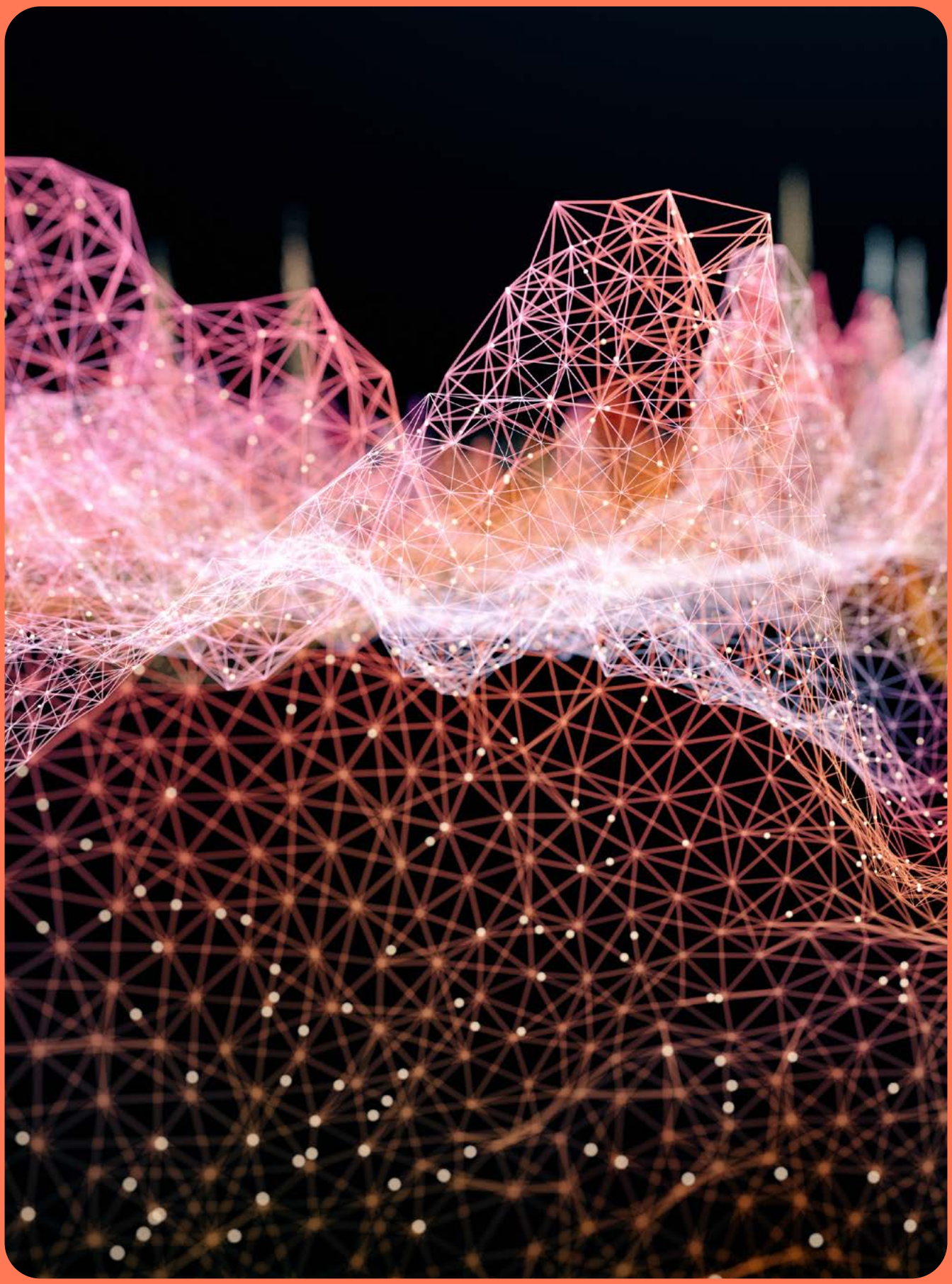
OpenRad Services UK

OpenRad

Exploring the Potential of Green Radiology

This white paper emphasises the need for radiology to become more sustainable and eco-friendly. Green radiology, exemplified by OpenRad Cloud, aims to reduce carbon emissions, conserve resources, and minimise ecological impact. Cloud-based PACS technology can help achieve these goals by reducing energy consumption, eliminating extensive hardware setups, and promoting remote work, thus reducing travel-related emissions and redundant examinations.

Embracing green radiology is crucial in addressing environmental challenges, with OpenRad envisioning a future where it becomes the norm. By adopting cloud-based PACS, radiology departments can actively contribute to environmental protection and a sustainable healthcare system, ensuring the wellbeing of both patients and the planet for future generations.



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Author

Our mission at OpenRad is to empower people to lead healthier lives through accessible and effective diagnostics. Yet climate change poses a threat to human health that cannot be ignored. As leaders in the hospital, radiologists are in a key position to be advocates for change.

That is why we have carried out in-depth research into the environmental issues facing healthcare and radiology and the way forward for the specialty to protect the health of citizens and the planet.

Green radiology is a movement that aims to reduce the carbon footprint of radiology departments and improve energy management. Also known as eco-radiology or sustainable radiology, its focus is on reducing the amount of energy used by equipment such as CT scanners, MRI machines, and workstations. However, there are many other ways to become greener in radiology departments such as recycling waste and reducing travel-related emissions.

Foreword

Dr Thomas Hartkens
— Director of Corporate Strategy

This paper summarises the key findings on the impact of radiology on the environment and sets out workable solutions for a greener radiology department.

At OpenRad we envisage a healthier future powered by intelligence and connectivity. This vision must include greener future for the health of all.

Dr Thomas Hartkens

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The biggest health threat to humanity

Climate change is a global health emergency with far-reaching impacts on public health.

According to the World Health Organization (WHO) climate change represents **the biggest health threat facing humanity**. It affects the social and environmental determinants of health and is expected to cause around 250,000 additional deaths per year between 2030 and 2050 from malnutrition, malaria, diarrhoea, and heat stress.

