Achieving Net Zero Healthcare

The UK's Approach

GREAT
BRITAIN & NORTHERN IRELAND

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About the Department for International Trade (DIT)

The UK's Department for International Trade (DIT) helps businesses export, drives inward and outward investment, negotiates market access and trade deals, and champions free trade.

DIT is an international economic department, responsible for:

- Supporting and encouraging UK businesses to drive sustainable international growth.
- Ensuring the UK remains a leading destination for international investment.
- Opening markets, moulding the trade environment with new and existing partners which is free and fair.
- Using trade and investment to underpin the government's agenda for a global Britain and its ambitions for prosperity, stability and security worldwide.

The Purpose of brochure

This brochure is our first step towards showcasing the UK's proposition and innovations in net zero healthcare. It is a celebration of the UK's success in delivering a net zero national health service, and is a call to action for more global cooperation and partnerships. Our proposal to you:

Examine what we've done

Adopt what feels right for you

Collaborate with us.

Introduction and Foreword

Aphrodite Spanou
Director of Science and Technology Directorate
Department for International Trade

According to the World Health Organisation (2015 & 2018) climate change is the greatest threat to global health in the 21st century.

The World Health Organisation (WHO) estimates that between 2030 and 2050 climate change is expected to cause approximately 250,000 additional deaths per year from four health impact categories: malnutrition, malaria, diarrhoea and heat stress.

In 2021, the UK's Net Zero Strategy: Build Back Greener set out policies and proposals for decarbonising all sectors of the UK economy to meet our net zero target by 2050. A year earlier, the NHS in England became the world's first health service to commit to reaching net zero: by 2040 for the emissions it controls and by 2045 for the emissions it influences. This is being driven by the Greener NHS, local UK hospitals and authorities, and business innovations. As an example, 56 NHS Trusts are planning to install on-site solar technology within the next three years. There are also a number of ambitious innovative programmes in place such as the world's first zero emission ambulance unveiled by the NHS at the UN's global COP26 summit, the construction of 40 new 'net zero hospitals', and the implementation of a net zero horizon scanning function to identify future pipeline innovations.

With scores of other countries now committed to creating low-carbon sustainable health systems, the NHS is working with the WHO to promote and facilitate this global ambition. Decarbonising and building climate resilience into their decisions, strategic and operational plans emerge as some of the pivotal priorities to be fully considered by hospital and health system leaders across the world.

This brochure showcases the UK's high-impact innovative approach to tackling net zero in our health systems and some key examples of real-life work, that is currently taking place by both NHS and private organisations. This is the first step of many towards promoting the UK's capabilities in sustainable healthcare.

Strengthening our collective net zero capabilities continues to be a key UK priority. We want to share these innovations and exchange knowledge internationally to help each other enhance resilience, address gaps and most importantly take steps towards having net zero health systems.

Reducing the impact of health systems on the environment will not only mean a healthier future for our patients and communities, but it also has the potential to drive efficiencies and reduce the cost of providing health services.

The UK at the vanguard of transitioning to a net zero future

The UK is proud to lead the way in the global transition to net zero emissions, and since 1990 the UK has almost halved our greenhouse gas emissions. The UK is tackling cliamate change by using free trade and investment to accelerate green technological progress.

In November 2022 the UK brought together UK businesses and global investors, as part of the Green Trade and Investment Expo, to capitalise on the commercial opportunities as the country continues its drive to net zero. The UK believes that green trade and investment will be the future-proofing force that will help us create a greener, healthier and better tomorrow.

The UK was the first major economy to create a legally binding target to bring greenhouse gas emissions to net zero by 2050.

- 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.
- In October 2021, the UK launched a Net Zero Strategy: Build Back Greener. This strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet our net zero targets by 2050.
- The UK is at the forefront of the growing global green economy. The UK government's 'Ten Point Plan for a Green Industrial Revolution', together with the 'Net zero strategy' and the 'British Energy Security Strategy' (launched in April 2022), is driving an unprecedented £100 billion of private sector investment by 2030 into new British industries including offshore wind and supporting around 480,000 clean jobs by the end of the decade.

