

A Green Guide for UK Diagnostic Imaging

How to start making progressive steps towards the NHS Carbon Zero targets



Balancing the health of the planet with the ongoing needs of patients

It is no exaggeration to say that humanity is facing an environmental crisis. Whilst UK healthcare has had to steer through testing times with the Covid-19 pandemic threatening to overwhelm NHS capacity, other storm clouds are gathering on the horizon.

The impact of climate change and destruction of the natural world is having a dramatic environmental consequence around the world.

- A rise in air pollution is linked to heart disease, stroke and lung cancer;
- Heatwaves put pressure on the elderly and vulnerable people with pre-existing cardiovascular conditions or exacerbated breathing issues needing hospitalisation;
- Poor air quality and aeroallergens drive up the numbers of fit and well people being diagnosed with asthma or other respiratory related illnesses;
- Cancer rates increase through ultraviolet radiation, air pollution and environmental toxins;
- The spread of new and as yet unknown global infectious diseases and pests is accelerated by changing weather conditions enabling faster reproduction and replication.

This year, 2021, offers an unprecedented opportunity for positive change in UK healthcare. Reviews and reflections as a result of the coronavirus crisis look to reshape the future of healthcare provision and diagnostics capacity, plus the NHS has set its ambition to be the world's first 'net zero' national health service.

Coming up in November 2021, the UK government will host the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow. This meeting will aim to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. Its success will help move progress at pace to inspire climate action and safeguard the health of our global societies and our planet.

We must all work **#TogetherForOurPlanet.**

Why the environment needs to matter to UK imaging departments

Diagnostic imaging departments already operate with limited resources. Patient numbers grow every year with imaging demands exceeding imaging capacity, while workforces are stretched by unfilled posts or retirement rates. Although impetus for change is coming through national initiatives, this should also be balanced with avoiding future UK health explosions and pressures linked to the environment.

Climate change as a result of carbon emissions has been acknowledged at a national level and the NHS is aiming to be net zero by 2040.

What is net-carbon or a carbon footprint?

A carbon footprint is the total amount of greenhouse gas emissions caused by an individual or an organisation expressed as a carbon dioxide equivalent.

Carbon neutral or net-zero carbon means achieving zero carbon dioxide (CO₂) emissions by eliminating the emissions or balancing removal often through carbon offsetting.

Five easy steps to a greener future that clinical departments can take now

As a leading supplier of diagnostic medical equipment to UK Radiology, it is Canon Medical's duty to balance the health of patient populations and providing the imaging tools that clinicians need now, with the need to look ahead and predict the long-term future factors of health.

This guide is written to provide advice and guidance to our diagnostic imaging community of radiographers, sonographers, radiologists, cardiologists, radiology service managers, imaging managers, as well as the health managers in procurement or sustainability roles. It is intended to provide practical steps that can be taken now to start working towards meeting the aims of the NHS' net carbon zero targets, at the same time as being aligned to wider digital health innovation transformation initiatives.

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Step 1. Embrace imaging equipment innovation

Reduce departmental energy emissions at the same time as improving patient care

62% of carbon emission sources in the NHS are generated by 'medicines, medical equipment and other supply chain': medicines (20%), medical equipment (10%), non-medical equipment (8%) and other supply chain (24%).

An easy hit for Radiology working towards decarbonising the NHS is a focus on the energy emissions from medical equipment that is used throughout the working day. This could include CT, MRI, ultrasound, interventional imaging systems and X-ray. Innovation in medical imaging is evolving at an astounding pace. MRI and CT scanners are frontline tools for patient diagnosis and patient triage and are well recognised for their versatility. The number of scans per year are set to rise.

- Evaluate models for energy consumption and carbon footprints at the same time as meeting clinical needs when the opportunity arises for new equipment selection.
- Official tender requests need to refresh, calling for imaging engine efficiency not requesting engine sizes in kw of CT scanners. Size does not matter. The larger the engine the greater the energy consumption. This does not correlate to better imaging results. Perhaps the question and selection criteria should be 'how efficient is your imaging engine'?
- Look for energy efficient innovation and features on medical

equipment. Sustainability reporting on carbon emissions will be far lower if systems go into standby between patients, for example an 'EcoMode', or innovative features that have been designed to generate a system's own energy source such as CT gantry spin technologies.

- Embrace Artificial Intelligence (AI). Imaging AI is enabling greater image quality, faster and at a lower dose. This helps to deliver greater clinical confidence and better patient care with no additional energy draw. For example, Canon Medical's Advanced intelligent Clear-IQ Engine (AiCE) is a Deep Learning Reconstruction AI algorithm integrated into new CT scanners. It reduces overall energy emission per patient case and helps to remove the need for repeat scans.
- Select virtual equipment service whereby equipment engineers can make repair or diagnostic decisions remotely via IT infrastructure. This saves physical travel that has a carbon footprint associated with it, and also saves time on diagnosing an equipment breakdown, ordering a part and getting it fitted.