This will compound the existing burden of disease and exacerbate existing barriers to accessing health services, often at the times when they are most needed.

The world's temperature has risen more than 1°C from preindustrial levels (1880-1900) based on **data from the National Centers for Environmental Information**.

Already, climate change is leading to death and illness from increasingly frequent extreme weather events, including heatwaves, storms and floods, the disruption of food systems, and increases in zoonotic diseases (transmitted from animals to humans), plus food, water, and vector-borne diseases. It also contributes to **the prevalence of cardiovascular, respiratory, infectious and mental health issues**, disproportionately affecting children, the elderly, outdoor workers, and those with pre-existing health conditions.

These health outcomes are felt most acutely by people on low incomes and living in disadvantaged communities that are already at risk of chronic health conditions, further magnifying healthcare disparities worldwide.

Climate change undermines social determinants for good health, such as livelihoods, equality and access to health care, and social support structures. Areas with weak health infrastructure are the least able to prepare and respond to this threat.

250,000
additional deaths per year between 2030 and 2050 due to global warming

The Lancet says climate change is "the greatest global health threat facing the world in the 21st century, but it is also the greatest opportunity to redefine the social and environmental determinants of health."

The Intergovernmental Panel on Climate Change (IPCC) has concluded that to avert catastrophic health impacts and prevent millions of climate change-related deaths, the world must limit temperature rise to 1.5°C.

According to the **latest predictions from the World Meteorological Organization**, there is a 66% likelihood that the annual average near-surface global temperature between 2023 and 2027 will be more than 1.5°C above pre-industrial levels for at least one year.

Reducing emissions of greenhouse gases (GHGs) that accumulate in the atmosphere through better energy-use choices is vital for reducing climate change and improving health – particularly through reduced air pollution. Carbon dioxide emissions (CO_2) account for around **76% percent of total GHGs**.

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Climate change and healthcare

The health sector has the aim of protecting and promoting health – yet ironically it is a major contributor to the climate crisis.

Hospitals have a huge power consumption and carbon footprint, as well as generating a large amount of waste. **A report from Health Care Without Harm** estimated healthcare's global carbon footprint to be two gigatons of carbon dioxide equivalent (CO_2e), equating to 4.4% of global net emissions. This is equivalent to the annual greenhouse gas emissions from 514 coal-fired power plants.

The top three emitters, the United States, China, and the countries of the European Union (EU), comprise more than half the world's total health care climate footprint (56%). The US healthcare system is **the world's top emitter** in both absolute and per capita terms, generating **9.8% of the country's GHGs**.

There is a growing awareness of the need for environmentally practices in healthcare. Around the world, organisations are being founded to tackle this problem in healthcare and there are several campaigns for environmentally friendly and sustainable hospitals including **Practice Greenhealth**, Green Health by the World Medical Association, Health Care Without Harm, and the Healthier Hospital Initiative.

Governments are increasingly producing guidelines on sustainability for healthcare, such as the UK's **'For a Greener NHS'** programme which launched in January 2020 and the ***Delivering a Net Zero National Health service*** report. This sets out statutory guidance on how to become net carbon zero by 2040 for emissions the NHS controls directly and net zero by 2045 for the emissions the NHS has the ability to influence.

Many hospitals worldwide are required to audit and optimise their resource consumption. Relevant legislation includes **IEC 60601-1-0**, which requires manufacturers to consider the environmental impact of their devices throughout the products' life cycles and **ISO 14001**, which is widely considered the most important environmental certification.

Hospitals have the potential to make a significant impact on climate change. Every 10,000 kWh of energy saved in a hospital is equivalent to removing 1.4 cars from the road, preventing the production of around 7.5 tons of carbon dioxide, 58 kg of sulphur dioxide and 25 kg of nitrogen oxide, according to the report ***'Energy efficiency of Colorado Hospitals'*** by McClearn PB.

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Environmental impact of radiology

The radiology department is one of the most power-hungry departments in a hospital, as the specialty is highly reliant on technology.

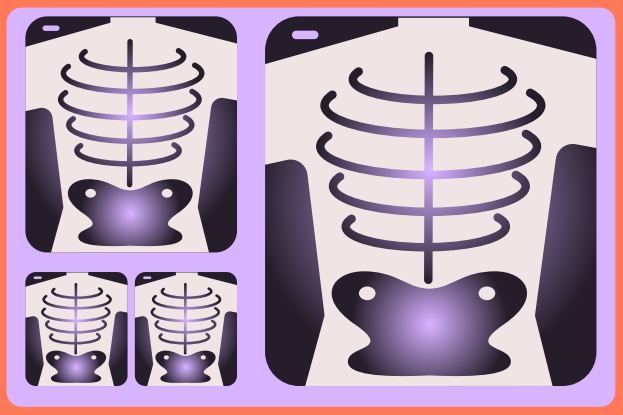
It uses numerous high-energy consuming equipment including computed tomography (CT), magnetic resonance imaging (MRI), PET-CT, interventional radiology suites and angiography.

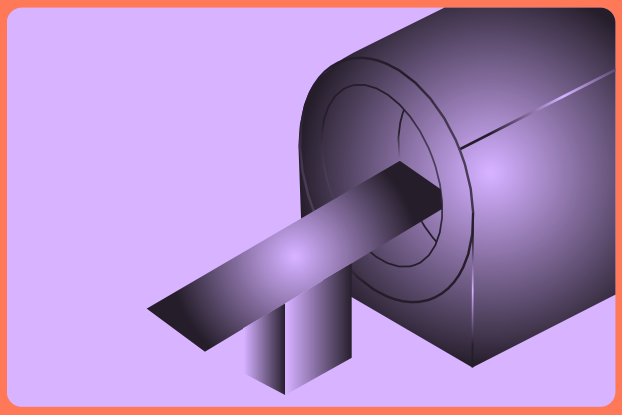
Radiologists are coming together to talk about the topic of climate change and recognising that as a specialty which interacts with multiple other hospital departments, there is an opportunity to lead the way when it comes to environmental issues in healthcare.