Greener NHS:

Committing to delivering the world's first net zero health system

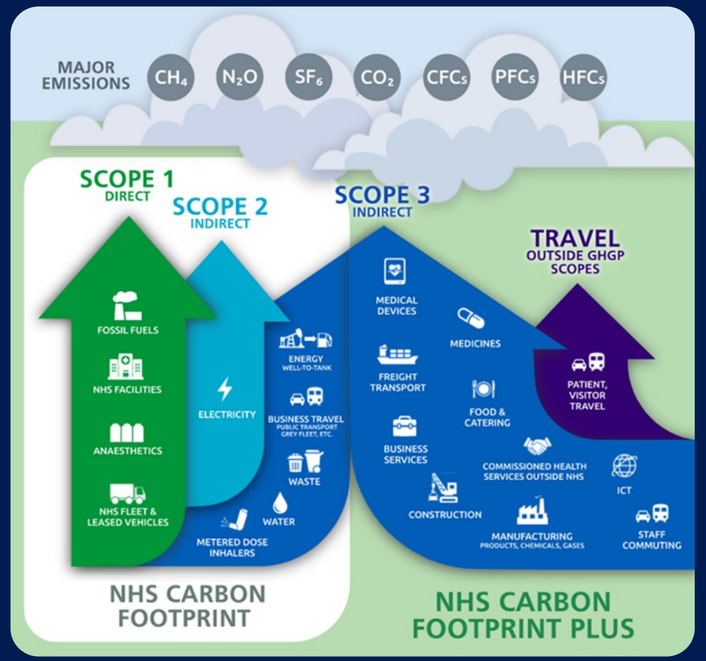


Figure 1: Sources of greenhouse gas emissions related to healthcare delivery in the NHS, grouped by GHG Protocol scopes and by the carbon footprints defined in the NHS net zero targets.

In 2020, the NHS in England committed to delivering the world's first net zero health service – both responding to climate change while improving health now and for future generations

As part of this, the NHS adopted a multilayer plan with clear deliverables to achieve their two overriding targets:

- For the emissions it controls directly (the NHS Carbon Footprint), net zero by 2040 with an ambition to reach an 80% reduction by 2028 to 2032.
- For the emissions it can influence (NHS Carbon Footprint Plus), net zero by 2045, with an ambition to reach an 80% reduction by 2036 to 2039.

The Greener NHS programme is working with staff, hospitals, partners and suppliers, building on the great work being done by trusts across the country. This includes sharing ideas on how to reduce the impact on public health and the environment, save money and reach carbon net zero. One year on from setting out the net zero targets, the NHS has reduced its emissions equivalent to powering 1.1 million homes annually.

The two NHS targets above include the Greenhouse Gas Protocol (GHGP)25, which scopes a set of emissions (scopes 1,2 and 3). However, these targets do not cover the full scope of emissions from the NHS, as there are additional emissions which are related to the delivery of a health service which falls out of these scopes. This is captured in Figure 1.

Case Study 1

Drone delivery of life-saving chemotherapy

Chemotherapy can be difficult to transport, as medications can be patient-specific and also have short shelf lives. This is particularly challenging for the delivery of chemotherapy to patients on the Isle of Wight (IoW), where each delivery can take several hours and requires two car journeys and one hovercraft or ferry journey.

Solent Transport is leading a Department for Transport funded project to see if drones can be used to address this. The trials are being delivered by a partnership including the NHS, the Universities of Southampton and Portsmouth and a number of drones suppliers. several have so far been undertaken.

The first, in partnership with **Windracers** during the COVID-19 lockdown in early 2020, successfully transferred inert medical equipment to the IoW from the mainland, and achieved five UK aviation firsts:

- First point-to-point beyond-visual-line-of-sight (BVLOS) flight of a fixed-wing UAV in the UK between two different airfields.
- First delivery of an NHS payload by a UAV in the UK.
- First BVLOS flight of a platform close to high population density urban areas and infrastructure.
- First BVLOS flight at an airport with concurrent operation of crewed aircraft
- First BVLOS flight of next generation “masterless” avionics (UK patent in progress).