The Aquilion ONE Genesis CT scanner is a Gold Winner of the Innovation category of the international **Green Apple Awards**, an annual accolade to recognise, reward and promote environmental best practice around the world. Its small and light design needs less power compared to other models and can be installed in compact spaces avoiding costly renovations at hospitals.



A team working on water boreholes, to provide fresh and clean water for a community in Uganda, with one of Canon Medical UK's CSR partners, CO2balance.

Step 2. Carbon conscious supply partners

An opportunity for green change via the NHS supply chain

By selecting supply partners with a carbon conscience helps reduce carbon footprint reporting and makes a positive difference to NHS sustainability reporting.

The 'Greener NHS' report highlighted two targets for the NHS to achieve net zero emissions: by 2040 (with interim 80% reduction by 2028-2032) for emissions under NHS direct control, and by 2045 (80% reduction by 2036-2039) including the wider NHS supply chain. By highlighting the supply chain as one of the greatest areas of opportunity for the first time rather than the traditional thinking of buildings, heating/lighting and vehicle fleets, it expanded the scope of potential for driving down emissions covering products procured from approximately 80,000 suppliers.

With NHS purchasing having the power to influence green change, the supply chain has an obligation to respond.

Look for external environmental accreditations

Sustainability accolades of NHS supply chain should always be underpinned by robust external, independent verifications. This could include the British Standards PAS2060 requirements, environmental management ISO14001 certification, auditing via partner status from the United Nations' Division for Sustainable Development Goals (DSDG), or ideally all of the above.

Canon Medical is one of the only UK medical equipment suppliers to be carbon neutral.

Every system it supplies comes with a **ZERO carbon footprint for the lifetime of its use inside the NHS**. This is because the entire carbon footprint of the system – from manufacture, shipping and logistics, through to the forecasted lifetime power consumption inside hospitals or clinics - has been taken into account and offset to a high impact project such as providing clean water bore holes or modern cooking stoves in developing countries.

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Canon Medical's latest carbon offset report, externally audited and verified to UN Gold Standard criteria, highlights the cumulative numbers since it became a 'net zero carbon' medical equipment supplier. It shows not just how carbon has been offset to advantage the health of the planet, but also how the wellbeing of less fortunate people in developing nations is benefited every time there is a new installation of medical imaging technology to assist UK NHS healthcare provision. This includes:

- 24 million litres of clean water provided from deep water bore hole projects;
- 13,600 tonnes of wood saved, and not deforested, from the clean stove project; and cleaner, healthier air for families to breath inside their homes via modern stoves that emit less smoke;



One of Canon Medical UK's CT Mobile Units, ready for action.

- Children are able to go to school as no longer required to help their families to walk miles to clean water wells far from their villages, or help collect firewood for old inefficient style stoves

- Females have been empowered in remote villages as they are no longer have to risk long walks in search of water or firewood.

- Overall, 11,000 people have benefitted from the carbon offset project providing them clean water and modern stoves to avoid illness.

Fifteen relocatable Canon Medical CT scanners, deployed by NHS England's COVID-19 recovery plan to help with patient imaging backlog and winter COVID-19 preparations, had **zero carbon tonnes of emission for the NHS to incorporate into its environmental reporting totals**. The 1,161.75 tonnes had already been offset by Canon Medical's robust carbon offset scheme which includes the CO2 emissions during manufacturer and the lifetime electrical running of the system once inside the hospital estate.

Step 3. Take imaging closer to the community

Fewer patient journeys to hospitals means lower carbon emissions

Moving patient care out of the acute setting and into the community is on the horizon as part of the reevaluation of UK health systems magnified by the arrival of Coronavirus. This will provide better infection control in the new Covid-era, give greater convenience for people to have appointments closer to home and therefore drive down carbon emissions due to less travel.

With the speculated introduction of Community Diagnostic Hubs, the conversion or introduction of new building facilities or mobile / relocatable buildings will also need to have environmental infrastructure considerations as part of the wider NHS infrastructure.

Whilst all new hospitals will have a new Net Zero Carbon Hospital Standard from Spring 2021 as part of the Government's Health Infrastructure Plan, will this include guidelines towards mobile units or community hubs?

Initial considerations to think about when redesigning patient imaging in the community includes:

- The use of low carbon building materials in remodelling facilities for use as Community Diagnostic Hubs or selecting sustainably built mobile / relocatable imaging units. This could include FSC certified wood and other building materials that have low environmental impact;
- Placement of mobile imaging units near to high density communities and where public transport links are good such as supermarkets or shopping centres. This removes the need for single use cars, taxis and promotes shared transportation or walking that emits lower overall emissions.