Organisations such as the **Royal College of Radiologists**, the **Radiological Society of North America**, and **Sociétē Française de Radiologie** have announced commitments towards tackling climate change and networks such as **Radiologists for a Sustainable Future** have emerged focused on the issue.

The European Coordination Committee of the Radiological, Electromedical and Healthcare IT industry (COCIR), has launched a **self-regulatory initiative**, which focuses on participating in eco-design in the medical device industry.

Improving the energy efficiency and sustainability of radiology has the potential to help protect vulnerable populations, improve healthcare delivery, and increase the value of care.





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MRI and CT scanners and their associated heating, ventilation, and air conditioning (HVAC) and lighting account for 525,600 kWh per year and 200,020 kWh respectively, according to the study Environmental impacts of abdominal imaging: a pilot investigation (Martin M et al, 2018).

Imaging equipment

The study ***The energy consumption of radiology: energy and cost-saving opportunities for CT and MRI operation*** (Heye et al, 2020) measured the energy consumption of modern CT and MRI scanners at the radiology department at University Hospital Basel in Switzerland, and estimated energy and cost-saving potential during clinical operation. They found that operation requires energy in the range of 0.5-30 kWh per examination, with peak consumption reaching beyond 100 kWh for a short time period. Three CT and four MR scanners accounted for 4% of the hospital's energy use, equating to the energy requirements of a town of 852 people living in four-person households.

Additionally, two-thirds of the energy requirements of the CT scanners took place in the non-productive idle state. Meanwhile, for MRI, one third of energy consumption was attributed to the cooling state owing to the need for constant helium cooling and cooling head operation. This required a comparable amount of energy to operating the MRI scanners.

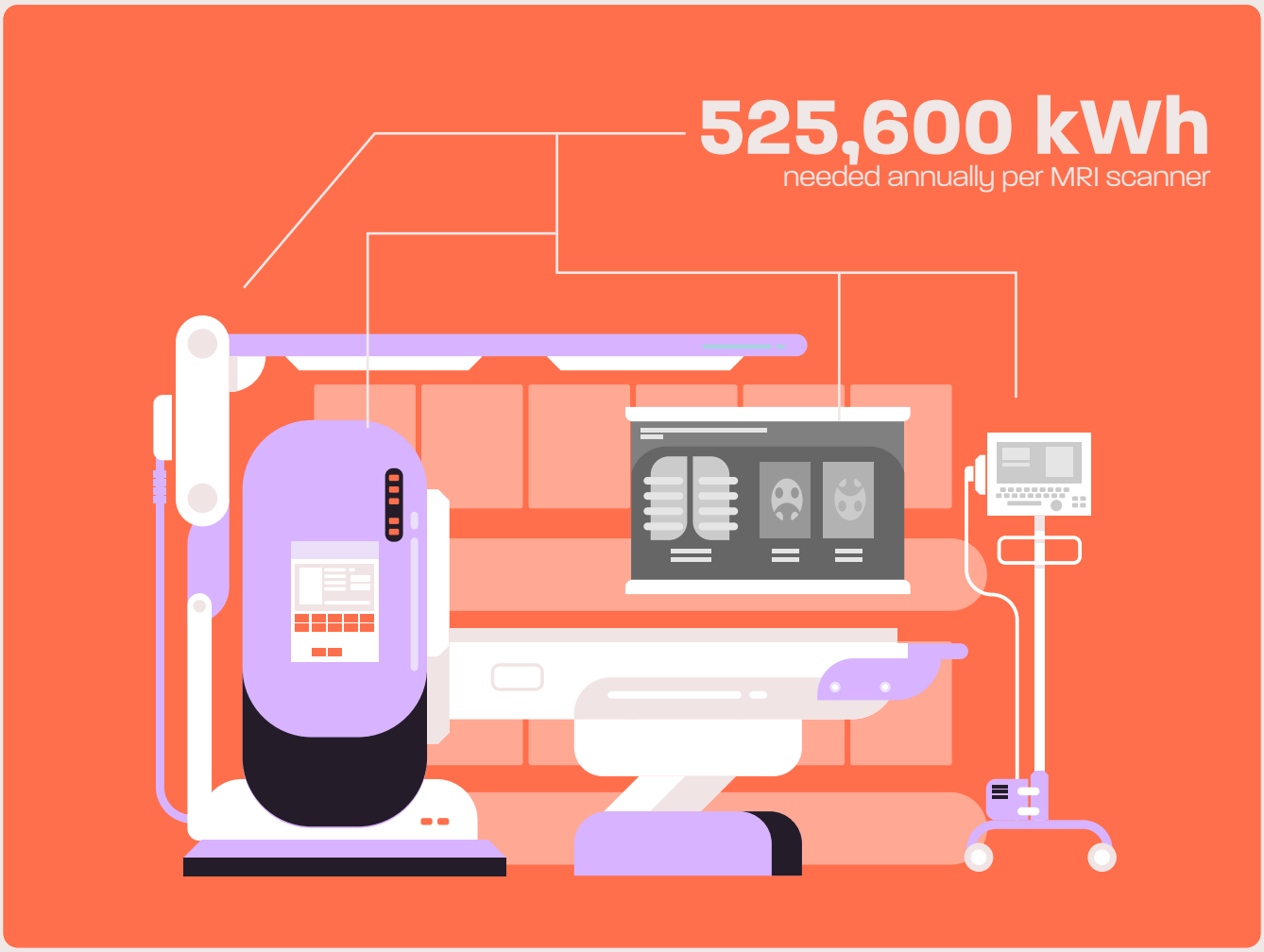
Heye et al concluded that CT and MRI energy consumption is considerable and cost-saving potential is present during non-productive idle and system-off modes. Increasing energy efficiency could be achieved by decreasing scanner energy consumption during non-productive idle and system-off states, which would need to be addressed by vendors. The introduction of power-down or standby modes could allow for savings in CT scanners.