The second in partnership with **Apian** built on this work, trailing fully electric, vertical take-off and landing drones to deliver greener, faster and smarter healthcare to patients in 2022. These trials identified that, while possible, range, hold capacity and integration with wider logistics systems was needed to ensure a reliable service for the NHS going forward. During this trial, Apian transferred a benign, non-chemotherapy medical prescription flown BVLOS to an NHS hospital on the IoW. In addition, within-line-of-sight flying of redundant chemotherapy treatments took place on the mainland as part of trials to better understand the potential effects of drone-induced vibration on the quality of flown medicines and how this might be mitigated. Test results have been positive indicating that for the drones used, vibration did not cause any significant negative impacts on medicine quality.

To achieve a long-term practical system for using drones for medical logistics, the UK Government is funding Solent Transport to research two broad areas:

- Develop a suitable airspace and control system that accommodates drones alongside existing aviation activity.
- Identify and test the logistics systems and practices that are necessary for drones to be part of the logistics vehicle fleet delivering for the NHS.

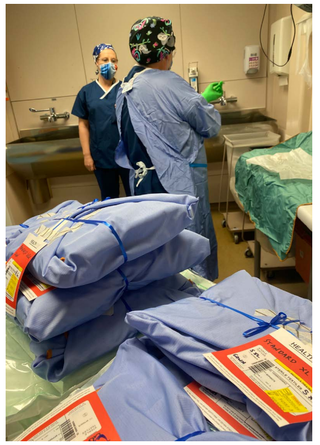
As yet, no live chemotherapy has been flown from the mainland to the IoW hospital. Solent Transport and their partners are working towards this, and it is hoped that drones will be able to significantly reduce the current delivery times and make cancer care much more convenient for patients living on the Isle of Wight, who would otherwise have to travel to the mainland for treatment.

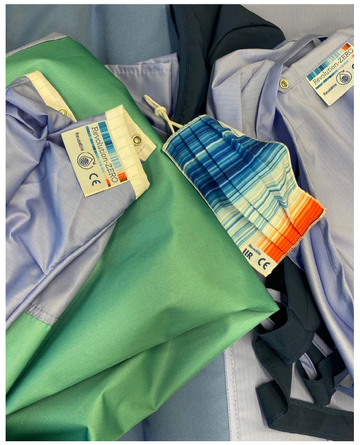
Case Study 2

Protecting patients and staff with zero waste, zero carbon, circular surgical textiles

Surgeries are a major clinical source of waste and carbon emissions

Revolution-ZERO's mission is to displace single use medical textiles with reusable net zero alternatives that are more effective, economic and sustainable. In doing so we are reducing emissions across the supply chain, which is responsible for >50% of healthcare emissions, whilst stimulating local economies and enhancing supply chain resilience. We have the support of the UK NHS in accelerating the delivery of net zero health systems through decarbonising healthcare supply chains. We have assembled a world-class team who provide health systems with real time oversight and control of PPE and energy to improve carbon emission, reduce healthcare expenditure and improve people's health. Our technology-enabled solutions have been developed and deployed in England, Scotland and Wales. We welcome discussions with healthcare funders, providers and suppliers in the race to net zero healthcare.





Case Study 3

Greener medical devices: Inhalers

- New low carbon propellant gas developed in UK will reduce carbon impact of MDIs by 90% (Koura)
- Recycling programme for Metered Dose Inhalers (MDIs) trialled (Chiesi)
- Innovative UK inhaler design, development and manufacturing supply chain for smart inhaler design to aid compliance and reduce drug waste (Kindeva)
- Supporting increased use of dry powder inhalers (DPIs) where feasible (GSK)
- New low carbon gas MDIs (in development) will provide greener option, alongside use of dry powder inhalers, supporting clinical and patient choice, especially for those where DPI unsuitable (Chiesi & AZ)

It is estimated that 12.7 million people in the UK (approximately 1 in 5) have a history of asthma, COPD or another longstanding respiratory illness*

Lung diseases are responsible for more than 700,000 hospital admissions and over 6 million inpatient bed-days in the UK each year. Inhalers are a key treatment for respiratory conditions, with about 60 million dispensed every year in England. However, evidence indicates that respiratory patients do not consistently receive care in line with best practice, and inhalers are not used in an optimal way, leading to poor disease control and avoidable deaths.