1,161.75 tonnes have already been offset by Canon Medical's robust carbon offset scheme

Make use of imaging equipment providers' online training and education programmes

- Selection of specially designed and compact imaging equipment to minimise space and keep construction costs and needs low. For example, the Vantage Elan MRI requires an overall installation area 29% smaller than previous 1.5T MRI systems and does not require a separate computer room.

- Maximise the use of digital health infrastructure and innovative imaging applications to power remote radiology reporting, support the efficient exchange of diagnostic images to patient records, and for pre-emptive equipment maintenance / service.

Step 4. Encourage and reward green behaviours

Cultural change within imaging departments is easy to achieve

Broadening knowledge within NHS departments and creating a self-propelling cycle of cultural change towards environmental consciousness should become part of the norms of radiology.

Encouraging wider green behaviours through extended training and education and rewards through internal award schemes or CPD will have a self-propelling positive effect on UK Radiology.

- Make use of imaging equipment providers' online training and education programmes. Learn new imaging techniques and protocols than can reduce repeat diagnostic scans and drive down power consumption. Plus reduce carbon footprints from travel to 'traditional' study days or industry

events and widens the reach of training benefits within a hospital department.

- Ensure that the creators of tenders and procurement professionals understand the energy efficiency of modern imaging equipment. For example, requesting efficiency metrics to evaluate competitor systems.

- Move towards new generation innovations and embrace AI. Modern technologies have been designed to be more energy and workflow efficient. Fewer repeat scans and lower dose are better for patients and better for the environment.

- Keep an eye on waste. Review if necessary, recycle and reuse strategies to eliminate waste in the department. This includes single use consumables, packaging on supplies and even the disposal strategies for old imaging equipment. Do you know how much gets recycled versus put into landfill?



A community of children just outside of their local school. These are just some of the children who can live healthier lives, with the CO2balance collaboration projects.

Step 5. The benefits of standardised medical imaging equipment

Uniformity equals scale, speed and less waste

Speed of access to modern imaging equipment is needed to catch up on Covid19 related imaging backlogs and decrease patient waiting times that existed even before the pandemic. Reducing choice of all the variable elements of imaging equipment and standardising the systems for routine patient diagnostic needs would give wider and quicker access to UK patient populations.

To use a car analogy, you wait longer and pay more when selecting bespoke features. The same is true of imaging equipment.

"It is estimated that carbon footprints of medical equipment can be reduced by a third when produced to a standard criterion. It can also greatly speed up

the manufacturing process giving hospitals and clinics much quicker access to much needed modern diagnostic imaging equipment. Sometimes there can be too many variables of bespoke imaging equipment available to the NHS. Meetings and steering groups to decide upon specifications and evaluate features can slow down the procurement process and then add time onto manufacture and set-up. Lean decision making often translates into lower cost, scale and lower carbon footprints." //

Mark Hitchman, Managing Director at Canon Medical Systems UK

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The NHS (National Health Service) logo at the Springfields Medical Centre in the centre of Warrington. Canon Medical UK support and work with the NHS throughout the United Kingdom and beyond.

Canon Medical Systems is the UK's only medical equipment provider to be a Carbon neutral business meeting all PAS2060 requirements by the British Standards Institute and monitored independently to Gold Standards for UN Global Goals.

As part of the UK diagnostic imaging supply chain, Canon Medical supports the NHS' aim to be net-zero carbon by 2040 and will guide its radiology customer community in playing its part to identify positive green change.

Canon's corporate philosophy is Kyosei — a Japanese word that means living and working together for the common good. This is a principle that is embraced by all Canon employees and shapes the mission and values. It embodies the company's goal of contributing to the prosperity of the world and the happiness of humanity. It means taking responsibility for the impact of our activities, respecting our customers, the communities and countries we operate within, as well as our natural environment.

With a 100-year pedigree, superior green credentials and a focus firmly on the future health of people and the planet, Canon Medical can advise and guide the UK Radiology community on how to start making progressive steps toward the NHS Carbon Zero targets. //

References

Recent clinical evidence is included for reference within this article.

¹ Delivering a Net Zero National Health Service, October 2020

² Diagnostics: Recovery & Renewal – Report of the Independent Review of Diagnostic Services for NHS England, October 2020

³ Delivering a Net Zero National Health Service, October 2020

⁴ Canon Medical UK Carbon Offset Reports produced by CO2Balance.

⁵ Canon Medical – https://global.medical.canon/products/magnetic-resonance/Vantage_Elan-Compact



To find out how to start saving your department and hospital CO2 emissions

Please contact Crawley CMSUK Headquarters, on 01293 653 700 or email marketing.UK@eu.medical.canon

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