Another solution to save energy in radiology departments is increasing the period of utilisation of scanners per time period. This would involve improved workflow and optimised patient output in radiology departments so that a larger proportion of the energy is spent when the scanners are in productive states.

Other solutions would involve designing radiology departments to facilitate synergetic use of cooling systems or scanner architecture, and the use of waste heat recovery methods such as heat transfer by heat pipes or heat-storing technology to recycle heat-related energy.

In an **essay on radiology and eco-responsibility**, Salah D. Qanadli, professor at the University of Lausanne says that the Centre Hospitalier Universitaire Vaudois (CHUV), in Lausanne, has been able to reduce its electricity consumption over the last five years while the hospital's activity has continued to increase by optimising the energy consumption of air-conditioning installations and the image archiving and transmission system.

There have also been some efforts from vendors to reduce the power consumption of CT and MRI scanners and fluoroscopy suites. For example, a **partnership between Siemens and the University of California San Francisco** is researching sustainability and accessibility in medical imaging using new Siemens scanner technology.
In addition to reducing the energy consumption of scanners, it is also important that clinicians have awareness of the impact of different modalities when indicating an examination, so they can consider energy consumption. Different imaging technologies, such as X-ray, CT scan, MRI, and ultrasound, have different levels of energy consumption and environmental impact. For instance, MRI scanners use considerably more energy than most other imaging modalities. If clinicians are aware of these differences, they can take them into account when deciding on an appropriate imaging modality as well as considering the patient's condition and the diagnostic value of the test. When multiple modalities could provide similar diagnostic value, they might opt for the one with less environmental impact.



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Use of rare resources

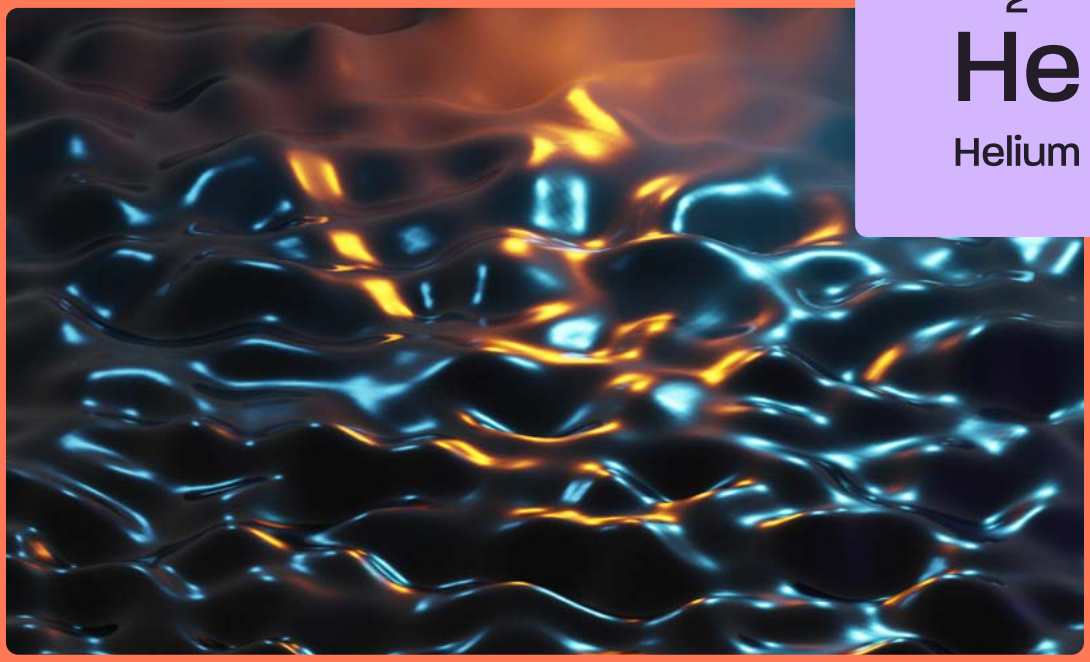
Radiology devices use rare resources, including helium in MRI scanners and gadolinium which is used as a base for MRI contrast agents.

Helium plays a crucial role in MRI systems as it is used to cool the superconducting magnets that are a key component of the device. However, helium is a non-renewable fossil resource, and its extraction, distribution, and use have environmental implications. Extracting helium often involves natural gas production, contributing to GHG emissions.

Gadolinium is a rare earth metal and is not a renewable resource. The extraction of gadolinium has a high environmental cost, resulting in the release of radioactive elements such as thorium and uranium into the environment.

According to the paper ***Radiology and Eco-responsibility (SFR)***, radiology accounts for 5% of global consumption of gadolinium. A radiology department consumes on average around 2 kg of gadolinium per MRI scanner each year with an average of 15% being unused in syringes and being disposed of. The substance is then urinated by patients and released into the environment.

The paper goes on to outline possible solutions including the recycling of unused doses and the recovery of urine from hospital radiology and cardiology patients who have received an injection of iodinated contrast products. These solutions are being developed by researchers working on the **Medical Gadolinium Recycling (Megadore) project** at the University of Western Brittany in France.



2
He
Helium

64
Gd
Gadolinium

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Environmental impact of reporting stations

In addition to imaging devices, the IT installed in radiology departments also consumes a lot of energy.

Reporting stations represent a significant energy consumption, which is sometimes overlooked. Radiologists use sophisticated workstations with Picture Archiving and Communications Systems (PACS) with high-powered graphics cards for viewing images and clinical information systems (CIS) which require multiple specialised monitors for image analysis. These use more energy than standard personal computers.

Although this may seem insignificant in relation to hardware such as MRI and CT scanners, it provides an opportunity to reduce the overall power consumption of the radiology department by turning them off when not in use or reducing their usage through cloud-based systems.