Propellants in metered dose inhalers (MDIs) also have a significant global warming potential, meaning that inhalers account for 3% of the NHS' total greenhouse gas emissions. Lower carbon alternatives, such as dry-powder inhalers (DPIs), are available, clinically equivalent for many patients and already used extensively in other countries.

In delivering a Net Zero Health Service, the NHS notes that achieving the required reduction in emissions from inhalers will only be possible by:

- significantly increasing the use of DPIs.
- increasing the frequency of the greener disposal of used inhalers.
- supporting the innovation in, and use of, lower carbon propellants and alternatives.

* Source: The British Lung Foundation https://statistics.blf.org.uk/lung-disease-uk-big-picture

Case Study 4

The UK's first climate-friendly gas and air for during labour

Newcastle Hospitals, partnering with BPR Medical (UK) and Medclair (Sweden), has pioneered the use of climate-friendly gas and air during labour

Entonox (a mixture of nitrous oxide and oxygen) has been used to provide pain relief for women in labour for over a hundred years.

However, nitrous oxide is a powerful greenhouse gas, almost 300 times more potent than carbon dioxide, and escapes into the atmosphere after being exhaled by a patient.

Exhaled air is passed from the mouthpiece into a climate-smart catalytic purification system, where the environmentally hazardous nitrous oxide gas is decomposed into harmless nitrogen (N2) and air (O2), which also reduces the amount of nitrous oxide hospital staff are exposed to.

Newcastle Hospitals has a global reputation for healthcare sustainability leadership. Recognising the threat that climate breakdown poses to public health they were the first healthcare organisation in the world to declare a climate emergency and commit to fast-tracking decarbonisation of their services.

Their award-winning Sustainable Healthcare in Newcastle (Shine) programme is helping to deliver on this commitment. The trust also received an honourable mention at the International Hospital Federation Awards in 2022 for their work towards achieving a net zero carbon supply chain.

Case Study 5

Delivering Scotland's first net zero hospital

Robertson is one of the largest family-owned construction, infrastructure and support services businesses in the UK

In 2018 it became one of the first UK companies in the built environment to achieve carbon neutrality, and in 2020 accredited as climate positive. The **Robertson Group,** a Scottish construction, infrastructure and support services business recently delivered the £65m hospital and healthcare facility for NHS Orkney's Balfour Hospital. The design is a strong, contemporary building fully electric powered with air-to-water heat pumps generating all hot water and heating. It includes green technology such as a 1,200m² expanse of solar panels installed to reduce reliance on the grid.

Built on the main Orkney Island, off the northern tip of Scotland, the Balfour Hospital provides a total of 49 inpatient beds, clinical assessment, maternity and mental health units for this rural 20,000 community. This rural general hospital has a large number of small departments and areas, including A&E, theatres, endoscopy, day surgery, cancer palliative care, radiology, dental, ambulance, renal, mortuary, pharmacy and outpatient departments. Two local GP practices are also accommodated in the new building.

Top Five

UK Net Zero Healthcare Capabilities

The Green Health Pathway

The UK has private and NHS expertise across the whole pathway (Figure 2), which covers all the GHGP scopes in the context of the NHS (Figure 1). This section of the brochure outlines the Green Health Pathway that we have identified and gives examples of the UK's capabilities at each stage.

