternity and emergency care. There is a lack of comprehensive data of international levels of nitrous oxide usage, but the limited data we have suggests that the United Kingdom uses this gas more than most countries. Often, nitrous oxide is used as a safe and predictable alternative to other forms of sedation during minor surgery where general anaesthesia is not required, particularly in paediatrics.

Potential solutions to this challenge include innovations that assist with:

1. Finding existing clinical alternatives or different delivery methods that are:
    a. Rapid onset and offset with few side effects.
    b. Non-invasive.
    c. Safe, particularly for patient groups that are unsuitable for alternative types of sedation.
    d. Cost-effective.

2. Reducing wastage across the use lifecycle, such as:
    a. Stock management and disposal – many cylinders are only partially used but must be fully discharged before being returned to the supplier.
    b. Leaks in manifold systems used to deliver the gas.

3. Behavioural interventions that encourage staff to use alternatives wherever possible.

Category 4: Tools to support low-carbon decision making

Background and challenges

There are pockets of sustainable practice throughout the health system, from nephrology to general practice, psychiatry to occupational therapy to name a few. Only a handful of tools have been validated and can be used widely across the system to support patients, clinicians and managers to assess any impact on carbon emissions during decision making. There is an opportunity to propagate pioneering models of sustainable excellence across Trusts and ICSs without impacting the quality of care provided to the patient. Potential solutions to this category should include creative and practical innovations that support patients, clinicians and/or managers in adopting low carbon practice where clinically appropriate.

Innovations to support this challenge could:

1. Guide patients in making sustainable decisions about their healthcare and health prevention.

2. Support shared decision-making processes for clinicians and patients, where clinically appropriate, to:
    a. Prescribe low carbon alternatives.
    b. Choose low carbon alternatives to care.

3. Support procurement colleagues at a Trust and/or ICS level to identify low carbon alternatives to their current supplies and use stocks effectively.

4. Assist hospital managers and leadership in redesigning their care pathways.

Useful Information for Applicants

Technologies excluded from this competition

There are a number of technologies or types of solution which may already be in development or are already available and will not be funded through this call. These are listed below:

- Development of innovative reduced carbon inhalers (e.g. dry powder inhaler and metered-dose inhaler)
- Travel and transport, specifically electrification of the fleet and infrastructure for charging and travel
- Optimisation of estates and energy / water management
- Food, catering and nutrition
- Development of new wearables devices
- Any technologies that negatively impact staff workloads will also be excluded

Additional considerations

Given the rural nature of many places with the largest need, an over-reliance on home and community interventions needing to be permanently online should be considered (Wi-Fi and phone signals in rural locations may be weak or unreliable).

For any digital intervention, the NICE Digital Health Technology Framework should be consulted and your application should evidence your plan to meet the appropriate evidence guidelines. This comprises both clinical effectiveness and economic evaluation.

Evidence that the NHSX Digital Technology Assessment Criteria (DTAC) has been considered should be demonstrated in your proposal.

SBRI Healthcare Programme

A new national Small Business Research Initiative (SBRI) Healthcare competition is being launched by NHS England and NHS Improvement in partnership with the Academic Health Science Networks (AHSNs) and the Greener NHS Programme to identify innovative new products and services. The projects will be selected primarily on their potential value to the health service and social care system and on the improved outcomes delivered for those in receipt of care.

The competition is open to single companies or organisations from the private, public and third sectors, including charities. The competition runs in two phases (subject to availability of budget in 2022):

- Phase 1 is intended to show the technical feasibility of the proposed concept. The development contracts placed will be for a maximum of 6 months and up to £100,000 **(Incl. VAT)** per project
- Phase 2 contracts are intended to develop and evaluate prototypes or demonstration units from the more promising technologies in Phase 1. Only those projects that have completed Phase 1 successfully will be eligible for Phase 2.

Developments will be 100% funded and suppliers for each project will be selected by an open competition process and retain the intellectual property rights (IPR) generated from the project, with certain rights of use retained by the NHS.

The competition opens on **13 July 2021**. The deadline for applications is **1pm, Tuesday 24 August 2021.**

Application process

This competition is part of the Small Business Research Initiative (SBRI) programme which aims to bring novel solutions to Government department issues by engaging with innovative companies that would not be reached in other ways:

- It enables Government departments and public sector agencies to procure new technologies faster and with managed risk;
- It provides vital funding for a critical stage of technology development through demonstration and trial – especially for early-stage companies.

The SBRI scheme is particularly suited to small and medium-sized businesses, as the contracts are of relatively small value and operate on short timescales for Government departments.

It is an opportunity for new companies to engage a public sector customer pre-procurement. The intellectual property rights are retained by the company, with certain rights of use retained by the NHS and Department of Health and Social Care.

The application process is managed on behalf of NHS England and NHS Improvement by LGC Group. All applications should be made using the application portal which can be accessed through the Research Management System. Applicants are invited to consult the Invitation to Tender and the Applicant and Portal Guidance; a template Application Form and Frequent Asked Questions are also accessible. All documents are available on the SBRI Healthcare website to help prepare your proposal.

An online briefing event for businesses interested in finding out more about these competitions will be held on **08 July 2021**. Please check the SBRI Healthcare website for confirmation of dates for this and any further events, information on how to register and details of the challenges that will be presented at the event.

Please complete your application using the online portal and submit all relevant forms by **1pm, 24 August 2021.**

Key dates

Briefing event	08 July 2021, Online
Competition Open	13 July 2021
Deadline for applications	24 August 2021 (1:00pm)
Assessment	September 2021
Selection Panels	21 October 2021
Contracts awarded	November 2021

More information

For more information on this competition, visit: https://sbrihealthcare.co.uk/

For any enquiries e-mail: sbri@LGCGroup.com

For more information about the SBRI programme, visit:

https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative

Appendix 1

Tools for measuring environmental impact

- The Hybrid Model, Health care's response to climate change: a carbon footprint assessment of the NHS in England.
- The Health Outcomes of Travel Tool (HOTT) developed by the Greener NHS Team
- Sustainable Healthcare Coalition, Care Pathways Carbon Calculator
- Future NHS Collaboration Platform, Carbon Calculator

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