Several studies (cited here) have noted that a large cause of energy consumption comes from leaving workstations on when they are not in use. In the ***'Green Fingerprint Project: Evaluation of the Power Consumption of Reporting Stations in a Radiology Department'*** (Hainc et al, 2019), researchers sought to quantify the power or energy consumption of reporting stations in a radiology department and consider a hypothetical scenario to reduce waste. They measured the energy consumption of 36 radiology reporting stations over a mean time frame of about 194 days and then extrapolated results to one year.

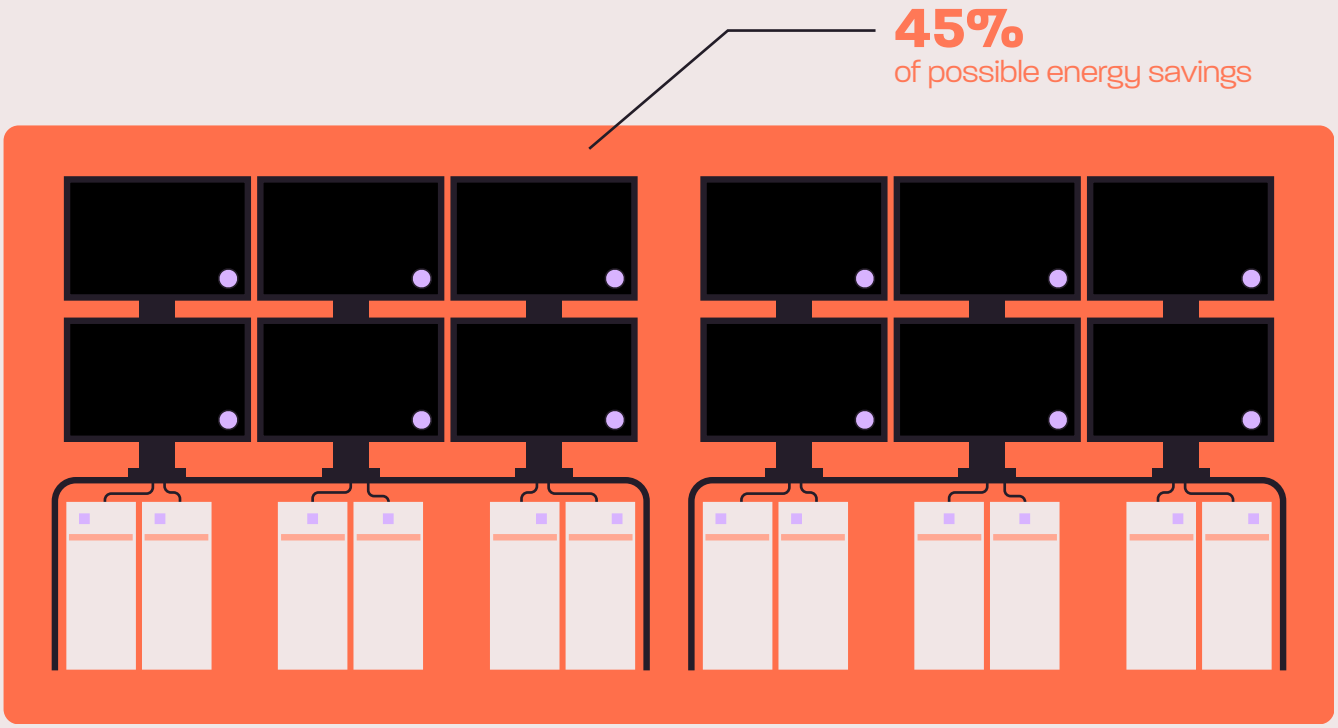
Each reporting station comprised of two reporting monitors, one radiology information system (RIS) monitor, a workstation associated with the monitors, a docking station for charging phones and sometimes a desktop lamp. Researchers noted that these workstations tend to be left on all the time for convenience, even when not in use. They found that half the energy consumption from reporting stations was from when they were turned on but not in use. This accounted for 18,243 kWh of wasted energy. Hainc et al estimated how much energy could be saved if workstations were turned off.

The study found that reporting stations entered a standby mode after four hours on inactivity, accounting for used 10,010 kWh/a. Researchers calculated that a hypothetical scenario in which standby mode was skipped and the reporting station was shut down after one hour of inactivity could achieve an energy consumption saving of 23,692 kWh/a – a reduction of about 45% of the initial energy consumption, equivalent to five households. They concluded that simple changes in device configuration could reduce energy waste in the radiology department and result in long-term energy savings.

The study ***'Greening Radiology'*** (Prasanna et al, 2011) aimed to assess workstations and monitors throughout a radiology department at University of Maryland School of Medicine in Baltimore/USA, to determine their electrical consumption, cost, and the potential for energy savings. Researchers found the largest electrical savings were made when computers and monitors were turned off at the end of the workday and during weekends. They concluded that if all reporting stations in a radiology department were shut down after an eight-hour workday it could save 83,866.6 kWh/a, equivalent to taking 11.6 cars off the road.

Another study of a radiology department at St. Vincent's University Hospital in Dublin, Ireland, ***'EcoRadiology'- pulling the plug on wasted energy in the radiology department'*** (McCarthy et al, 2014), found that 29 of 43 desktop computers and 25 of 27 PACS reporting stations were left on needlessly overnight and/or at weekends. Researchers found that this use of desktop computers left on amounted to 25,040 kWh of energy in a year – producing 17.7 metric tons of carbon dioxide – equivalent to the emissions from four cars in a year. Meanwhile PACS stations left on wasted 47,490 kwh a year – equivalent to seven cars.

The essay ***'Greening the Radiology Department: Not a Big Mountain to Climb'*** (Chawla et al, 2017) published in the Canadian Association of Radiologists Journal, estimates that each radiology workstation consumes around 400-650W of power. A single workstation left on 24 hours a day, seven days a week would annually consume 455.65 to 2,358.72 kWh. Therefore, Chawla et al recommend shutting down workstations to save significant energy and associated cost.



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The role of innovative technology in solutions

The role of emerging technologies in enhancing the sustainability of radiology cannot be overstated.