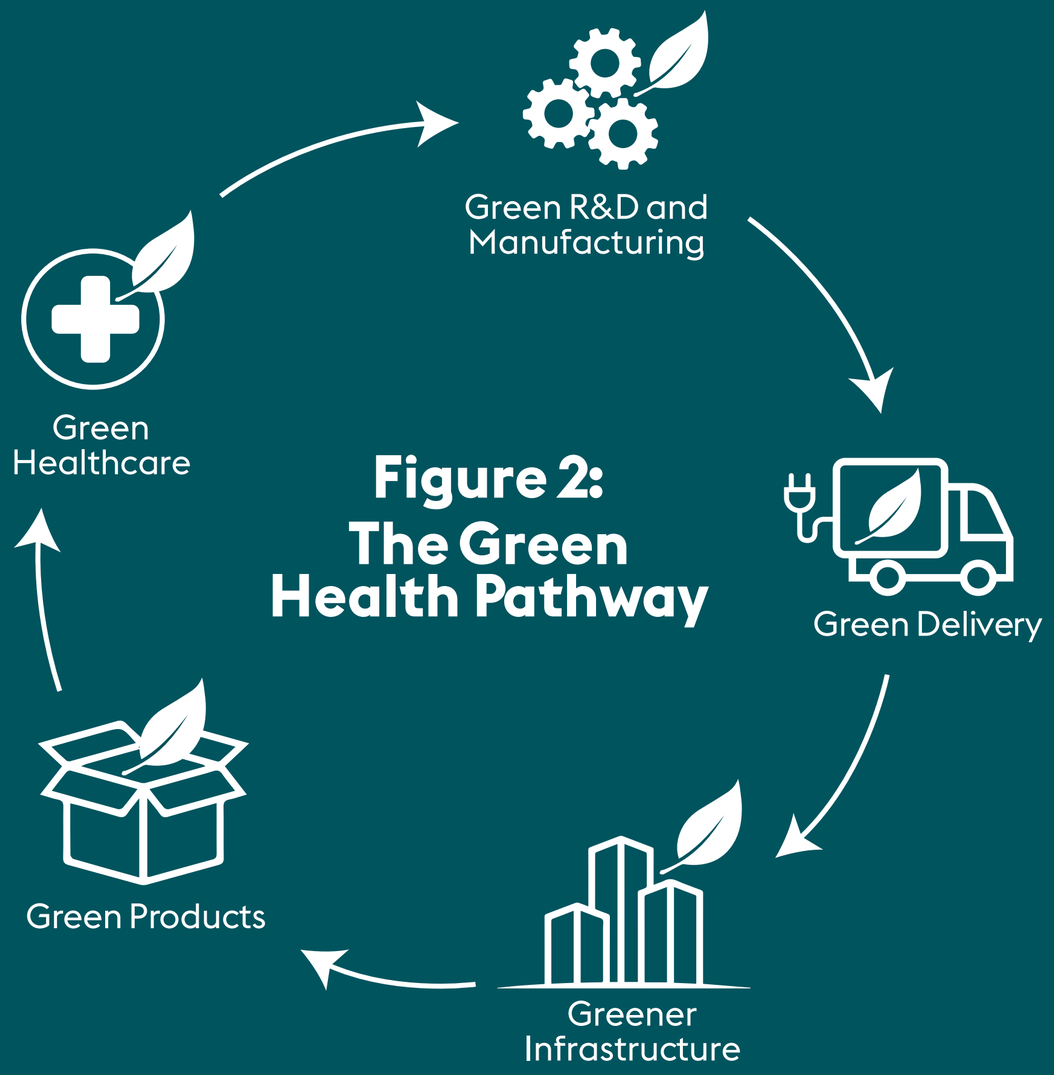


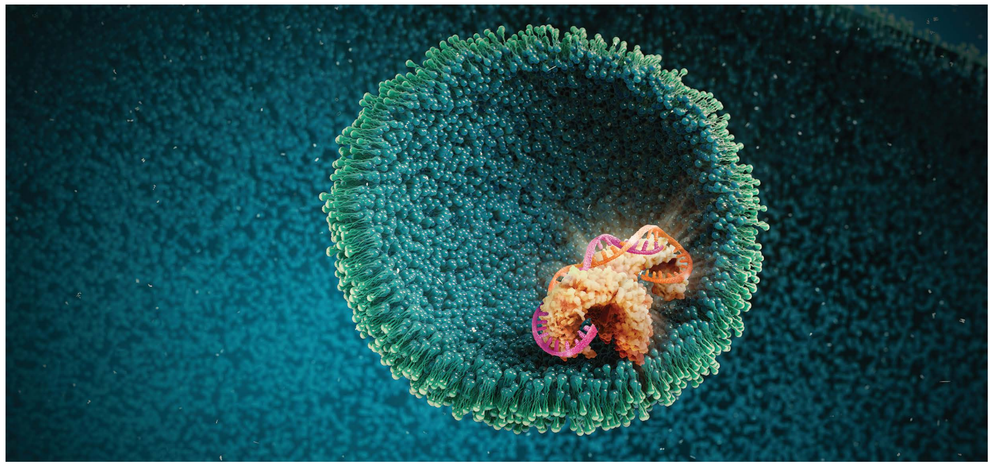
Figure 2: The Green Health Pathway

Green R&D and Manufacturing

Many UK healthcare and life science companies are pioneering sustainable approaches to their organisations and systems including research, manufacturing, product design, development, packaging and supply chain that build the foundations of a greener ecosystem.

01

- **AstraZeneca** pushes the boundaries of science and innovation to solve some of the world's biggest health challenges. Sustainability is fundamental, not only to the health of the planet, but to the health of our society and people. AstraZeneca is looking at every part of its business to see how it can make a difference, ensuring sustainability is part of its DNA and embedded into everything it does. Through pioneering science, it wants to deliver patient-centric, transformative, net zero healthcare that has a positive impact on its patients, the environment and society. AstraZeneca was one of the first seven companies worldwide to have its net zero, science-based targets verified under the new 'Science Based Targets initiative' a net zero corporate standard, and by 2030 the company will be carbon negative.



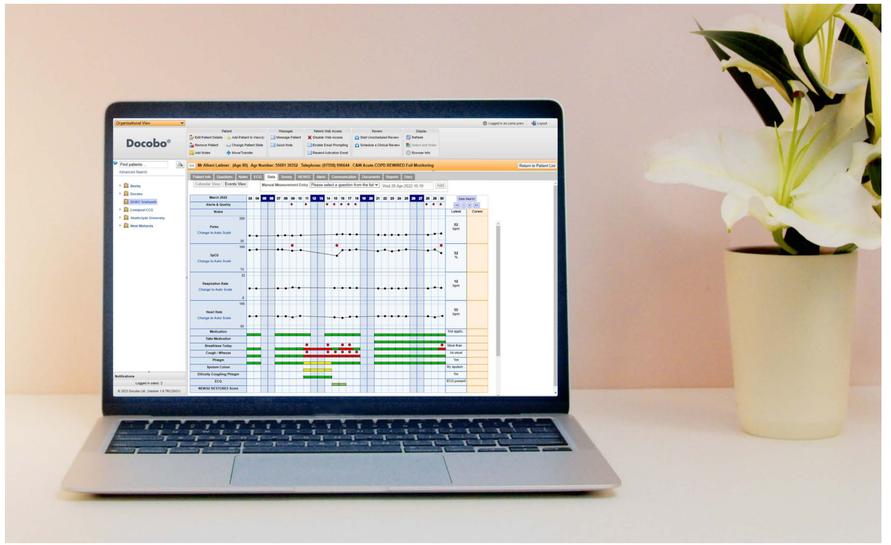
- **Haleon** is a global leader in consumer health, with brands trusted by millions of consumers globally. In line with its purpose - to deliver better everyday health to humanity - Haleon is committed to helping break down social and environmental barriers that hold people back from better everyday health. As it relates to climate change, the company is pursuing decarbonisation across its entire value chain, from source to sale. It has solar projects at 12 of its global manufacturing sites and is on track to source 100% of the electricity for its operations from renewable sources by the end of 2022. It's also exploring lower carbon footprint alternatives for select materials, identifying where the amount of material it uses can be reduced and partnering with suppliers to help them reduce the drivers of their carbon footprint. Recognising the linkages between climate change, air pollution and people's health, Haleon also works with experts to help provide consumers with trusted advice on mitigating the impact on their respiratory health.

Green delivery

The UK has both private and public organisations which work to support the evaluation, delivery and management of health and social care; from remote monitoring and online consultations, to reuse of equipment, innovative cleaning protocols and waste management to new transport and supply methods.