Digitalisation and cloud-based systems are minimising the need for physical resources, such as DVDs and reducing energy usage by eliminating the need for on-site servers. Also, teleradiology and virtual consultations reduce travel-related emissions and make healthcare more accessible. These innovations, coupled with a commitment to sustainable practices, are paving the way towards a more environmentally friendly future for radiology.

One example of this is cited in the paper ***Radiology and Environmental Responsibility: The Canadian Perspective*** (Soulez), which suggests that a user-friendly web-based appointment booking system with interoperability for appointment booking in other specialties could allow the synchronisation of imaging examinations with different medical sites. It argues this not only reduces the carbon footprint but significantly improves the quality of service to patients.

Also, advanced AI and machine learning algorithms are optimising imaging protocols and reducing scan times, leading to lower energy consumption. For example, the opinion piece ***Radiology in Our Changing Climate: A Call to Action*** (Schoen et al, 2021) argues that shortening MRI protocols with AI algorithms such as the **NYU FastMRI data set** could result in decreased energy use. It also advocates for regularly powering down workstations to improve energy efficiency, referring to leaving on workstations as "one example of many common wasteful practices that do not add value to patient care."

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The environmental benefit of cloud solutions

Although several studies mentioned earlier have pointed to the need to turn off reporting stations when not in use, this is not always achievable for several reasons.

One difficulty with this is the 24/7 nature of hospitals – means it is not possible to turn off all computers and PACS upgrades often happen overnight.

Another problem noted by **McCarthy et al** is that radiologists reported being reluctant to turn off workstations because they could take more than five minutes to start up when switched back on, resulting in delays. They note that despite an educational session encouraging staff to turn off computers when not in use, a reaudit 18 months later found no improvement in results. In fact, there had been a slight increase in the number of PACS workstations left on overnight. McCarthy et al suggest this could be tackled by upgrading equipment to support a sleep mode, which switched the machine into an energy-saving mode with a faster restart. Another solution they suggest is cloud computing, which offers the prospect of energy savings by transferring data applications to energy-efficient data centres.

Hainc et al also note that the centralisation of radiology reporting through teleradiology solutions could result in energy savings as it uses one or more radiologist at a central hospital interpreting images acquired from multiple hospital sites, reducing the use of workstations and transport-related emissions.

The use of cloud solutions instead of local servers could reduce the carbon footprint by 70% for small and medium-sized enterprises according to the report ***The usage and adoption of cloud computing by small and medium businesses*** by Gupta et al.

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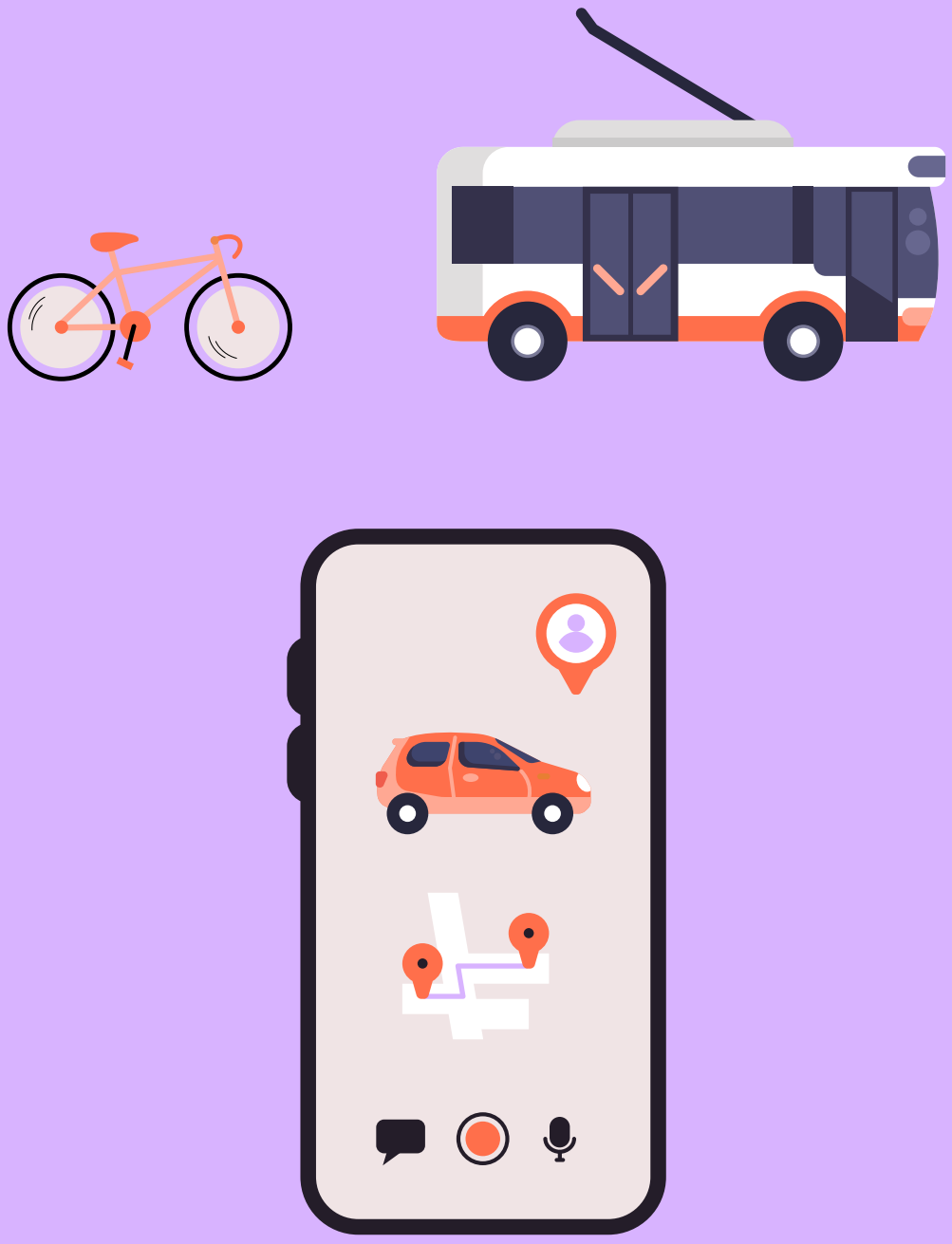
Transport-related emissions

Transport-related emissions significantly contribute to the environmental footprint of radiology departments.

The daily commuting of staff and patients, particularly by single-occupancy vehicles, involves substantial amounts of energy and results in sizable carbon emissions. A reduction in these emissions could be achieved through strategies encouraging the use of public transportation, cycling, or carpooling among staff and patients.

Telemedicine also offers a solution to the issue of travel-related emissions by allowing remote working and patient consultations. The study ***Does telemedicine reduce the carbon footprint of healthcare? A systematic review*** (Purohit et al, 2021), concluded that telemedicine could play a valuable role in the transition to a net carbon-zero healthcare system, primarily by a reduction of transport-related emissions. It found that carbon footprint savings range between 0.7 and 372 kg CO_2e per consultation, with the emissions of the telemedicine systems themselves found to be low in comparison to the savings from travel reductions.

The use of cloud-based reporting solutions such as **OpenRad Cloud (by Biotronics3D)** allows radiologists to work remotely, reducing the need for travel and transport-related emissions.



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OpenRad's enterprise remote reporting platform

OpenRad's remote reporting platform **OpenRad Cloud (by Biotronics3D)** provides a workstation for radiologists in an eco-friendly green cloud. The solution utilises cloud providers that use 100% green energy. This means that radiology departments no longer have to be reliant on individuals switching off their workstations in order to save energy and CO_2 emissions. The entire power consumption is done in the data centre, so it is much more eco-friendly.

OpenRad Cloud increases efficiency, improves patient experience, and reduces costs by enabling seamless utilisation of both in-house and external reporting resources, whilst leveraging the economies of scale, rapid deployment, and security protection afforded by the cloud.

The solution integrates patient and referrer portals with a diagnostic viewer including 3D–native functionality. The client includes advanced visualisation applications together with workflow and reporting as well as a dedicated teleradiology module which supports sub-specialty reporting, resource load balancing, and an enterprise worklist.

It can be accessed on any device via a standard web browser, and because it is a thin-client, only pixels are streamed, and no data is transferred. This means it is totally secure and incredibly fast.

OpenRad Cloud
by Biotronics3D

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Radiology clinic case study: by Dr Thomas Constantine, Director of Coastal Medical Imaging

Coastal Medical Imaging is a small service providing non-obstetric ultrasound (NOUS) in South Wales, so our impact is small. However, being sustainable and green is something that we have built into our company's ethos from when we started up in 2022.

Working in the healthcare sector, we strongly believe in safeguarding not only our patients' current health but also the health of future generations. On a personal level, I have two children and a family, so it is important to me to conduct business ethically. Trying to reduce carbon to net zero is one of the ways to achieve this.

We formalised our commitment to running a green clinic with a written sustainability policy soon after opening and began crafting our carbon reduction plan. As a startup, we grappled with identifying our initial carbon emissions, but as we stabilised operations, we have been gradually forming a clearer picture of our environmental impact.

The time when we really started to focus our attention on sustainability was when we applied for a framework agreement that allows us to bid for tenders for outsourcing from the local public sector. This required us to commit to a net zero carbon target by 2050 and to reduce our carbon emissions by 20% within the first five years of our plan. The process was challenging due to our short operational history, but it opened our eyes to an important realisation: sustainable decisions often make commercial sense, too.

One of the first steps we took was to condense our clinics into fortnightly, extended sessions, significantly reducing energy consumption and travel emissions. Compared to the long waiting time in the public sector, patients are happy to wait a few more days for their scan. It means that we are now using the building much less and sonographers are not coming to and from the clinic using fossil fuels in their cars. Also, the ultrasound machine is on much less. That is one example of how we have made a commercial decision that has also been in line with reducing carbon emissions.

Our commitment to sustainability extends to our equipment, too. Our clinic has a single ultrasound machine that we can easily switch on and off to minimise energy consumption. We are proud that our electricity tariff comes from a 100% renewable source, and we are exploring options to reduce our gas usage, potentially even switching to an electricity source for heating the building.

In the future, we plan to integrate MRI scanners, which will undoubtedly pose new challenges due to their high energy needs. We are contemplating a mobile unit, but we need to consider the carbon emissions implications of its transport. This adds another layer of complexity to our operations, but we are determined to find the most sustainable solution by offsetting the energy that we use.

Our workstations are another area where we have been able to reduce our carbon footprint. We have two workstations at the clinic: one for reporting and one for the reception. Utilising the **OpenRad domestic cloud platform** means there is no need for an on-site server room with electricity-guzzling computers. We also have no requirement for an on-site radiologist to report or provide support, as this can be done remotely.

My advice to anyone considering setting up a radiology clinic would be to ensure that sustainability remains a core ethos from the start. Using companies like OpenRad that have a cloud-based system not only saves time and money, but also reduces your carbon emissions and electricity. Finding solutions that allow people to work remotely also helps you to be sustainable in what you do.

As we continue to grow and expand, we are committed to remaining true to our green roots, making decisions that are environmentally conscious.

Dr Thomas Constantine
— Director of Coastal Medical Imaging

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Conclusion

The evolution of radiology towards a more sustainable, greener future is not just a possibility – it is a necessity.

As our understanding of environmental impact of healthcare grows, we must apply this knowledge in all specialties, including radiology.

Throughout this white paper, we have explored the various aspects of green radiology and its potential to revolutionise the field. From energy-efficient imaging equipment to streamlined workflows and optimised resource management, the principles of green radiology provide a roadmap for reducing carbon emissions, conserving resources, and mitigating the environmental impact of radiological practices.