02

- **Docobo's** DOC@HOME Remote Monitoring platform enables healthcare systems to meet net zero targets in multiple ways. Docobo works to reduce GP and community nurse visits to a patients place of residence and reduce ambulance conveyances and visits to the hospital for outpatients and pre/post op appointments, in addition to reduced car parking and local traffic congestion.
- An example of a company making an impact through virtual appointments is **Babylon**, one of the fastest-growing digital health companies in the world. Babylon serves 24m people globally with digital tools that transform how people engage with their care at every step of the healthcare continuum. Babylon's highly-scalable platform uses AI-powered technology to reengineer the system from reactive 'sick care', to proactive healthcare that puts patients at the centre of their own health.
- **Surgical Holdings** is a 30-year-old family run business, based in Southend-on-Sea. It is an award-winning British surgical instrument manufacturer and repairer, facilitating sustainability in surgery through its range of reusable instruments and laparoscopic instruments, which can be serviced in-house by their experienced and specialist technicians. Surgical Holding's smart repair service for rigid endoscopes and its 'as new' full surgical tray refurbishments, save 50% in CO_2 vs buying new.



Greener infrastructure

The UK is home to over 500 infrastructure companies many of which are market leaders in designing and applying greener healthcare approaches to healthcare estates and the built environment.

Image: Currie & Brown's Monklands Hospital Replacement Project © Keppie Design Ltd

03

- **Currie & Brown** is one of the world's leading physical asset management and construction consultancies. Part of Currie & Brown's service includes comprehensive sustainability advice, including the creation of pathways and solutions for achieving net zero carbon operations and minimising embodied and other net zero Scope 3 emissions. Its zero carbon and sustainability expertise is closely integrated with its whole life performance and social value teams, ensuring that its advice meets environmental, social and economic requirements and contributes positively to project and programme business cases.

- **Mace** is a global company of experts in shaping and making the built environment. It provides development, consulting, construction and operations services for many of the world's most inspiring building and infrastructure projects and programmes. In Mace's 2026 strategy, Mace committed to pursuing a sustainable world by realising its own net zero carbon ambitions, supporting its clients to drive their carbon ambitions, creating biodiversity net gain and sourcing and managing their resources responsibly.

- **Mott MacDonald** is a global management, development and engineering consultancy. It works with clients across many different sectors to develop and embed carbon reduction strategies at both an organisational and project level. Within healthcare, it supports its clients to reduce both capital and operational carbon.

  It is supporting the NHS in its net zero journey – this ranges from advising on service and estates reconfiguration strategies, supporting the development of the NHS Net Zero Building Standard for NHS England in 2021 and developing estate decarbonisation strategies for individual NHS Trusts.

  Mott MacDonald recognises how digital technology will underpin net zero strategies, enabling smarter, data driven decisions and catalysing behavioural change among buildings users. It advises clients on these digital enablers and uses its own products in project delivery.

Green products

The UK has numerous private sector companies which are leading the way to produce greener medicines and healthcare products not only by embracing sustainability within their own organisations but also through innovative individual product design, components and packaging.

04

- **SureScreen Diagnostics** manufacture IVD medical diagnostic kits, including lateral flow tests, clinical chemistry tests and electrochemical devices to test for a wide range of parameters from pregnancy to drugs of abuse to infectious disease. It believes sustainability should be a key target of the medical industry, and it is working hard to reduce the environmental impact of its devices. SureScreen have launched what it believes is the first mass produced biodegradable Covid-19 test cassette. It is continuing this work by making more of its tests biodegradable in the near future, alongside reducing the overall quantity of materials used across the range.

- **Koura** (formerly Mexichem Fluor) is a global leader in the development, manufacture and supply of fluorochemicals. Koura provides medical propellant gases used in 80% of the world's pressurized metered-dose inhalers. In 2020, Koura announced multimillion-pound sterling investment into a new medical-propellant production facility, featuring R152a gas which provides over 90% carbon reduction over traditional metered dose inhalers. This is the first in the world to offer dedicated pharmaceutical-grade laboratories specialising in the commercial development of R152a-based inhaled medicines. The new £12m commercial pilot facility is based at its medical division headquarters at Thornton Science Park, Chester and was commissioned in June 2022.

- **Vernacare** is a pioneer of sustainable infection prevention solutions in healthcare environments. It continues to innovate and collaborate in the areas of single-use waste management systems, clinical waste management, bathing and continence care, surgical solutions, harm reduction services, vaccine solutions, wound care and animal healthcare; continually innovating and pushing the standard of care forward. Through Vernacare's partnership with experts, customers and end users, it is driving sustainable product innovation across all product speciality areas to maximise infection prevention whilst protecting our planet.