Although there are challenges to overcome, the integration of innovative technology like cloud-based PACS into radiology departments shows a promising path forward.

OpenRad Cloud (by Biotronics3D) is a transformative solution, shifting the paradigm from traditional, energy-intensive imaging processes towards more sustainable practices. Its digital nature drastically reduces the need for physical workstations, thereby decreasing carbon footprint. By centralising and digitising image archiving and communication, it mitigates the need for extensive hardware setups.

Cloud-based PACS are also scalable and accessible, which extends their environmental benefits. They allow for worldwide accessibility, reduce redundant examinations by enabling easy access to past scans, and allow remote working – significantly cutting down on travel-related emissions.

Green radiology, enhanced by innovations like cloud-based PACS, signifies the specialty's collective commitment to protecting the environment and ensuring the sustainability of global healthcare systems. This aligns with OpenRad's vision to empower people to lead healthier lives.

OpenRad

In the face of mounting environmental challenges, embracing green radiology offers a hopeful path forward. At OpenRad we envision a future where green radiology is the norm rather than the exception and our healthcare systems function in harmony with the planet. Cloud-based PACS is a critical step in this journey, bringing us closer to that sustainable future.

The role of radiology departments in this transition is not passive, we must actively seek, support, and implement these sustainable solutions. By making a commitment to green radiology, we have the power to help mitigate climate change and safeguard our planet for future generations while ensuring the wellbeing of patients today.

If you would like to find out more about our carbon-zero cloud-native solutions, please contact us via email to **welcome@openrad.com**.

More info on **www.openrad.com**

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Practical tips to reduce the environmental impact of radiology

A simple to-tick-off list

Digital transition

Go paperless where possible. Digitise records, reports, and communications to reduce paper waste. Use digital imaging and electronic health records. Eliminating data carriers, such as DVDs, is a major contribution to reducing waste.

Efficient equipment

Use energy-efficient radiology equipment. Regularly maintain and service machines to ensure they run optimally and use less power.

Green IT

Use energy-saving computers and servers, and consider cloud solutions, such as OpenRad Cloud, to reduce the need for physical storage.

Recycle

Implement a recycling program for both clinical and non-clinical waste. This includes everything from paper and plastic to old equipment and electronics.

Minimise single-use items

Wherever possible, use reusable items instead of single-use ones. If disposables must be used, opt for those made from recycled or biodegradable material.

Sustainable procurement

Purchase from suppliers who demonstrate a commitment to sustainable practices. This could include their manufacturing process, supply chain, or the materials they use.

Travel reduction

Encourage remote working and tele-radiology to minimise travel for both staff and patients. Also, promote the use of public transport, cycling, or walking to the clinic.

Education and training

Provide staff with regular training on sustainable practices and encourage them to contribute ideas on how to further reduce the department's environmental impact.

Sustainability assessments

Sustainability assessments should be conducted on a regular basis to understand the environmental impacts of radiology practices and to take action to reduce these negative environmental impacts.

Waste segregation

Segregate waste appropriately to ensure it is disposed of or recycled in the most efficient way.

Offset carbon emissions

Consider investing in carbon offset programs and renewable energy projects. If possible, use an electricity tariff that comes from a 100% renewable source.

Green building design

If you can do so, consider the building's design. Energy-efficient lighting, proper insulation, and efficient HVAC systems can significantly reduce energy consumption.

Energy audit

Conduct an energy audit to identify where wastage is occurring and take steps to address it.

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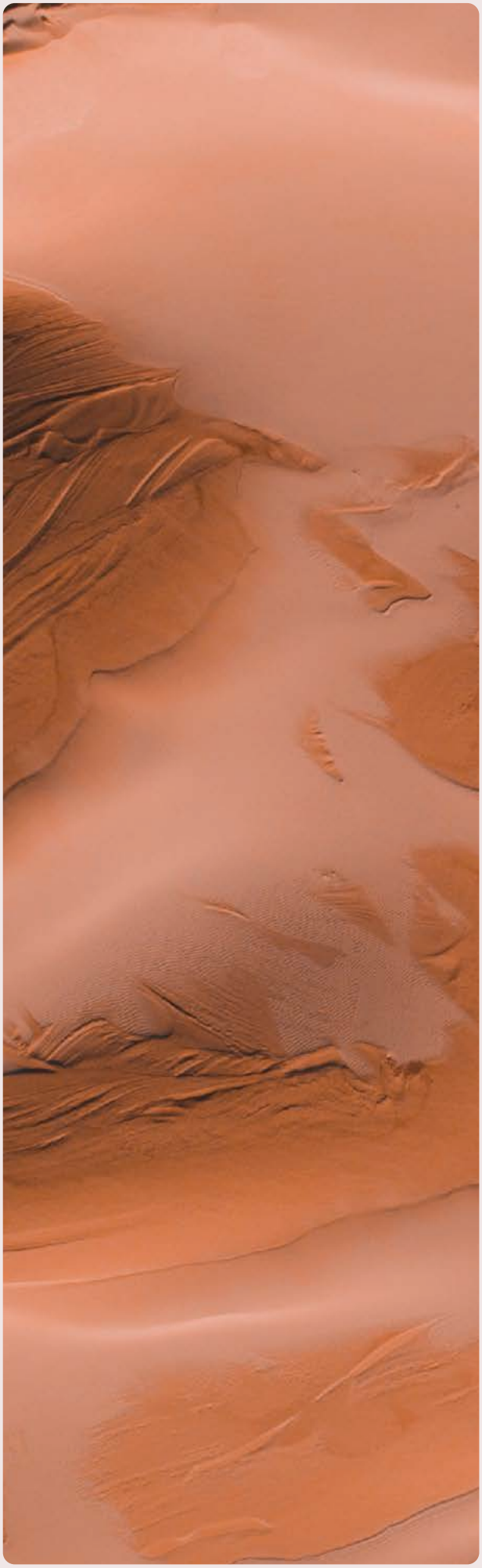

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