Green healthcare

NHS organisations and allied bodies are innovatively looking at how they can support net zero and sustainability to contribute to the world-first NHS net zero targets, improve workplace health and wellbeing and assist both staff and patients to understand how they can support this agenda through their individual actions and choices.

05

- **Gloucestershire Hospitals NHS Foundation Trust** - Gloucestershire Hospitals NHS Foundation Trust (GHFT) is a leader in sustainable healthcare. GHFT has a Green Plan which covers all aspects of sustainability including adaptation to climate change, travel, green space, new models of healthcare and improvements to infrastructure and resource efficiency. GHFT is committed to achieving carbon net zero by 2040.

- **The Imperial College Healthcare Trust** sustainability team launched their 2021 Green Plan to align with the NHS 2040 net zero target. The Trust won a decarbonisation grant of £26m to install an air source heat pump, to enable zero carbon electric heating while the Trust's automatic computer power down software is projected to save £40,000 per month in electricity. Further projects include the creation of an e-education module, animation and waste playbook as part of a campaign to educate staff on how to better segregate clinical/recycling waste and circular economy trials started including reusable gowns/walking aids and recycling facemasks. A programme to reduce/capture/eliminate the most harmful anaesthetic gases is also being implemented.

- **The National Institute for Health and Care Excellence (NICE)**, which provides evidence-based guidance and advice to the NHS and social care, has committed to exploring ways to include environmental impact data in its products to reduce the carbon footprint of the health and care system. To inform its system sustainability efforts, NICE are undertaking a project focused on environmental sustainability via NICE Listens, its deliberative public engagement programme. It is working with a research partner to run online workshops with members of the public. NICE are looking to understand the publics views on how NICE should take environmental sustainability into account in its decision-making, and how the public would like to be involved in making decisions about their care that impact on the environment. The project will report in early 2023.

Organisations that can provide additional information

Association of British HealthTech Industries (ABHI)

ABHI is the UK's leading industry association for health technology (HealthTech). Products from its members span from syringes and wound dressings to surgical robots and digitally enhanced technologies and play a critical role in supporting quality and efficiency within the NHS. Collaboration between ABHI members, across the healthcare system and others is necessary now and in the future, whilst working towards the net zero agenda.

BioIndustry Association (BIA)

BIA is the voice of the innovative life sciences and biotech industry, enabling and connecting the UK ecosystem so that businesses can start, grow and deliver world changing innovation. Established 33 years ago, BIA is the award-winning trade association with more than 490 members, from start-ups, biotechnology and innovative life science companies to universities, research centres and tech transfer offices.

Association for British Pharmaceutical Industries (ABPI)

The ABPI exists to make the UK the best place in the world to research, develop and use new medicines and vaccines. It represents companies of all sizes who invest in discovering the medicines of the future.

ABPI members supply cutting edge treatments that improve and save the lives of millions of people. ABPI works in partnership with Government and the NHS so patients can get new treatments faster and the NHS can plan how much it spends on medicines. It works with members in England, Scotland, Wales and Northern Ireland.

Geneva Sustainability Centre (GSC)

As part of the International Hospital Federation's commitment to raise awareness, advocate for and take robust action towards sustainable, net zero healthcare systems, GSC was established in April 2022. The GSC's mission is to support current and future hospital leaders with the information, tools and skills to drive the sustainable transformation at leadership, management and institutional levels in health care delivery.

See below the logos of organisations profiled in the company directory, that can provide net zero healthcare solutions. Click on a logo to find out more.

Click HERE for full Company Directory

Click HERE to view Net Zero NHS video

Engagement with DIT

Looking to buy from the UK?

UK net zero businesses and other organisations have a range of offerings for international customers and collaborators, from research to business partnering or commercial innovations. Check out the case studies and accompanying company directory or email healthcare.uk@trade.gov.uk with your request, our expert trade team will contact you to discuss your needs to match-make with the a UK organisation.
Find out more: www.great.gov.uk/international/trade/

Looking to invest in the UK?

The Department for International Trade network provides a global reach in 170 countries. Staff work to ensure global businesses can invest successfully in the UK, whether directly creating a UK entity, or indirectly investing capital in a UK business or development.
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